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The Treaty on Non-Proliferation of Nuclear Weapons: Nuclear Technology Confronts World Politics

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I ask you to stop and think for a moment what it would mean to have nuclear weapons in so many hands, in the hands of countries large and small, stable and unstable, responsible and irresponsible, scattered throughout the world.¹

President John F. Kennedy

From the dawn of the nuclear era, the problem of nuclear weapons proliferation has confronted the nations of the world. Since 1945, despite continuing efforts to prevent further proliferation, there has been a five-fold increase in the number of nations having nuclear weapons of their own. At last, after long and arduous negotiations, the United States and the Soviet Union have reached agreement on a "Treaty on the Non-Proliferation of Nuclear Weapons."² This Treaty represents "the maximum area of agreement now obtainable."³ It has

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1. A Step Toward Peace: Report to the People on the Nuclear Test Ban Treaty, DOCUMENTS ON DISARMAMENT, 1963, at 250 (U.S. Arms Control & Disarmament Agency Pub. No. 24, 1964).

2. The complete Treaty did not emerge until June 10, 1968. U.N. General Assembly, A/RES/2373(XXII), Annex, U.N. Doc. A/7016/Add.1, Annex, June 10, 1968.

3. Statement of United States Representative to the Eighteen Nation Disarmament Committee (ENDC). Eighteen Nation Disarmament Conference Procès Verbale 378 (prov.), at 23 [hereinafter cited as ENDC/PV].

been widely discussed in the Eighteen Nation Disarmament Committee in Geneva,⁴ the NATO Council in Brussels,⁵ and the United Nations

Agreement was first reached between the United States and the Soviet Union on a draft Treaty on August 24, 1967, at the Eighteen Nation Disarmament Committee. The draft was complete in all major respects except for Article III, dealing with safeguards on peaceful nuclear activities. The Soviet Union insisted at that time, perhaps in a peculiar application of a principal of separate and equal, on tabling identical drafts rather than one agreed draft. For the treaty draft of August 24, 1967, see DOCUMENTS ON DISARMAMENT, 1967, at 338 (U.S. Arms Control & Disarmament Agency Pub. No. 46, 1968) [hereinafter cited as DOCUMENTS ON DISARMAMENT, 1967]. Speeches by United States and Soviet Union Representatives to the ENDC at the time of tabling are reprinted in *id.* 342, 347.

A second set of identical drafts was tabled by the United States and the Soviet Union at the ENDC on January 18, 1968. For text see ENDC/192/Rev.1. For the United States and Soviet Union tabling speeches, see ENDC/PV.357. The January 18, 1968, draft included Article III and also incorporated as amendments certain suggestions of other delegations to the ENDC made during intervening discussion of the August 24, 1967, draft.

A third agreed draft was presented by the United States and the Soviet Union to the ENDC on March 11, 1968, which incorporated certain minor changes in light of discussions since the second draft had been tabled. ENDC/225, Annex A. For the United States and Soviet Union tabling speeches, see ENDC/PV.376. Article IX, paragraph 2, in which the names of Depositary Governments were to be specified, was still blank. Previously, on March 7, 1968, the United States, the Soviet Union, and the United Kingdom had presented to the ENDC a draft resolution of the United Nations Security Council on security assurances to non-nuclear-weapon states. ENDC/225, Annex B. For tabling speeches of the United States, the Soviet Union, and the United Kingdom, see ENDC/PV.375. The March 11, 1968, draft Treaty and March 7, 1968, draft Security Council resolution were submitted by the ENDC in its report to the United Nations General Assembly on March 14, 1968, and, thereafter, were discussed primarily in the First Committee (Political and Security) of the resumed 22d Session of the General Assembly, which convened on April 26, 1968. In light of these discussions, on May 31, 1968, certain changes were agreed to by the United States and the Soviet Union and incorporated into the June 10, 1968, Treaty text.

Most of the public documents dealing with non-proliferation and the Treaty are collected in DOCUMENTS ON DISARMAMENT, a series compiled and issued annually by the United States Arms Control and Disarmament Agency. An excellent historical account of the Non-Proliferation Treaty, issued under the auspices of the U.S. Arms Control and Disarmament Agency is LAMBERT, EFFORTS TO PREVENT THE SPREAD OF NUCLEAR WEAPONS (1968). The story of post-World War II arms control negotiations in general, up to 1961, is authoritatively and readably told in B. BECHHOEFER, POSTWAR NEGOTIATIONS FOR ARMS CONTROL (1961). See also KLEIN, L'ENTREPRISE DU DÉSARMEMENT DEPUIS 1945 (1964); OFFICE OF PUBLIC INFORMATION, THE UNITED NATIONS AND DISARMAMENT 1945-1965 (United Nations, no date).

4. The ENDC was established by agreement between the United States and the Soviet Union and endorsed unanimously by the U.N. General Assembly on December 20, 1961. 16 U.N. GAOR 1129, A/RES/1722(xvi), Jan. 3, 1962; DOCUMENTS ON DISARMAMENT, 1961, at 741 (U.S. Arms Control & Disarmament Agency, Pub. No. 5, 1961). The Committee is composed of five NATO members: Canada, France, Italy, the United Kingdom, and the United States; five Warsaw Pact members: Bulgaria, Czechoslovakia, Poland, Rumania, and the Soviet Union; and eight non-aligned nations: Brazil, Burma, Ethiopia, India, Mexico, Nigeria, Sweden, and the United Arab Republic. France has never taken part in the meetings. The United States and the Soviet Union serve as permanent co-chairmen. The Committee first convened on March 14, 1962. The basis for discussion was a United States-Soviet Union "Agreed Statement of Principles" for future multilateral negotiations on disarmament. Paragraph 8 of the Joint Statement stated in part: "States participating in the negotiations should seek to achieve and implement the widest possible agreement at the earliest possible date." Under the rubric of this paragraph, a Committee of the Whole was established (since discontinued) to discuss so-called "collateral measures." The Committee of the Whole agreed on May 25, 1962, to begin "concurrent" discussions on two proposals. The United States' item was reduction of the risk of war by accident, miscalculation, or failure of communications; the Soviet Union's item was non-proliferation of nuclear weapons, which at the time meant little more than an excuse for propaganda attacks against West Germany. DOCUMENTS ON DISARMAMENT, 1963, at 544 (U.S. Arms

General Assembly in New York. Moreover, on June 12, 1968, the Treaty was commended in a resolution of the United Nations General Assembly—adopted by a vote of 95 in favor, 4 against and 21 abstaining⁶—and on June 19, 1968, in conjunction with the Treaty, a resolution on “security assurances” was adopted by the Security Council.⁷ Now each nation must decide whether or not to become a party.⁸

A goal of overriding importance in the nuclear era is the avoidance of nuclear war.⁹ A flat prohibition on the further spread of nuclear

Control & Disarmament Agency Pub. No. 24, 1964). As of March 14, 1968, when it adjourned for discussion of the Non-Proliferation Treaty in the General Assembly, the ENDC had held 379 plenary meetings divided into 13 sessions. Much in addition to non-proliferation has been discussed, but the Non-Proliferation Treaty is clearly the Committee's major accomplishment to date.

5. An account of NATO consultations regarding the Non-Proliferation Treaty is contained in *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 29-30 (1968).

6. For text see A/RES/2373(xxii), U.N. Doc. A/7016/Add.1, at 5, June 10, 1968. Four members were absent at the vote. Those against were Albania, Cuba, Tanzania and Zambia. Among the abstentions were Argentina, Brazil, France, India and Spain. The first three operative paragraphs of the resolution are:

“1. *Commends* the Treaty on the Non-Proliferation of Nuclear Weapons, the text of which is annexed to the present resolution;

“2. *Requests* the Depositary Governments to open the Treaty for signature and ratification at the earliest possible date;

“3. *Expresses the hope* for the widest possible adherence to the Treaty by both nuclear-weapon and non-nuclear-weapon States”

In a previous resolution of November 19, 1965, the General Assembly had urged “the early conclusion” of a non-proliferation treaty which should “be void of loop-holes” and should “embody an acceptable balance of mutual responsibilities and obligations of the nuclear and non-nuclear Powers.” A/RES/2028(xx), Nov. 23, 1965; DOCUMENTS ON DISARMAMENT, 1965, at 532 (U.S. Arms Control & Disarmament Agency Pub. No. 34, 1966) [hereinafter cited as DOCUMENTS ON DISARMAMENT, 1965]. At the resumed 22d Session of the General Assembly, the Treaty was criticized by many non-nuclear-weapon states mainly because it violated, in their view, the principle of “balance” of obligation of non-nuclear and nuclear states.

7. The vote was 10 in favor, 0 against and 5 abstentions. Among the abstentions were France and Pakistan. S/RES/255, June 19, 1968. For text of operative paragraphs see note 154 *infra*.

8. On May 17, 1966, the Senate approved without a dissenting vote a resolution sponsored by Senator Pastore, Chairman of the Joint Committee on Atomic Energy, which recognizes that “the spread of nuclear weapons constitutes a grave threat to the security and peace of all nations,” and commends “the President's serious and urgent efforts to negotiate international agreements limiting the spread of nuclear weapons and supports the principle of additional efforts . . . for the solution of nuclear proliferation problems.” S. Res. 179, 89th Cong., 2d Sess. (1966). For hearings on this Resolution see *Hearings on Nonproliferation of Nuclear Weapons Before the Joint Comm. on Atomic Energy*, 89th Cong., 2d Sess. (1966).

A conference of non-nuclear-weapon states, not limited to U.N. members, is scheduled to be held in Geneva, August 29–September 28, 1968, pursuant to General Assembly resolution. A/RES/2346(xxii), Jan. 5, 1968. Topics on the agenda will include: (1) methods of assuring the security of non-nuclear-weapon states, (2) implications of the production and acquisition of nuclear weapons by non-nuclear-weapon states, (3) prevention of proliferation through cooperation among non-nuclear-weapon states, (4) programs for the peaceful uses of nuclear energy, and (5) implementation of conference decisions.

9. For a dispassionate and revealing assessment of the effects of a variety of possible uses of nuclear weapons, including a summary of the effects of the Hiroshima and Nagasaki drops, see Report of the Secretary-General, *infra* note 14, at 6-28. The classic work in the field is *THE EFFECTS OF NUCLEAR WEAPONS* (Glasstone ed. 1962), issued jointly by the AEC and the Department of Defense.

weapons to additional states seems justified as the preferred policy when it is weighed against other alternatives in relation to this goal. Moreover, even though non-proliferation itself is not likely to reduce the present risk of nuclear war, a general non-proliferation policy may be justified as perhaps the only means of buying the time needed to take further steps which might lead to a significant reduction in that risk.¹⁰

The principal aim of the Non-Proliferation Treaty is to prevent the present five nuclear-weapon states¹¹ from increasing to ten or fifteen in the future.¹² At the same time, the Treaty is intended to permit, indeed to accelerate, the future development and spread of peaceful uses of nuclear energy throughout the world.

10. It is often asserted that non-proliferation policy should be viewed as a means to the end of disarmament: e.g., "A treaty on non-proliferation of nuclear weapons is not an end in itself but only a means to an end. That end is the achievement of General and Complete Disarmament, and, more particularly, nuclear disarmament." Eight Nation Joint Memorandum Submitted to the ENDC, Sept. 15, 1965, ENDC/158; DOCUMENTS ON DISARMAMENT, 1965, at 424. While non-proliferation policy is related to disarmament policy, both nuclear and conventional, all such policies should be evaluated in terms of their effect on the likelihood of use of force, especially nuclear force. A disarmament scheme which increased the likelihood of nuclear war would not be good policy. For a statement of the reasons why the further spread of nuclear weapons "increases the danger of nuclear war and diminishes the security of all nations," see testimony of Secretary of State Rusk in *Hearings on Nonproliferation of Nuclear Weapons Before the Joint Comm. on Atomic Energy*, 89th Cong., 2d Sess. 3, 4 (1966). For a statement *contra* which concludes that: "a policy of vigorously pursuing a [non-proliferation] treaty over the reservations of a number of allies and friendly neutrals may represent a mistaken notion of the [U.S.] national interest," see testimony of Dr. James McBride, *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 37, 40 (1968).

The other basic relationship against which non-proliferation policy should be evaluated, however, is that between proliferation and economic development. The costs of various kinds of nuclear weapons capabilities can be determined with a fair degree of accuracy. See, e.g., Report of the Secretary-General, *infra* note 14, at 29-41. The interaction between achievement of a nuclear weapons capability, or an attempt to achieve such a capability, and the process of economic development in a particular state is, however, much more difficult to judge.

11. Paragraph 3 of Article IX of the Treaty defines "nuclear-weapon State" as "one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967." All other states would presumably fall into the category of "non-nuclear weapon States," an undefined term used throughout the Treaty. These terms were introduced by the United States in amendments to its draft treaty proposals on March 22, 1966, in order to "help stop the talk of a 'nuclear club.'" DOCUMENTS ON DISARMAMENT, 1966, at 164 (U.S. Arms Control & Disarmament Agency Pub. No. 43, 1967) [hereinafter cited as DOCUMENTS ON DISARMAMENT, 1966]. Certain nations possessing substantial civil nuclear industries which had chosen not to acquire nuclear weapons, such as India, had objected to being relegated to a status of "non-nuclear States" under the prior United States draft Treaty proposals of August 17, 1965. DOCUMENTS ON DISARMAMENT, 1965, at 348.

12. The identity and number of non-nuclear-weapon states which could probably develop a nuclear weapons capability vary widely depending on the time frame and also the particular perspective of the compiler. Official governmental sources are understandably reluctant to publish their intelligence estimates covering this subject. Nevertheless, there is a group of states which appear at the top of most lists. It has been recently estimated that the following seven non-nuclear-weapon states could produce a nuclear weapon in less than two years: Canada, India, Israel, Japan, Sweden, Switzerland, and West Germany. UNITED NATIONS ASSOCIATION OF THE UNITED STATES OF AMERICA, NATIONAL POLICY PANEL, STOPPING THE SPREAD OF NUCLEAR WEAPONS (1967).

The range of activities at which non-proliferation policy is aimed has a large political and military, and a growing economic, content. But at the core of nuclear activities is science and technology. Science discovered the energy latent in the nucleus of the atom. With technology that energy has been unleashed. The technological opportunities present in nuclear energy are now being exploited on an increasing scale to achieve a growing variety of human goals throughout the world.

From a global perspective, the processes of research, development and innovation focused on nuclear energy are taking place within and among certain states in a nation-state system. Although one global framework for voluntary cooperation in the peaceful uses of nuclear energy exists and several structures for regional coordination of peaceful and military nuclear activities are established, states remain the primary actors.¹³ The development and exploitation of nuclear energy has occurred, and will probably continue to occur, in a predominantly decentralized and competitive world context. Viewed from this perspective, non-proliferation policy seeks to stop diffusion of the science and technology of nuclear weapons across international boundaries and to prevent scientific and technological activities pertaining to nuclear weapons from taking place within any state except the five existing nuclear-weapon states.

The feasibility of such a policy may be questioned. Is an international policy feasible which seeks to prevent only a narrow band of activity pertaining to nuclear weapons within a broad spectrum of activity pertaining to nuclear energy generally? Is such a policy feasible

13. The global framework for peaceful nuclear cooperation is the International Atomic Energy Agency, headquartered in Vienna (IAEA). The objectives of the IAEA are to "accelerate and enlarge the contribution of atomic energy to peace . . . throughout the world," and to "ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose." I.A.E.A. STAT. art. II, *opened for signature* Oct. 26, 1956, [1957] 1 U.S.T. 1093, T.I.A.S. No. 3873, 276 U.N.T.S. 3. For the history, see Bechhoefer, *Negotiating the Statute of the International Atomic Energy Agency*, 13 INT'L ORG. 38 (1959); Stoessinger, *Atoms for Peace: The International Atomic Energy Agency*, in COMMISSION TO STUDY THE ORGANIZATION OF PEACE, *ORGANIZING PEACE IN THE NUCLEAR AGE* 117 (1959).

The principal regional structure is the European Atomic Energy Community (Euratom), whose aim is "the creation of conditions necessary for the speedy establishment and growth of nuclear industries" in its member states. Treaty Establishing the European Atomic Energy Community (EURATOM), Mar. 25, 1957, art. I, 298 U.N.T.S. 167. For a recent excellent appraisal of Euratom, see Scheinman, *Euratom: Nuclear Integration in Europe*, INT'L CONCIL., May, 1967.

On the military side, efforts to achieve nuclear cooperation as a part of collective defense arrangements, especially within NATO, have created intense arguments and have been a prime source of conflict in the Non-Proliferation Treaty negotiations. These efforts, therefore, will be discussed in some detail below. But any treaty commitment to "act to meet the common danger" in the event of an "armed attack" against any party to the treaty—the common formula for multilateral and bilateral mutual defense treaties to which the United States is a party—has a nuclear aspect.

even though the technology which underlies nuclear weapons production overlaps to a great extent that which applies to peaceful nuclear activities? Moreover, can a policy to prevent nuclear weapons proliferation be effective without structural change in an international system in which nation-states are the dominant actors? For these fundamental issues the Non-Proliferation Treaty will provide the acid test.

The purposes of this article are to analyze the Treaty and assess its potential. First, the technological prerequisites for a nuclear capability, and, second, the global distribution of these prerequisites are outlined. Next, the existing international legal framework affecting non-proliferation is described. Thereafter, the Treaty is analyzed in some detail, primarily in terms of the various interpretations that may govern its application to specific problems which will be encountered by the parties as it is implemented. Lastly, the major implications of the Treaty for the future are assessed.

I. Nuclear Capabilities: The Technological Base

A nuclear weapons capability consists of a stockpile of nuclear weapons and an effective means of delivery. The Non-Proliferation Treaty places restraints, however, only on the warhead aspect of nuclear weapons capabilities. Therefore, we will limit our analysis to this aspect.

An essential ingredient of any nuclear capability, whether for warlike or peaceful purposes, is fissionable material.¹⁴ The two fissionable materials of primary interest are uranium-235 and plutonium-239. The former is the only fissionable material known to occur in nature.

Uranium-235 usable in nuclear weapons can be obtained from natural uranium by an "enrichment" process in which the proportion of uranium-235 atoms is increased from 0.7 per cent, as it occurs in nature, to 90-95 per cent. The enrichment process most widely used, gaseous diffusion, requires extremely large plants and complex technology. A single plant of economic size has been estimated to cost upwards of \$750

14. An important and recent source of expert estimates concerning nuclear weapons technology is contained in Report of the Secretary-General on the Effects of the Possible Use of Nuclear Weapons and on the Security and Economic Implications for States of the Acquisition and Further Development of These Weapons, United Nations General Assembly, U.N. Doc. A/6858, Oct. 10, 1967; DOCUMENTS ON DISARMAMENT, 1967, at 476. The report is particularly useful in presenting the elements that comprise a nuclear weapons capability and the cost estimates, including both warheads and delivery systems, of a range of possible nuclear weapons capabilities.

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million to build and \$500-600 million per year to operate.¹⁵ In addition to cost and engineering difficulties, information relating to processes for the separation of uranium isotopes is highly classified within various national programs.¹⁶

It is considerably easier to produce plutonium usable in nuclear weapons than enriched uranium. Uranium-238, the remaining 99.3 per cent of natural uranium, can be converted into plutonium-239 by subjecting it to a neutron flux in a nuclear reactor fueled with either natural uranium or uranium that is only 3-5 per cent enriched.¹⁷ In

15. Report of the Secretary-General, *supra* note 14, Annex IV, at 1. The United States has built three gaseous diffusion plants. The first cost \$1 billion and the next two cost a total of \$1.3 billion to build.

16. As the need for additional uranium enrichment plant capacity approaches, pressure will increase to loosen information controls, at least to the extent of permitting broader access to classified information. See, e.g., ATOMIC INDUSTRIAL FORUM, REPORT OF THE STUDY COMMITTEE ON PRIVATE OWNERSHIP AND OPERATION OF URANIUM ENRICHMENT FACILITIES (1968).

It is possible that the cost barrier to enriched uranium will be lowered in the future if the gas centrifuge process, an alternate method of separating isotopes of the same elements which does not require such large-scale and costly facilities, is demonstrated to be economically feasible. A plant capable of producing 50 kilograms of 90 per cent enriched uranium-235 per year has been estimated to cost about \$130 million to build and \$13 million per year to operate. Report of the Secretary-General, *supra* note 14, Annex IV, at 2. Since large-scale facilities are not required for the centrifuge process, a nuclear weapons production capability would be easier to conceal as well as being cheaper. Therefore, wide dissemination of gas centrifuge technology could contribute to nuclear weapons proliferation.

On March 21, 1967, the AEC summarily announced that "national security interests would best be served if privately sponsored work on the gas centrifuge process for separation of isotopes were discontinued." U.S.A.E.C. Release No. K-70, Mar. 21, 1967, [1962-67 Transfer Binder] CCH ATOM. EN. L. REP. ¶ 10,376, at 16,595. Gas centrifuge work is the sole business of Electro-Nucleonics, Inc., and as a result of the AEC decision, the SEC suspended over-the-counter trading in the company's stock. Wall Street Journal, Mar. 23, 1967, at 10, col. 2. Since that time, certain private firms affected by the AEC decision, including Electro-Nucleonics, have signed contracts with the AEC under which their research and development work in this field will be continued on a classified basis. U.S.A.E.C. Press Release No. K-163, June 29, 1967, 2 CCH ATOM. EN. L. REP. ¶ 10,061, at 16,109.

17. The slightly enriched uranium used as fuel for nuclear power reactors cannot be used in a nuclear weapon without substantial further enrichment. In evaluating natural uranium and slightly enriched uranium as potential fuels for a planned nuclear power reactor, a series of complex technological, economic, political and security comparisons must be made. On economic grounds alone, enriched reactor technology has the edge in most cases. Virtually all nuclear power reactors built and planned in the United States and a large majority in the Soviet Union use enriched fuel. Of the total nuclear power capacity outside both the United States and the communist bloc by 1980, about 30 per cent is forecast to be in natural uranium reactors and about 70 per cent in enriched uranium reactors. ARTHUR D. LITTLE, INC., THE GROWTH OF FOREIGN NUCLEAR POWER (1966).

If a state uses nuclear power and lacks its own uranium reserves, it must rely on foreign fuel supplies. If a state uses enriched reactor technology and lacks an isotope separation plant, although it has its own uranium deposits, it must rely on foreign sources of enrichment services. The United States, with a large stake in a future share of the world's nuclear power industry, has given repeated assurances of the availability of United States enrichment services on a long-term, non-discriminatory basis at attractive and stable prices. This "toll enrichment" policy is intended not only to assist in the export of United States enriched reactor technology, but also to minimize incentives for construction of additional uranium isotope separation plants outside the United States. For a

addition to a reactor, several other specialized facilities are required to carry out all the operations necessary to obtain usable plutonium. Of major importance are a facility to fabricate fuel elements for nuclear reactors and a plant to separate by chemical methods the plutonium produced in irradiated fuel elements from depleted uranium and certain radioactive waste materials. Plutonium technology is unclassified, well-understood, and already widely diffused.¹⁸ Moreover, the aggregate capital cost of the facilities required for production of militarily substantial amounts of plutonium is well under \$100 million, and operating costs can be reduced below \$10 million per year.¹⁹ Once fissionable material is in hand, manufacture of crude fission weapons that work should no longer be considered a particularly demanding or costly task, although weapons design information is cloaked in secrecy.²⁰

more extensive discussion of the political factors in the choice between natural and enriched uranium technology, see Willrich, *International Control of Civil Nuclear Power*, BULL. ATOM. SCI., Mar. 1967, at 31, 33.

18. The United States played a leading role in the diffusion process beginning with President Eisenhower's famous "Atoms for Peace" address to the U.N. General Assembly, which included a plan to "encourage worldwide investigation into the most effective peacetime uses of fissionable material." 1 DOCUMENTS ON DISARMAMENT, 1945-1959, at 393, 400 (U.S. Dep't of State Pub. No. 7008, 1960).

The Atomic Energy Act of 1946, then in effect, prohibited "exchange of information with other nations with respect to the use of atomic energy for industrial purposes." Act of Aug. 1, 1946, ch. 724, § 10(a)(2), 60 Stat. 755, 766. Following the "Atoms for Peace" speech, Congress enacted the Atomic Energy Act of 1954, which provided: "The dissemination of scientific and technical information relating to atomic energy should be permitted and encouraged so as to provide that free interchange of ideas and criticism which is essential to scientific and industrial progress" Atomic Energy Act of 1954, 42 U.S.C. § 2161(b). The Act also established a scheme for declassification of restricted data from time to time by the AEC. *Id.* § 2162. The First United Nations Conference on Peaceful Uses of Atomic Energy, held in Geneva during 1955, resulted in the declassification and subsequent diffusion of large amounts of information primarily concerning reactor technology. Thereafter, on December 12, 1956, the United States, the United Kingdom, and Canada took joint action to revise their information policies to declassify information relating to "all phases of nuclear power from ore recovery and fabrication of fuel elements to the design and operation of plants for the chemical recycling of spent fuel elements from civilian reactors." Statement of Lewis L. Strauss, Chairman, U.S. Atomic Energy Commission, on the Reciprocal Tripartite Declassification Guide, CCH ATOM. EN. L. REP. ¶ 5056, at 11,088. Two further United Nations Conferences on the Peaceful Uses of Atomic Energy have been held in Geneva in 1958 and 1964. The IAEA annually sponsors between 10 and 15 scientific and technical conferences and symposia involving about 2000 participants from upwards of 50 countries. Annual Report of the Board of Governors to the General Conference, 1 July 1966—30 June 1967, I.A.E.A. Doc. GC/(xI)/355, at 26.

19. Total costs and costs per unit will vary with the size. It is estimated that 8 kilograms of 95 per cent plutonium-239 would be required to manufacture one nuclear warhead with a yield of about 20 kilotons (equivalent to the bomb used on Nagasaki). The estimated costs of an integrated production complex for 8 kilograms, or 1 bomb, per year are \$22 million for construction and \$4.8 million annually for operation; comparable costs for 160 kilograms, or 20 bombs, per year are \$87 million for construction and \$9.5 million annually for operation. As the scale of operation increases there is a dramatic decrease in the cost per kilogram: from \$0.9 million per kilogram to \$0.12 million per kilogram of plutonium for the two previous examples. Report of the Secretary-General, *supra* note 14, Annex IV, at 3-7.

20. A weapons fabrication and assembly plant which can manufacture ten fission warheads per year has been estimated to cost only \$8 million to construct and \$1 million

The technology involved in the major peaceful uses of nuclear energy is basically the same as that required to produce plutonium for nuclear weapons. The facilities and materials required for a civil nuclear power program consist of nuclear reactors, which use natural or enriched uranium as fuel and produce large amounts of plutonium, fuel fabrication plants and chemical separation plants. Thus, the increasing use of nuclear energy to generate electric power will greatly complicate the task of preventing nuclear weapons proliferation.

A variety of possible peaceful applications for nuclear explosives have also been suggested. These include nuclear excavation of canals, harbors and rail cuts, and underground natural resource development projects, such as nuclear stimulation of natural gas production and the recovery of oil from shale. Such "Plowshare" applications require the development of "clean" thermonuclear explosives.²¹ But "[a] device which moves a million tons of earth to dig a canal or create an oil deposit can just as easily pulverize a city of a million people."²² Therefore, the development of "Plowshare" devices must be restrained in the Non-Proliferation Treaty.

II. Distribution of Nuclear Capabilities

Outside the Communist states, roughly 80 per cent of the known reserves of uranium are located in three countries, the United States, Canada and South Africa.²³ Within Western Europe, France has de-

per year to operate. Report of the Secretary-General, *supra* note 14, Annex IV, at 8. The successful development of a thermonuclear (fusion) device, however, still represents a significant technological achievement. For one thing, enriched uranium is the preferred material for a fission "trigger."

Thorium-232 is the only other important "fertile" material (*i.e.*, material which can be transformed into fissionable material) that occurs in nature, in addition to uranium-238. Upon neutron capture, thorium-232 will convert into uranium-233, another synthetic fissionable material similar to plutonium in its nuclear properties. Therefore, the possibility exists of a thorium-232/uranium-233 fuel cycle which would parallel the uranium-238/plutonium-239 fuel cycle. In either case a fissionable material is needed to begin with. Thorium technology is still in the development stage. Only very small quantities of uranium-233 have been produced, and no nuclear weapons are known to have been constructed using this material.

21. For a simple and general explanation, see Gerber, *Hamburger & Hull, Plowshare* (U.S.A.E.C. Div. of Technical Information 1966). For a mine of information some of which is now out of date, see *Hearings on Peaceful Applications of Nuclear Explosives—Plowshare—Before the Joint Comm. on Atomic Energy*, 89th Cong., 1st Sess. (1965). A recent critical assessment is found in Inglis & Sandler, *Prospects and Problems: The Nonmilitary Uses of Nuclear Explosives*, BULL. ATOM. SCI., Dec. 1967, at 46.

22. Statement of United Kingdom Representative to the ENDC, Feb. 23, 1967, ENDC/PV.288, at 7.

23. ORGANIZATION FOR ECONOMIC DEVELOPMENT/EUROPEAN NUCLEAR ENERGY AGENCY, *WORLD URANIUM AND THORIUM RESOURCES* (1965). Of course, reserves must be placed in various price ranges based on costs of recovery. The figure quoted is an approximation at the \$5-10 per pound range.

posits that are sufficient for its own weapons program, but probably insufficient for its civil nuclear power needs as well. In addition, Sweden, Australia, Argentina, and a few African states have significant uranium reserves.²⁴ Of the Communist states, both the Soviet Union and China²⁵ are believed to have uranium reserves which are adequate for their own military and civil power needs. Within Eastern Europe, the largest uranium deposits are located in East Germany and smaller deposits in Czechoslovakia.

Facilities for enriching uranium are presently located in each of the five nuclear-weapon states. Such facilities are not known to have been built in any non-nuclear-weapon state. With respect to plutonium technology, in addition to over 300 small research reactors located throughout the world,²⁶ large power reactors with an output above 100 megawatts (electric) are in operation or under construction in all nuclear-weapon states except possibly China and a lengthening list of non-nuclear-weapon states, including Belgium, Canada, Czechoslovakia, West Germany, East Germany, India, Italy, Japan, Netherlands, Pakistan, Spain, Sweden, and Switzerland. The list of states planning to begin construction of nuclear power reactors in the near future is considerably longer.²⁷ Thus, it is clear that the spread of nuclear power and plutonium production capacity is not confined to particular geographic regions, or to specific political or ideological persuasions, or to countries advanced in economic development.

Fuel fabrication plants to supply the input and chemical separation

24. Gabon has significant uranium deposits which are presently exported to France. Thus far, Gabon has closely followed the French lead in the General Assembly concerning non-proliferation.

25. Terminology is difficult concerning China. Unless otherwise indicated, "China" hereafter in this article refers to the People's Republic of China. No political judgment concerning China policy is intended by this terminology.

26. Plutonium production is nominal in most research reactors, but can be significant in certain test facilities. Nevertheless, it should be recognized that such reactors are essential facilities for the education and training of the manpower required for a state to translate nuclear ambitions into capabilities.

27. *Power Reactors the World Around*, NUCLEONICS, Aug. 1966, at 94. Less than 10 kilograms of plutonium is needed for a bomb which will destroy a medium-sized city. One recent estimate of the aggregate plutonium production capacity represented by these civil nuclear power programs is 8,000 kilograms per year by 1970 and 50,000-70,000 kilograms annually by 1980. WASHINGTON CENTER OF FOREIGN POLICY RESEARCH, REPORT ON INTERNATIONAL ORGANIZATIONAL ARRANGEMENTS FOR THE UNITED STATES PROPOSAL FOR A VERIFIED AGREEMENT TO HALT PRODUCTION OF FISSIONABLE MATERIALS FOR WEAPONS PURPOSES 90 (1966). The corresponding estimated amounts of plutonium accumulated in the world as a result of this production are 28,000 kilograms by 1970 and 300,000-450,000 kilograms by 1980. Another estimate shows that by 1974, plutonium will be produced in the world at an annual rate of 36,700 kilograms, 9,500 kilograms of which will be produced in non-nuclear-weapon states. The cumulative totals for the world, by this estimate, are 127,100 kilograms, of which 28,300 kilograms will be located in non-nuclear-weapon states. Taylor, *The Rapid Growth of Nuclear Technology—Implications for Nuclear Safeguards*, INT'L RESEARCH & TECHNOLOGY J., Jan. 1, 1968, at 8.

plants to process the output of nuclear reactors have not yet been as widely dispersed throughout the world as the reactors themselves. Since nuclear fuels are readily available in international commerce, the lag is due primarily to the absence of an economic justification for a complete uranium-plutonium fuel cycle within one state unless that state's civil nuclear power program exceeds a minimum size. All the nuclear-weapon states, of course, already possess their own fuel fabrication and chemical separation plants. Chemical separation plants capable of processing industrial quantities of irradiated nuclear fuels are also located in Belgium and India, and construction is planned for the near future in West Germany, Japan and Sweden. Wherever a separation plant is located militarily significant quantities of plutonium will be found in a chemically pure form.²⁸

The present distribution of raw materials and production capabilities for obtaining fissionable materials demonstrates that the United States and the Soviet Union are the only nuclear-weapon states with large and self-sufficient military and civil nuclear programs. The United Kingdom lacks its own uranium, and France lacks adequate indigenous uranium to supply both its civil and military needs. China, which probably has sufficient uranium to service both a military and a civil program has thus far focused its limited scientific and technical resources on the acquisition of a nuclear weapons capability.

Canada is the only non-nuclear-weapon state which possesses both large uranium deposits and a strong base in nuclear technology. West Germany and Japan are making bids for leadership in peaceful nuclear technology, in each case backed by a broad industrial capability and a

28. To prevent the creation of complete nuclear fuel cycles within non-nuclear weapons states, it has been suggested that an international agency be established which would own all nuclear fuel from the start. It would lease fuel for reactors, but would own and operate the processing facilities, and, in particular, the chemical separation plants used. All plutonium produced in power reactors would, thus, be under international ownership and control. Beaton, *Nuclear Fuel-for-All*, 45 FOREIGN AFFAIRS 662, 667 (1967). The European Company for the Chemical Processing of Irradiated Fuels (EUROCHEMIC) is an interesting example of international cooperation in this field. The Statute of EUROCHEMIC establishes a joint stock company. The stock is held by twelve governments or governmental authorities. The plant is located at Mol, Belgium. For the statute see *Multilateral Agreements*, 1 I.A.E.A. LEGAL SERIES 220 (1959).

Nevertheless, the general tendency for states to place a high value on resource self-sufficiency would seem irresistible, and the suggestion, therefore, impractical. Moreover, the United States supply policy now encourages self-sufficiency. Prior to legislation requiring private ownership of fissionable material, the AEC could insert plutonium buy-back provisions in its agreements for cooperation with other countries. Under the present legislation, the AEC is not permitted to buy back plutonium that is produced in fuel that has been "toll" enriched. AMENDING THE ATOMIC ENERGY ACT OF 1954 TO PROVIDE FOR PRIVATE OWNERSHIP OF SPECIAL NUCLEAR MATERIALS, H.R. REP. NO. 1702, 88th Cong., 2d Sess. 2 (1964).

firm political commitment;²⁹ India is embarked on a civil nuclear power program of substantial size; and Israel, which has developed a strong scientific and technical base, is now considering a variety of power applications; but each of these non-nuclear-weapon states lacks a uranium supply of its own. South Africa's large uranium reserves make it a major power to be dealt with in the non-proliferation context, but its nuclear power program is not far advanced. Thus, many more nations, in addition to the present five nuclear-weapon states, could easily acquire nuclear weapons in the future.³⁰ Yet relatively few could do so exclusively out of their own resources, at least not without substantial cutbacks in their civil nuclear power plans.

III. Non-Proliferation: The Existing Legal Framework

The Non-Proliferation Treaty would be a major step toward nuclear arms control, but it would not be the first. The Antarctic Treaty, concluded in 1959, dedicated the South polar region to exclusively peaceful purposes and prohibited "any measures of a military nature," including "the testing of any type of weapons."³¹ In contrast to the strategic nuclear hub in the Arctic, Antarctica became the first nuclear-free zone.

During the Cuban missile crisis in October 1962, the United States

29. A comprehensive description of Japan's program is contained in Gilinsky & Langer, *The Japanese Civilian Nuclear Program*, RAND Memorandum RM-5366-PR (Aug. 1967). A long-range program submitted by the Japanese Atomic Energy Commission to its government in 1967 recommends that Japan import foreign reactor technology that is already developed and concentrate its own resources in the development of breeder technology. If successful, such a "leap-frog" strategy could put Japan in the front rank of nuclear technology after a period of heavy dependence on foreign technology. *See id.* 38.

30. *See* note 12 *supra*. Here it is important to distinguish the costs of nuclear weapons, which are relatively cheap, and the total program costs for a nuclear deterrent force, including the delivery systems, which are generally expensive. It has been estimated that to acquire in 10 years time a modest nuclear capability of 30-50 jet bombers and 50 medium-range missiles in soft emplacements armed with 100 plutonium warheads of 20 kilotons each would cost approximately \$15 million per year for warheads and \$155 million per year for delivery systems, for a total 10-year program cost of \$1.7 billion. A small, high-quality nuclear force composed of 10-15 bombers, 100 intermediate range missiles and 2 missile launching submarines, each equipped with thermonuclear warheads, would cost \$560 million per year, for a total 10-year program cost of \$5.6 billion. Report of Secretary-General, *supra* note 14, at 36; *id.*, Annex IV, at 6.

31. The Antarctic Treaty, art. I, para. 1, [1961] 1 U.S.T. 794, 795, T.I.A.S. No. 4780, 402 U.N.T.S. 71, 72. The parties are Argentina, Australia, Belgium, Chile, Czechoslovakia, Denmark, France, Japan, New Zealand, Norway, Poland, the Republic of South Africa, the Soviet Union, the United Kingdom, and the United States. This Treaty was the first arms control arrangement to include both East and West. In 1954 West Germany undertook "not to manufacture in its territory any atomic weapons" as a part of the arrangements for its accession to NATO. Neither the Soviet Union nor the United States are parties to the specific agreements which incorporate the West German renunciation. There are complex arguments pro and con, concerning the continued legal efficacy of the West German pledge. *See* Willrich, *West Germany's Pledge Not to Manufacture Nuclear Weapons*, 7 VA. J. INT'L L. 91-100 (1966).

and the Soviet Union saw clearly that avoidance of nuclear war between them was a rule of necessity on which their mutual survival depended. The Limited Nuclear Test Ban Treaty followed in 1963. This Treaty, now in force among over ninety parties, prohibits nuclear test explosions in the atmosphere, outer space and underwater.³² The ban is incomplete since it does not prohibit explosions underground as long as the radioactive debris is contained within the territory of the state where the test is conducted. Nevertheless, the Treaty halted the race between the United States and the Soviet Union for ever increasing explosive yields in the 100 megaton range and above,³³ and substantially reduced radioactive contamination of the atmosphere. Moreover, by confining permissible nuclear tests of any party to the costly and time-consuming underground environment, the Limited Nuclear Test Ban Treaty may retard the pace of nuclear weapons proliferation, at least in the absence of a more effective legal barrier.³⁴

Since the Limited Nuclear Test Ban Treaty, two additions have been made to the legal structure of nuclear arms control. In 1967 the Treaty for the Prohibition of Nuclear Weapons in Latin America was completed, and it has since been signed by twenty-one states of that region.³⁵

32. [1963] 2 U.S.T. 1313, T.I.A.S. No. 5433, 460 U.N.T.S. 43 (1963).

33. The maximum yield of a nuclear explosion that can be contained underground will vary substantially with the depth of burial and surrounding geology. At the Foreign Relations Committee hearings on the Limited Nuclear Test Ban Treaty most experts agreed that "with the passage of time tests of up to 1 megaton would be possible underground." Testimony of Secretary of Defense McNamara, *Hearings on the Nuclear Test Ban Treaty Before the Senate Comm. on Foreign Relations*, 88th Cong., 1st Sess. 126 (1963). "From tests at yields of up to 1 megaton some improvement in high-yield weapons design could be achieved and . . . new warheads—for example, a 35 megaton warhead for our Titan II—could be developed and stockpiled with confidence that they would work." *Id.* 101. Prior to the Limited Nuclear Test Ban Treaty the United States had already emphasized the acquisition of large numbers of invulnerable delivery systems carrying a warhead in the one megaton range. The Soviet Union had tested a device of 60 megatons which could have been scaled up to 100 megatons for aircraft delivery. The significance of very high yield nuclear weapons has been the subject of continuing debate which the Nuclear Test Ban Treaty has by no means ended. Secretary of Defense McNamara has discounted in advance the significance of any "megatonnage gap" between the Soviet Union and the United States. "Far more important is the surviving number of separately targetable, serviceable, accurate, reliable warheads." In these terms, Secretary McNamara has concluded: "our strategic forces are superior to those of the Soviet Union. But I must caution that in terms of national security, such 'superiority' is of little significance." Statement by Secretary of Defense Robert S. McNamara before the Senate Armed Services Committee on the Fiscal Year 1969-73 Defense Program and the 1969 Defense Budget 52 (1968).

34. President Kennedy clearly viewed the Treaty as "the opening wedge" in a campaign to persuade other countries not to acquire nuclear weapons. Radio-Television Address by President Kennedy, July 26, 1963, *DOCUMENTS ON DISARMAMENT*, 1963, at 250, 255 (U.S. Arms Control & Disarmament Agency, Pub. No. 24, 1964).

35. This Treaty is referred to as the Treaty of Tlatelolco. An English version of the text is found in *DOCUMENTS ON DISARMAMENT*, 1967, at 69. In addition to signing, Mexico and El Salvador have ratified the Treaty, and also have waived the conditions for entry into force contained in Article 28, paragraph 1, among them two conditions particularly

When the Treaty enters into force the Latin American States will have applied to themselves a substantially broader concept of non-proliferation than is embodied in the Non-Proliferation Treaty.³⁶ Also in 1967 the Outer Space Treaty was completed and entered into force.³⁷ Under this Treaty the parties, and in particular the United States and the Soviet Union as the major space powers, pledged not to place nuclear weapons "in orbit around the Earth," to "install" them "on celestial bodies," or to "station" them in outer space.³⁸

"Safeguards" is the concept which has been developed to provide assurance that the materials and equipment used in peaceful nuclear activities are not diverted to use in nuclear weapons programs. Safeguards consist of a system of international accountability applied to the nuclear materials used, produced and processed in a peaceful nuclear activity in a state. The system includes reports to an external authority and physical inspection by that authority to verify the accuracy of the

impossible to fulfill; ratification by all Latin American states, including Cuba, and ratification of Protocol II by all nuclear-weapon states, including China. Brazil has signed and ratified the Treaty without waiving any conditions for entry into force.

On April 1, 1968, the United States signed Protocol II to the Treaty. Article 3 of Protocol II contains an undertaking "not to use or threaten to use nuclear weapons against the Contracting Parties . . ." In signing the Protocol the United States stated that "each of the Contracting Parties retains exclusive power and legal competence, unaffected by the terms of the Treaty, to grant or deny non-Contracting Parties transit and transport privileges;" and that "an armed attack by a Contracting Party in which it was assisted by a nuclear-weapon State, would be incompatible with the Contracting Party's corresponding obligations under Article 1 of the Treaty." Thus, the United States has preserved its right to transport nuclear weapons through the Panama Canal, and has narrowed the scope of its commitment not to use nuclear weapons to circumstances where no other nuclear-weapon state is involved. For a discussion of the Treaty by a man instrumental in the negotiations, see G. ROBLES, *THE DENUCLEARIZATION OF LATIN AMERICA* (1967).

36. In addition to prohibiting the acquisition of nuclear weapons by the parties, Article 1(1)(b) of the Treaty of Tlatelolco prohibits "The receipt, storage, installation, deployment and any form of possession of any nuclear weapons, directly or indirectly, by the Parties themselves, by anyone on their behalf or in any other way." Under the Treaty, therefore, the parties could not permit nuclear-weapon states to deploy nuclear weapons on their territories establishing a nuclear free zone in Latin America. Black Africa has also moved in this direction. On July 21, 1964, at an Organization of African Unity Summit Conference, the heads of government declared: "we are ready to undertake, through an international agreement to be concluded under United Nations auspices, not to manufacture or control atomic weapons." *DOCUMENTS ON DISARMAMENT*, 1964, at 294 (U.S. Arms Control & Disarmament Agency Pub. No. 27, 1965).

37. For text see 55 *DEPT STATE BULL.* 953 (1966).

38. *Id.* The question has arisen whether deployment by the Soviet Union of a Fractional Orbital Bombardment System (FOBS) would violate the Outer Space Treaty. The question was quickly dismissed. For one thing, the FOBS would be launched in an operational mode only in time of war. Moreover, the vehicle launched in a FOBS mode is fired into very low orbit about 100 miles above the earth and at a given point in time rockets are fired to bring the vehicle out of orbit. The vehicle is not intended to orbit completely "around the earth." An ICBM normally does not go into orbit, but rather follows a ballistic trajectory with a typical apogee of 500-800 miles. Although a FOBS has the potential to place a nuclear weapon "in orbit around the earth," so does an ICBM. For these reasons the deployment of a FOBS should not violate the Outer Space Treaty.

reports. The external authority which administers safeguards can be an international or regional organization or another state which has supplied assistance to the activity. Various systems for international safeguards exist. The two principal international systems are administered by the European Atomic Energy Community (Euratom), which covers all civil nuclear activities on the territories of France, West Germany, Italy, Belgium, the Netherlands, and Luxembourg, and the International Atomic Energy Agency (IAEA), which is organized on a world-wide basis and presently has 98 members.³⁹

In 1962 the United States adopted a policy of transferring to the IAEA the responsibility for administration of safeguards with respect to its bilateral agreements for cooperation with countries outside Euratom, as these agreements were renewed. This policy and parallel efforts by Britain and Canada have been largely responsible for the recent marked expansion of the applicability of the IAEA's system. As of June 30, 1967, the Agency had signed 34 safeguards agreements with 27 member states covering 61 reactors.⁴⁰

The safeguards responsibilities of Euratom have also increased substantially. For instance, over 70 per cent of the total amount of nuclear materials the United States has supplied to foreign countries is subject to Euratom safeguards. Although the Soviet Union has refused to accept safeguards on any of its own peaceful nuclear activities, since 1963 it has given strong support to the development and application of safeguards by the IAEA.

The four treaties described above and the expanded role of international safeguards represent some progress in the construction of legal barriers to prevent further nuclear weapons proliferation. Nevertheless, the buildup of nuclear armaments in nuclear-weapon states continues and takes on new dimensions which threaten the security of non-nuclear-weapon states. Moreover, the spread of civil nuclear power in a

39. For legal analyses, see Szasz, *The Law of International Atomic Energy Agency Safeguards*, 3 REV. BELGE DE DROIT INT'L 196 (1967) (a useful bibliography is set forth in Annex B); Willrich, *Safeguarding Atoms for Peace*, 60 AM. J. INT'L L. 34 (1966); Gorove, *The First Multinational Atomic Inspection and Control System at Work: Euratom's Experience*, 18 STAN. L. REV. 160 (1965). For a political-technological analysis, see Willrich, *International Control for Civil Nuclear Power*, 23 BULL. ATOM. SCI. (March 1967). For a discussion from the United States point of view, see Hall, *Atoms for Peace or War*, 43 FOREIGN AFFAIRS 602 (1965).

40. Only four of the reactors are power reactors, located in the United States, the United Kingdom, Spain and Japan. The majority are small research reactors. In addition, the United States has opened a chemical processing plant to IAEA inspection while the plant is engaged in reprocessing fuel from the power reactor in the United States which is subject to IAEA safeguards. Annual Report of the Board of Governors to the General Conference, 1 July 1966—30 June 1967, I.A.E.A. Doc. GC/(xi)/355.

commercially competitive global environment continually threatens to outrun the willingness of the states concerned to accept safeguards and open their peaceful nuclear activities to international inspection. Clearly, a comprehensive legal framework is needed to achieve the goal of non-proliferation policy on a worldwide scale.

IV. The Non-Proliferation Treaty

To prevent nuclear weapons proliferation, the Treaty⁴¹ establishes the following legal framework: nuclear-weapon states undertake not to transfer nuclear weapons, or to assist non-nuclear-weapon states to acquire such weapons (Article I); non-nuclear-weapon states undertake not to manufacture or otherwise acquire nuclear weapons (Article II); non-nuclear-weapon states agree to accept safeguards on their peaceful nuclear activities (Article III); all parties are guaranteed the right to exploit the peaceful uses of nuclear energy (Article IV); an obligation and procedure for international sharing of any potential benefits from peaceful applications of nuclear explosions is established (Article V). The Treaty enters into force once the Soviet Union, the United Kingdom, the United States, and forty other signatory states have ratified it (Article IX), and may be amended by a majority of the parties, including all nuclear-weapon parties and parties which are members of the IAEA Board of Governors (Article VIII). The Treaty has an initial duration of twenty-five years, but any party may withdraw if it decides that "extraordinary events" have jeopardized its "supreme interests" (Article X). In addition, parties to the Treaty undertake to pursue further nuclear arms control negotiations "in good faith" (Article VI), and groups of states may establish regional nuclear-free zones apart from the Treaty (Article VII).⁴²

41. The Treaty consists of a preamble and eleven articles. The eleventh Article deals with languages. Discussion of the Treaty's preamble will generally be relegated to appropriate places in the footnotes.

42. The draft Treaty of August 24, 1967, included what is now Article VII as the last paragraph in the preamble. ENDC/192, ENDC/193; DOCUMENTS ON DISARMAMENT, 1967, at 338. In the discussion of the August 24, 1967, draft, Mexico proposed a transfer of this provision from the preamble to the body of the Treaty, considering it an "authentic legal provision." ENDC/PV. 331, at 8-9. This was subsequently done by the superpowers in the revised draft Treaty of January 18, 1968. ENDC/192/Rev.1, ENDC/193/Rev.1. During discussion of the latter draft, Brazil proposed that Article VII be amended so that nothing in the Non-Proliferation Treaty would be interpreted "as affecting, in any way, the rights or obligations of signatory States under regional Treaties on the proscription of nuclear weapons . . . consistent with the objectives of this Treaty." ENDC/201/Rev.2. Had Brazil's amendment been accepted, difficult problems of priority between the Non-Proliferation Treaty and the Treaty of Tlatelolco could have arisen, especially in light of Brazil's apparent continued insistence on an interpretation of the latter as not precluding its right to develop peaceful nuclear explosives.

A. *Non-Transfer and Non-Acquisition*

The obligation of nuclear-weapon states under Article I⁴³ generally complements the obligation of non-nuclear-weapon states under Article II:⁴⁴ the Treaty prohibits transfer by nuclear-weapon states on the one hand, and receipt by non-nuclear-weapon states on the other, of "nuclear weapons," "other nuclear explosive devices," and "control" over such weapons or devices. Since none of these terms is explicitly defined, the scope of the Treaty will largely depend on how each is interpreted.

A number of questions arise in defining "nuclear weapon."⁴⁵ Obviously, the nuclear warhead on the tip of an ICBM and the nuclear bomb carried in a strategic bomber are nuclear weapons. But does "nuclear weapon" include the delivery system as well as the warhead? What about nuclear reactors used as power plants for Polaris sub-

43. "Each nuclear-weapon State Party to the Treaty undertakes 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; and 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." Art. I.

44. "Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices." Art. II.

45. In 1966 the United States was "convinced of the need for such a definition," but apparently changed its mind because no definition appeared in the agreed draft of August 24, 1967. DOCUMENTS ON DISARMAMENT, 1967, at 167. United States amendments to Article IV of the earlier United States draft Treaty submitted on March 21, 1966, included among other defined terms a reference to "nuclear weapons" followed by a blank. DOCUMENTS ON DISARMAMENT, 1966, at 160. Article 5 of the Treaty of Tlatelolco defines "nuclear weapon" as "any device which is capable of releasing nuclear energy in an uncontrolled manner and which has a group of characteristics that are appropriate for warlike purposes. An instrument that may be used for the transport or propulsion of the device is not included in this definition if it is separable from the device and not an individual part thereof." DOCUMENTS ON DISARMAMENT, 1967, at 72. Much of this language seems to have been derived from the United States Atomic Energy Act of 1954, which defines "atomic weapon" as "any device utilizing atomic energy, exclusive of the means for transporting or propelling the device (where such means is a separable and divisible part of the device) the principal purpose of which is for use as, or development of, a weapon, a weapon prototype, or a weapon test device." Atomic Energy Act of 1954, as amended, § 11(d), 42 U.S.C. § 2014(d) (1964). Thus the definitions in both the Treaty of Tlatelolco and the United States legislation expressly exclude nuclear delivery and propulsion systems. One important difference in the definitions is that the United States legislation includes a subjective element of purpose while the Latin American definition is more objective and not dependent on the intended purpose for which the device will be used, as long as it possesses a "group of characteristics" which make it "appropriate" for use as a nuclear weapon. Hence Plowshare devices would seem to be excluded from the definition of nuclear weapon under United States law, but included in the Treaty of Tlatelolco.

We may speculate why a definition was omitted from the Non-Proliferation Treaty. A definition similar to the Treaty of Tlatelolco would perhaps have highlighted the Soviet Union's concession to the status quo regarding the United States' arrangements within NATO. It might also have accentuated the exclusion of non-weapons military cooperation from the prohibitions of the Treaty.

marines or surface warships? The drafters clearly intended to exclude nuclear delivery and military propulsion systems from the term "nuclear weapon" and to limit this term to only one aspect of a nuclear weapons capability, namely the warhead or bomb.⁴⁶

Articles I and II also prohibit the transfer and receipt of "other nuclear explosive devices." This phrase is primarily intended to cover nuclear explosives of potential use in peaceful applications—so-called "Plowshare" devices.⁴⁷ These devices are indistinguishable on technical grounds from nuclear weapons. Moreover, the production of such devices requires a technology "even more sophisticated" than that required to produce serviceable nuclear weapons. Therefore, if the Non-Proliferation Treaty is to prevent nuclear weapons proliferation, it must prohibit transfer and acquisition of nuclear explosive devices for peaceful applications on the same terms as nuclear weapons.

Nevertheless, the superpower duopoly which the Non-Proliferation Treaty would preserve with respect to acquisition of this aspect of peaceful nuclear technology is bitter medicine for certain non-nuclear-weapon states. Brazil is a leading critic of any such restriction which could create, in its view, "an irreparable relationship of dependence" and prevent the "technological leap that full utilization of nuclear energy for peaceful purposes can provide" to a developing country.⁴⁸

46. On March 14, 1968, the State Department issued a press release which stated: "For purposes of the treaty a nuclear powered submarine is not, in itself 'a weapon.' The treaty does not deal with such military applications of nuclear energy as nuclear propulsion of warships. Therefore, nothing in the treaty would prohibit the provision of nuclear fuel for this purpose . . ." Statement by State Department Spokesman Robert McCloskey, Mar. 14, 1968 (unpublished).

It is clear, however, that the Non-Proliferation Treaty makes no distinction between offensive nuclear warheads and nuclear warheads associated with ballistic missile defense systems. The prohibitions on transfer and acquisition under Articles I and II apply equally to both. This is important because several of the Treaty's critics have suggested that ballistic missile defense systems be transferred to United States allies, and one noted authority has stated that "methods have been developed so that defensive nuclear explosives can be used for ballistic missile defense and for that purpose alone." Statement by Dr. Edward Teller, *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 245, 246-47 (1968). For the Executive Branch reply, see *id.* at 184-85.

47. Statement by United States Representative to ENDC, June 8, 1967, ENDC/PV.303, at 4-11; DOCUMENTS ON DISARMAMENT, 1967, at 252, 253.

48. Statement by Representative of Brazil to ENDC, May 18, 1967, ENDC/PV.297, at 14-17; DOCUMENTS ON DISARMAMENT, 1967, at 225, 226. Under the Treaty of Tlatelolco Brazil has agreed (subject to conditions virtually impossible to fulfill) to commit itself not to acquire nuclear weapons. But it has thus far steadfastly refused to "waive the right . . . to manufacture or receive nuclear explosives that will enable us to perform great engineering works." *Id.* Brazil maintains that the Treaty of Tlatelolco "draws a clear cut distinction between peaceful nuclear explosions and explosions for nuclear weapons purposes." Statement by Representative of Brazil to ENDC, Mar. 14, 1967, ENDC/PV.293, at 8-18; DOCUMENTS ON DISARMAMENT, 1967, at 135, 140. The United States and a majority of the Latin American states have taken repeated exception to such an interpretation. Article 18 of the Treaty of Tlatelolco permits Parties to "carry out ex-

The United States and Soviet Union have both taken a hard line in reply. The United States has put it bluntly: "Should a State decide that it does not wish to accept a treaty which prohibits the spread of nuclear explosive devices we will have to conclude that it does not wish to accept a treaty which prevents the spread of nuclear weapons."⁴⁹

Finally, Articles I and II prohibit transfer and receipt of "control" over nuclear weapons and explosive devices. The meaning of "control" and the related Soviet concept of "access" were the major language barriers between the United States and the Soviet Union for the five years of negotiations until agreement was reached in 1967 on Articles I and II. At issue was the future role of non-nuclear members of military alliances, especially West Germany, with regard to their own nuclear defense. Throughout the long years of disagreement, the Soviet Union never tired of reiterating that regardless of United States plans for its NATO allies, "the Soviet Union will never agree to West Germany obtaining access to nuclear weapons."⁵⁰ The United States was equally adamant that it was "not going to invite the Soviet Union to sit at the NATO table and determine NATO nuclear policy," and that there was no conflict between non-proliferation policy and possible nuclear arrangements proposed for the NATO alliance.⁵¹ The compromise ulti-

plosions of nuclear devices for peaceful purposes—including explosions which involve devices similar to those used in nuclear weapons, provided that they do so in accordance with . . . articles 1 and 5"; however, in light of the definition of nuclear weapons in Article 5, note 45 *supra*, the United States has stated: "We understand the definition contained in Article 5 of the Treaty as necessarily encompassing all nuclear explosive devices. It is our understanding that Articles 1 and 5 restrict accordingly the activities of the Contracting Parties under paragraph 1 of Article 18." Statement Accompanying Signature of the United States of America of Protocol II to the Treaty for the Prohibition of Nuclear Weapons in Latin America, 58 DEP'T STATE BULL. 555, 556 (1968). In simpler terms, the United States has interpreted the Treaty of Tlatelolco "as prohibiting the contracting parties from acquiring or testing nuclear explosive devices for peaceful purposes . . . unless someone can someday invent a nuclear explosive which cannot be used as a nuclear weapon." Statement by United States Representative to ENDC, Mar. 7, 1967, ENDC/PV.291, at 14-16; DOCUMENTS ON DISARMAMENT, 1967, at 126, 127-28. Moreover, in a statement at the signing ceremony of the Treaty of Tlatelolco, Mexico interpreted the Treaty in this respect similarly to the United States' interpretation. Statement by Representative of Mexico to ENDC, Feb. 21, 1967, ENDC/PV.287, at 23-28; DOCUMENTS ON DISARMAMENT, 1967, at 99, 101.

49. Statement by United States Representative to ENDC, June 8, 1967, ENDC/PV.303, at 4-11; DOCUMENTS ON DISARMAMENT, 1967, at 252, 257. The Soviet Union has been just as unflinching. *See, e.g.*, Statement by Soviet Union Representative to ENDC, July 13, 1967, ENDC/PV.313, at 4-8; DOCUMENTS ON DISARMAMENT, 1967, at 298-300. The steps taken in the Treaty to mitigate, or perhaps reverse the discriminatory effects of the potential Plowshare duopoly will be discussed below in connection with other aspects of cooperation in the peaceful uses of nuclear energy. *See* p. 1498 *infra*.

50. Statement by Soviet Union Representative to ENDC, Feb. 17, 1966, ENDC/PV.241, at 24-33; DOCUMENTS ON DISARMAMENT, 1967, at 24, 29. Earlier in the same speech the Soviet Representative had stated that the "ambivalent approach" of the United States to the solution of the problem of non-proliferation was "as plain as a pikestaff" in the United States draft treaty of August 17, 1965. *Id.* 27.

51. *See, e.g.*, News Conference Remarks by Acting Secretary of State Ball, July 6, 1966,

mately arrived at and embodied in Articles I and II basically reflects the status quo.⁵²

In analyzing the existing circumstances in NATO, as well as possible future arrangements, and the impact of the Non-Proliferation Treaty on these circumstances and arrangements, we must distinguish the warhead from the delivery vehicle. At present the United States has deployed some seven thousand nuclear warheads in non-nuclear-weapon states in Western Europe, principally West Germany. All of these weapons are legally owned by the United States and remain in the physical custody of United States armed forces stationed in Europe.⁵³

55 DEP'T STATE BULL. 122-23 (1966); DOCUMENTS ON DISARMAMENT, 1966, at 406. The remarks by Acting Secretary Ball followed by one day a remark at a news conference by President Johnson: "We hope the Soviet Union will meet us and find an acceptable compromise in language which we can both live with." News Conference Remarks by President Johnson, July 5, 1966, 2 WEEKLY COMPILATION PRESIDENTIAL DOCUMENTS 905; DOCUMENTS ON DISARMAMENT, 1966, at 405. President Johnson's statement signalled to his own State Department, the NATO allies and the Soviet Union a willingness to take a fresh look at the problem of reconciling NATO nuclear arrangements with a non-proliferation treaty.

52. Article I, paragraph 1, of the Soviet draft Treaty proposal of September 24, 1965, would have prohibited the transfer of control over the "emplacement and use" of nuclear weapons to "units of the armed forces of military personnel of States not possessing nuclear weapons even if such units or personnel are under the command of a military alliance." Article I, paragraph 2, would have prohibited nuclear-weapon states from transmitting to non-nuclear-weapon states "any kind of . . . information or documentation which can be employed for purposes of the manufacture or use of nuclear weapons." (Emphasis added.) There were corresponding obligations for non-nuclear-weapon states in Article II. U.N. Doc. A/5976, Sept. 24, 1965; DOCUMENTS ON DISARMAMENT, 1965, at 443-44. This language might have been interpreted as excluding non-nuclear-weapon states from any knowledge concerning nuclear strategy or tactics and any voice in nuclear deployment arrangements, even on their own territory. There is no counterpart for this language in the Treaty text finally agreed upon.

53. Section 92 of the Atomic Energy Act of 1954, as amended, provides in part: "It shall be unlawful, except as provided in section 2121 of this title [Atomic Energy Act § 91], for any person to transfer or receive in interstate or foreign commerce, manufacture, produce, transfer, acquire, possess, import, or export any atomic weapon." 42 U.S.C. § 2122 (1964). The exceptions contained in Section 91 permit cooperation with another nation and the transfer to that nation of nuclear materials for use in atomic weapons, non-nuclear parts of atomic weapons, and reactors and reactor fuels for military applications. The President must determine that any such transfer "will promote and will not constitute an unreasonable risk to the common defense and security, while such other nation is participating with the United States pursuant to an international arrangement by substantial and material contributions to the mutual defense and security . . ." 42 U.S.C. § 2121(c) (1964). In the event of any transfer of nuclear materials for use in an atomic weapons program or of non-nuclear parts of atomic weapons, there is an added requirement that the recipient nation must have already made "substantial progress in the development of atomic weapons," *id.* § 2121(c)(1), which has generally been construed to mean that the recipient must have already acquired nuclear weapons. In no case, however, can the United States transfer to another nation an entire nuclear weapon or the nuclear parts of a nuclear weapon under existing legislation. With respect to the interaction between Section 92 and the Non-Proliferation Treaty a United States spokesman has said that there is "nothing in this treaty that is an inhibition on the United States that we haven't already adopted on a unilateral basis, basis of U.S. law, as far as the substantive inhibitions are concerned. There is a difference between undertaking an international obligation and having a U.S. statute which can be changed by the will of the Congress." Testimony of Adrian S. Fisher, Deputy Director, United States Arms Con-

The United States has sold to certain NATO allies which are non-nuclear-weapon states large numbers of aircraft and surface-to-surface missiles capable of delivering nuclear weapons. The bulk of these nuclear capable delivery systems has gone to West Germany.⁵⁴

If a major conflict broke out in Europe which required use of nuclear weapons, under present arrangements the United States would respond with its own nuclear equipped forces and would also release nuclear warheads in its custody to its non-nuclear NATO allies for delivery on target by their weapons delivery systems. Release of United States nuclear weapons to non-nuclear NATO allies would be effected through "permissive action links," or the "PAL" system. Any such release of nuclear weapons from United States custody would require a specific Presidential decision at that time, followed by an affirmative physical act: the turn of a key by a member of the United States armed forces.⁵⁵

Would the Non-Proliferation Treaty, and in particular the prohibitions on transfer and receipt of nuclear weapons in Articles I and II, upset these large-scale but delicately balanced nuclear force arrangements already established within NATO? It may be argued that stationing or deployment of nuclear weapons on the territory of a non-nuclear-weapon state does not, of itself, constitute a "transfer" of weapons by the nuclear-weapon state concerned. Moreover, existing

trol and Disarmament Agency, *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 70 (1968).

54. The range of the nuclear delivery systems the United States has provided to non-nuclear-weapon NATO allies, however, limits their use to interdiction missions in Eastern Europe and perhaps the western fringe of the Soviet Union.

55. One of the most comprehensive and authoritative unclassified descriptions of existing nuclear arrangements came on September 16, 1964, at the height of the Johnson-Goldwater contest for the Presidency. In an address by President Johnson entitled "Direction and Control of Nuclear Power," which was his response to Senator Goldwater's assertion that authority to use tactical nuclear weapons should be delegated to NATO field commanders, President Johnson stated unequivocally: "The release of nuclear weapons would come by Presidential decision alone." He then went on to explain: "Complex codes and electronic devices prevent any unauthorized action. Every further step along the way from decision to destruction is governed by the two-man rule. Two or more men must act independently and must decide the order has been given. They must independently take action. An elaborate system of checks and counterchecks, procedural and mechanical, guard against any unauthorized nuclear bursts. In addition, since 1961 we have placed permissive-action links on several of our weapons. These are electromechanical locks which must be opened by secret combination before action at all is possible, and we are extending this system. The American people and all the world can rest assured that we have taken every step man can devise to insure that neither a madman nor a malfunction could ever trigger nuclear war." 51 DEP'T STATE BULL. 458-60 (1964); DOCUMENTS ON DISARMAMENT, 1964, at 429, 431 (U.S. Arms Control & Disarmament Agency Pub. No. 27, 1965).

As might be expected, the Soviet Union took a dim view of this technological "fix" adopted by the United States and its non-nuclear NATO allies. It called for an explanation from the U.S. as to "why these locks cannot be opened by evil-doers." Statement by Soviet Union Representative to ENDC, July 21, 1966, ENDC/PV.275, at 20-29; DOCUMENTS ON DISARMAMENT, 1966, at 460, 462-63.

United States custodial and release arrangements with non-nuclear NATO allies would not constitute a transfer or receipt of "control" of nuclear weapons as long as the affirmative act effecting release of the weapons has not occurred.⁵⁶ Thus, "control" would seem to mean actual, not potential, control.

56. What would be the legal effect under the Non-Proliferation Treaty of a United States release of nuclear weapons to non-nuclear-weapon NATO allies? A Presidential decision to effect such a release would not be made except in what appeared at the time to be an extreme emergency at the brink of nuclear war. It is doubtful, however, that sufficient time exists between actual launch of a Soviet nuclear attack and its impact in Western Europe (about 15 minutes) for receipt of warning, a Presidential decision in Washington, nuclear arming of NATO delivery systems in Europe, and, in the case of aircraft at least, stationing on airborne alert. Therefore, it would be possible, if not probable, for the release of United States nuclear weapons to be effected in certain situations prior to actual launch of a Soviet nuclear attack. In these circumstances, two basic scenarios can be envisioned: (1) a major crisis in Europe in which war was subsequently avoided; and (2) a major crisis which resulted in armed conflict.

If war was subsequently avoided and United States nuclear weapons had been released, both the United States and recipient NATO allies would be vulnerable to being charged with a violation of the Non-Proliferation Treaty (assuming the fact of release became known). Of course, the Soviet Union might have an interest in not pressing the charge.

If war subsequently occurred, the question of the impact of war on the Non-Proliferation Treaty would arise. During Senate Foreign Relations Committee hearings on the Limited Nuclear Test Ban Treaty the question arose as to whether Article I of that Treaty, which banned "any other nuclear explosion" in addition to a "nuclear weapon test explosion" in the atmosphere might ban the use of nuclear weapons in war. Both the United States and the Soviet Union had publicly taken the position that the Treaty did not restrict the use of nuclear weapons in war, but only the peacetime conduct of certain nuclear explosions. The implications of the Treaty itself and the intentions of the drafting parties clearly expressed in the legislative history support this position. The Senate Foreign Relations Committee report concluded: "As a practical matter, it would be inconceivable that the treaty, or any of its provisions, could affect a decision to use nuclear weapons should a situation develop in which the security of the United States or any of its allies appeared to be in jeopardy." SENATE COMM. ON FOREIGN RELATIONS, REPORT ON THE NUCLEAR TEST BAN TREATY, S. EXEC. DOC. NO. 3, 88th Cong., 1st Sess. 5 (1963). See also *Hearings on the Nuclear Test Ban Treaty Before the Senate Comm. on Foreign Relations*, 88th Cong., 1st Sess. 76 *et seq.* (1963) (opinion of the Legal Adviser on the meaning of the words "Or Any Other Nuclear Explosion," Aug. 14, 1963); Letter to Senator Fulbright from General Counsel of the Department of Defense concerning use of nuclear weapons in time of war. *Id.* 177-78.

However, the effect of a war involving nuclear weapons on the Non-Proliferation Treaty is not as clear as in the case of the Limited Nuclear Test Ban Treaty. Although the record is unclear, the United States and the Soviet Union may have agreed to interpret the Treaty as being suspended or ended by war. See Testimony of Adrian S. Fisher, *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 67 (1968). It may be argued that a major purpose of the Treaty is to prevent from arising the circumstances under which United States nuclear weapons must be released. If such circumstances do arise, then the purpose of the Treaty will already have been defeated and the restraints of the Treaty would be suspended. Moreover, a case might be made justifying United States action because of prior violations by another Party, or hostile acts justifying a resort to individual or collective self-defense which would override the Treaty's prohibitions.

An argument can also be made that the Non-Proliferation Treaty should not be suspended in time of war. The first two paragraphs of the Preamble read:

"Considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples.

"Believing that the proliferation of nuclear weapons would seriously enhance the danger of nuclear war . . ."

It can be argued that these introductory paragraphs indicate an intention that the Treaty

How much influence must a nation have over or within the decision-making process concerning the use of nuclear weapons to be deemed to have "control"? Nuclear-weapon states consult with non-nuclear-weapon states within both NATO and the Warsaw Pact. Indeed, consultation would seem to be an essential part of any concept of collective defense. In the course of the consultation process, non-nuclear-weapon states have an opportunity to influence to some extent decisions made concerning use of nuclear weapons in the common defense.⁵⁷ It would be difficult to assert, however, that the non-nuclear-weapon states either individually or collectively, would "control" the decision process simply as a result of their participation in consultations.

Planning concerning the deployment and use of nuclear forces has been a central activity of NATO. Participation in detailed planning would accord non-nuclear-weapon states a substantially larger role in the decision-making process than the mere exchange of views which would normally constitute consultation.

In particular, as the United States and certain of its NATO allies gradually backed away from proposals for a multilateral nuclear force (MLF) during 1966 and 1967, the United States came forward with a series of proposals for intensifying consultation and planning concerning nuclear force posture, deployment, strategy and tactics. United States efforts to construct a satisfactory framework for sharing responsibility within NATO for planning and decision-making concerning

not be suspended during hostilities, and that it is essential to the achievement of the purposes of the Treaty that it be maintained during future periods of tension and nuclear crises, including an armed conflict.

Finally, it should be noted that there is no express authority in the Atomic Energy Act of 1954 for lifting in time of major crisis or war the prohibitions on transfer of nuclear weapons contained in Section 92. The assumption on which both Congress and the President have clearly operated has been that the President's inherent authority as Commander-in-Chief to effect release of nuclear weapons in wartime remains unimpaired by Section 92. For discussion, see *Hearings on Amending the Atomic Energy Act of 1954—Exchange of Military Information and Material with Allies—Before the Subcomm. on Agreements for Cooperation of the Joint Comm. on Atomic Energy*, 85th Cong., 2d Sess. 470-74 (1958).

57. In the course of ENDC discussions, Poland attacked the United States draft treaty because it would permit NATO nuclear arrangements which might "increase the influence of a State among its allies." The United States replied: "influence among members of either of the alliances has nothing to do with proliferation and cannot be governed by a treaty." Statement by United States Representative to ENDC, Mar. 3, 1965, ENDC/PV.245, at 25-32; DOCUMENTS ON DISARMAMENT, 1966, at 78, 82-83. Subsequently the United States affirmatively stated the need for consultation: "There must be, in fact, a measure of consultation in any military alliance of sovereign States on the overall strategy or plan of use of all the integrated forces available to the alliance, whether for air defense or other purposes. This consultation must above all seek to achieve an understanding as to the circumstances in which the most devastating of all weapons—that is, nuclear weapons—could be used." Statement by United States Representative to ENDC, Mar. 31, 1966, ENDC/PV.253, at 10-16; DOCUMENTS ON DISARMAMENT, 1966, at 183, 187.

nuclear defense culminated with the establishment in December 1966 of a Nuclear Defense Affairs Committee and a Nuclear Planning Group. The Committee is open to any NATO nation willing to participate. The Nuclear Planning Group is composed of seven Defense Ministers drawn from the full Committee, with the United States, the United Kingdom, West Germany, and Italy as permanent members, and three other Committee members on a rotating basis.⁵⁸ Do the non-nuclear-weapon NATO members which participate in this planning structure have "control" of nuclear weapons?

It may be argued on legal grounds that even joint and detailed planning does not involve a shift in control over an actual decision to use nuclear weapons. Furthermore, the United States has made clear throughout the negotiations its view that a non-proliferation treaty to which it would subscribe must not affect existing consultative and planning arrangements with its NATO allies. The Soviet Union has apparently acquiesced in this view as evidenced by dropping objectionable language in its earlier draft treaty proposals and a subsequent press release.⁵⁹

Thus, we are driven toward an interpretation of "control" which focuses on the actual decision to use nuclear weapons. If a non-nuclear-weapon state could make a *unilateral* and *effective* decision to use nuclear weapons, it would clearly have control—a "finger on the trigger"—whether or not it had physical possession of the weapons. On the other hand, if use of a nuclear weapon by a nuclear-weapon state required concurrence of a non-nuclear-weapon state, then the non-nuclear-weapon state would have control in a negative sense. How-

58. A short summary of the various proposals beginning in 1960 to promote integration between nuclear-weapon and non-nuclear-weapon NATO allies is contained in a statement by Secretary Robert McNamara preceding the first meeting of the Nuclear Planning Group which took place in Washington on April 6-7, 1967. 56 DEP'T STATE BULL. 686-87 (1967). Concerning technical arrangements, in 1964 the United States entered into an agreement for cooperation regarding the exchange of military nuclear information with NATO and its members. Agreement Between the Parties to the North Atlantic Treaty for Cooperation Regarding Atomic Information, [1965] 1 U.S.T. 109, T.I.A.S. No. 3768. The agreement, which supersedes an earlier 1955 agreement, provides for exchange of "atomic information" necessary to development of defense plans, training of personnel in the military applications of atomic energy, evaluation of atomic capabilities of potential enemies "and other military applications," and "development of delivery systems compatible with the atomic weapons which they carry." *Id.* art. III. The agreement specifies that there will be "no transfer [by the United States] of atomic weapons, non-nuclear parts of atomic weapons, or non-nuclear parts of atomic weapons systems involving Restricted Data." *Id.* art. IV.

59. For language dropped by the Soviet Union from its draft Treaty proposals, see note 52 *supra*. West German newspapers reported on April 23, 1968, statements by a Soviet Union official that "the so-called McNamara Committee does not deal with questions relating to proliferation of nuclear weapons, and from this viewpoint discussions of questions which do not concern non-proliferation are not a violation of commitments which can be taken or have already been taken by parties to the treaty."

ever, this kind of decisional control—a “finger on the safety catch”—would seem not to be the kind of control which the Non-Proliferation Treaty is intended to prevent non-nuclear states from acquiring.

Between a finger on the trigger and one on the safety catch, there are a number of intermediate positions. To illustrate three major possibilities, assume that the NATO Nuclear Planning Group, composed of two nuclear-weapon states and five non-nuclear weapon states, is delegated authority to make a binding decision to use nuclear weapons assigned but not transferred to it by the nuclear-weapon states.

One way to make such a decision would be by a simple majority vote. This clearly amounts to a transfer of control in a decisional sense from the nuclear-weapon states to non-nuclear-weapon states and is barred by the Treaty. The result is the same even if a two-thirds, or three-fourths majority were required as long as the majority could be constituted exclusively from non-nuclear-weapon states.

The second possibility is to require a majority vote, which must include the concurring vote of at least one nuclear-weapon state, for decision by the Group to use any of the nuclear weapons assigned to it. This is also prohibited since a nuclear-weapon state is barred by the Treaty from transferring control “to any recipient whatsoever.” This language would bar an arrangement under which a majority of the Group could decide to use nuclear weapons in the physical possession of the United States upon the vote of a majority, including the United States *or* the United Kingdom.

The third possibility is to require a majority which must include the concurring votes of both the United Kingdom *and* the United States. Does retention of a veto over use by every nuclear-weapon state participating take such an arrangement outside the reach of the Non-Proliferation Treaty’s prohibitions? In one sense, as long as a nuclear-weapon state retained a veto over the decision to use any nuclear weapons it had assigned, control would not have passed to any other state or states. If a multilateral decision framework as such is deemed a “recipient” of control, then it would seem to be ruled out by the Treaty. However, if such a framework is deemed to have no organic existence apart from its members, then it may be argued that retention of a veto by each participating nuclear-weapon state is effective to preclude a “transfer” of “control” to a “recipient.” Control would not pass in these circumstances because there is, alternatively, either no transfer or no recipient.⁶⁰

60. Such an argument is supported by analogy to the authority of the United Nations Security Council. Nuclear-weapon states are members of the Security Council. In theory,

Each of the three possibilities discussed above reflects positions taken by the United States during succeeding stages of the Non-Proliferation Treaty negotiations. These efforts to preserve some possibility for joint decision-making concerning the use of nuclear weapons were mounted primarily to keep open an MLF option and other possible "hardware" solutions to the problem of sharing nuclear defense within NATO. These "hardware" solutions would have involved the "transfer" of nuclear weapons to a group or association of NATO allies composed of both nuclear-weapon and non-nuclear-weapon states. "Control" over use of nuclear weapons would have been subject, at least at the outset, to a United States veto.⁶¹

the Charter could provide a legal basis for a decision by the Council ordering the nuclear-weapon permanent members to use nuclear weapons in their custody as part of its authority to use force. Although such a decision may seem beyond the realm of political reality, it is precisely the possibility that such a decision may be made which provides whatever "muscle" there is in the proposed Security Council resolution on security assurances which would be adopted in conjunction with the Non-Proliferation Treaty. *See* discussion at pp. 1512-13 & note 54 *infra*. Of course, it is arguable that a distinction should be drawn between the Security Council and a group within a military alliance.

61. During the 1963-1965 period (before any draft non-proliferation treaty was tabled) under the United States MLF proposal, "firing of the missiles in wartime would be by decision of an agreed number of participants including the United States." However, "In the longer term . . . evolution toward European control as Europe marches toward unity is by no means excluded." Address by Gerald C. Smith, Special Adviser to the Secretary of State, before the United States Naval Academy Foreign Affairs Conference, Dep't of State Release No. 178, Apr. 22, 1964, at 5. This address is one of the fullest official public descriptions of the United States proposal for an MLF. While under the proposal the United States would retain a veto at the outset, it could have been relinquished. Moreover, the recipient of control of the nuclear force might have been an entity composed entirely of non-nuclear-weapon NATO allies. The United States draft non-proliferation treaty of August 17, 1965, retreated somewhat from this position. Article I, paragraph 1, read as follows: "Each of the nuclear States Party to this Treaty undertakes not to transfer any nuclear weapons into the national control of any non-nuclear State, either directly, or indirectly through a military alliance, and each undertakes not to take any other action which would cause an increase in the total number of States and other organizations having independent power to use nuclear weapons." ENDC/162, Aug. 17, 1965; DOCUMENTS ON DISARMAMENT, 1965, at 347. As the United States conceded, this formulation might have been interpreted "to permit the creation of a new nuclear entity composed entirely of non-nuclear-weapon states, in the event that a pre-existing nuclear-weapon state had previously unilaterally disarmed itself of nuclear weapons." Statement by United States Representative to ENDC, Mar. 22, 1966, ENDC/PV.250, at 4-12; DOCUMENTS ON DISARMAMENT, 1966, at 160, 164. The United States draft treaty of August 17, 1965, might also have been interpreted as permitting the creation of a multi-lateral nuclear force to which a nuclear-weapon state had assigned its entire nuclear force and in which a decision to use nuclear weapons could have been taken by a majority vote. On March 22, 1966, the United States amended its proposed Article I to read: "Each of the nuclear-weapon States party to this treaty undertakes: 1. Not to transfer nuclear weapons into the national control of any non-nuclear-weapon State, or into the control of any association of non-nuclear-weapon States." The word "control" was defined in Article IV to mean "right or ability to fire nuclear weapons without the concurrent decision of an existing nuclear-weapon State." In addition, Article I, paragraph 3, obligated the nuclear-weapon states "[n]ot to take any other action which would cause an increase in the total number of States and associations of States having control of nuclear weapons." ENDC/152/Add. 1, Mar. 21, 1966; DOCUMENTS ON DISARMAMENT, 1966, at 159. Under this formulation an MLF in which the United States retained its veto would have been permitted. An MLF in which more than one nuclear-weapon state participated,

The Soviet Union attacked all such schemes as involving proliferation because nuclear weapons would be transferred to the group of states, and, thus, indirectly to the participants in the group. The United States contended there would be no proliferation since there would be no transfer of control over a decision to use nuclear weapons. Moreover, because of the permissive action link system, participants in an MLF would lack not only the right but the ability to fire nuclear weapons. The Soviet Union replied with a series of questions:

We might, for example, ask what the situation would be if the partners of the United States in NATO were to reject the legality of the United States veto at a decisive or crucial moment? What would happen if the partners of the United States in NATO were to find means of opening the lock on nuclear weapons in circumvention of the United States veto? Who would inherit the United States right of veto if NATO ceased to exist? . . . Can it be seriously suggested that a vital multilateral international agreement, to which according to our calculations many States, probably even more than a hundred, could become parties, should be based on the unilateral right of veto of one of the parties to this agreement, the United States? . . . [N]either the Soviet Union nor the many other States . . . can base their security on the United States right of veto on decisions within NATO relating to the use of nuclear weapons.⁶²

There the matter stood, with the United States focusing on "control" and no transfer of control and the Soviet Union emphasizing a vague concept of "access" and simply no transfer, until the United States, for a variety of reasons, gave up all efforts to create a multilateral nuclear force within NATO.⁶³ Although the public record is not clear on this point, it is reasonable to conclude that the Non-Proliferation Treaty

and which permitted nuclear weapons to be fired with the concurrence of either nuclear-weapon state, but not both, would also have been possible. As a practical matter, however, the United States does not seem to have seriously contemplated any such possibility. Shortly before the United States treaty amendments were tabled, on February 23, 1966, Secretary of State Rusk had stated: "We would have to insist . . . that the United States be a party to a decision to use nuclear weapons. Because the vast arsenals of the United States are so heavily involved in that decision, we must be present for that decision and must ourselves agree to the decision taken." *Hearings on Nonproliferation of Nuclear Weapons Before the Joint Comm. on Atomic Energy*, 89th Cong., 2d Sess. 20 (1966). Moreover, the United States could not relinquish its veto without an amendment to existing United States law. *Id.*

62. Statement by Soviet Union Representative to ENDC, Apr. 5, 1966, ENDC/PV.255, at 16-25; DOCUMENTS ON DISARMAMENT, 1966, at 199, 202-03.

63. For a dialogue which reveals some of the thinking behind the United States move, see Testimony of Adrian S. Fisher, Deputy Director, United States Arms Control and Disarmament Agency, *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 200 (1968).

does not necessarily rule out a multilateral decision process which may authorize use of nuclear weapons if each participating nuclear-weapon state retains its individual veto and no nuclear hardware is transferred to the group. Indeed, the net effect of such an arrangement would be more fingers on the nuclear safety catch, but no more on the trigger.

Articles I and II are concerned not only with prohibiting the transfer and acquisition of nuclear weapons or of their control, but also with prohibiting the receipt and transfer of nuclear weapons by certain parties. Although this latter prohibition has been adverted to in discussing the issue of "control," two further implications should be analyzed.

First, Article I prohibits the transfer of nuclear weapons "to any recipient whatsoever," to nuclear-weapon as well as non-nuclear-weapon states. For example, the United States could not, under the Treaty, supply nuclear warheads to the United Kingdom for the Polaris missiles which the United Kingdom will obtain from the United States.⁶⁴ Similarly, Article II prohibits the receipt of nuclear weapons by a non-nuclear-weapon state "from any transferor whatsoever." This language is probably intended to make the undertaking coextensive with the non-transfer obligation of the nuclear-weapon states; it also serves to reinforce the conclusion that transfer and receipt through international organizations or multilateral frameworks is not permitted under the Treaty.⁶⁵

Second, whether these restrictions concerning transfer and receipt would operate as an obstacle to Western European unity deserves discussion. For example, would either France or the United Kingdom, or both, be able to weld their nuclear forces into a "United States of Europe" under the Treaty? Although such a possibility is far below the horizon of political reality today, preservation of the option through some form of express "European clause" has been a continuing concern of some of those favoring European integration. Earlier United States proposals for a non-proliferation treaty contained specific language to protect such a possible political evolution.⁶⁶ At that time the Soviet

64. Under the Nassau agreement the United States and the United Kingdom agreed "that the United States will make available on a continuing basis Polaris missiles (less warheads) for British submarines." Statement on Nuclear Defense Systems, attached to Nassau Communiqué by President Kennedy and Prime Minister Macmillan, Dec. 21, 1962, 49 DEP'T STATE BULL. 43-45 (1963); DOCUMENTS ON DISARMAMENT, 1962, at 1274, 1276 (U.S. Arms Control & Disarmament Agency Pub. No. 19, 1963).

65. Under Articles I and II, "transfer" and "receive" are also modified by "directly, or indirectly." Although this expression is deeply rooted in the history of the negotiations it now seems merely to add further cement to the interpretation suggested previously concerning nuclear sharing arrangements.

66. See analysis, note 61 *supra*.

Union took a firm stance against any evolution in Western Europe, federated or otherwise, which would multiply the number of states or former states having "access" to nuclear weapons.⁶⁷

Since no comparable language appears in the agreed Treaty text, may such a provision still be implied? It would seem reasonable to make a distinction between the notions of "transfer" and "succession." In the process of political unification a United Western Europe would "inherit" the nuclear weapons of France and/or the United Kingdom without transfer or acquisition.⁶⁸

In addition to the prohibitions against transfer and receipt of nuclear weapons, Articles I and II proscribe a further range of activity which is broad, vague, and in large measure susceptible only of subjective appraisal. A nuclear-weapon state undertakes "not in any way to assist, encourage, or induce" any non-nuclear-weapon state to "manufacture or otherwise acquire" nuclear weapons or "control" over such weapons; a non-nuclear-weapon state undertakes "not to seek or receive any assistance in the manufacture of nuclear weapons."⁶⁹

67. In reference to Article I, paragraph 3, of the United States draft treaty amendments of March 22, 1966, the Soviet Union envisioned the possibility that "one or another nuclear Power will give up the rights to use nuclear weapons in favour of a group of States or in favour of the whole military alliance . . ." and "will thus be transformed into a whole series of nuclear States, and instead of one there may be five, ten, fourteen or fifteen Powers having the right and ability to use nuclear weapons." Statement by Soviet Union Representative to ENDC, June 23, 1966, ENDC/PV.267, 4-13; DOCUMENTS ON DISARMAMENT, 1966, at 359, 361.

68. Foreign Minister Brandt of West Germany has stated that a united Europe "would not automatically become a member of such a treaty. A federal European state would instead inherit what its members possess." Interview with *Die Welt*, Feb. 23, 1967. DOCUMENTS ON DISARMAMENT, 1967, at 92, 93. Italy also has made a distinction between an alliance and a federation which would provide for defense under a unified government and would receive only those nuclear weapons that its original members possessed. Statement by Representative of Italy to ENDC, ENDC/PV.267, at 16-17. The United States based its support for keeping the "European option" open on the ground that "welding of all a nuclear weapon State's nuclear forces into a collective unit could take place only in the event of a very profound change in the political relationships existing between States . . ." and even if such a change came about the "centres of nuclear power . . . would not be increased . . ." Statement by United States Representative to ENDC, Mar. 31, 1966, ENDC/PV.253, at 10-16; DOCUMENTS ON DISARMAMENT, 1966, at 183, 185-86.

69. The meaning of "manufacture" which is used in both Articles I and II is extremely important, yet difficult to ascertain. The United States draft treaty of August 17, 1965, had simply prohibited "manufacture" by non-nuclear-weapon states and "assistance to any non-nuclear State in the manufacture of nuclear weapons" by nuclear-weapon states. ENDC/162, Aug. 17, 1965; DOCUMENTS ON DISARMAMENT, 1965, at 347. On the other hand, the Soviet Union draft treaty of September 24, 1965, had included "preparations for the manufacture" of nuclear weapons among the forms of prohibited assistance by nuclear-weapon states and activities prohibited to non-nuclear-weapon states. U.N. Doc. A/5976, Sept. 24, 1965; DOCUMENTS ON DISARMAMENT, 1965, at 443, 444. Sweden addressed the problem fully during the course of the ENDC discussion. Referring to manufacture as "a long ladder with many rungs," the Representative of Sweden contended "the practical question is: on which of these is it reasonable and feasible to introduce international blocking?" Planning decisions to undertake research on nuclear weapons and to obtain fissionable material for use in weapons could be described as preparations for manufacture,

Almost any kind of international nuclear assistance is potentially useful to a nuclear weapons program. Indeed, most nuclear activity is objectively ambiguous. Therefore, if only Articles I and II applied, any nuclear assistance received by a non-nuclear-weapon state could be subjectively appraised as falling within the range of prohibited activity. Fortunately, the application of safeguards to all peaceful nuclear assistance to non-nuclear-weapon states, as required by Article III, provides a way to establish and clarify the peaceful purpose of most international nuclear assistance.⁷⁰

The prohibitions against encouragement and inducement by nuclear-weapon states are even broader and more nebulous than those against assistance, and no other parts of the Treaty would operate to narrow or sharpen the meaning of the terms used.⁷¹ Could China's blandishments to the Afro-Asian nations to follow their example be deemed the kind of encouragement proscribed by the Treaty? Or is something more than

as, of course, could *operational* decisions to build plants and conduct tests. "To prohibit just the final act of 'manufacture' would seem to come late in these long chains of decisions. On the other hand, already to probe the preliminary thinking of politicians and the laboratory research of scientists obviously is as difficult, as it would be considered undesirable intervention. Could a middle link be found on which the prohibitory regulation should most definitely be focused?" Statement by Representative of Sweden to ENDC, Feb. 24, 1966, ENDC/PV.243, at 4-15; DOCUMENTS ON DISARMAMENT, 1966, at 49, 56.

In the March 22, 1966, amendments to its draft Treaty, the United States adopted to some extent the Soviet Union's position concerning preparations for manufacture. Under Article I, as amended, nuclear-weapon states would have undertaken not to provide assistance "in preparations for such manufacture." Under Article II, as amended, non-nuclear-weapon states would have undertaken not to seek or receive assistance "in preparation for such manufacture." However, as distinguished from the Soviet Union's position, there would have been no express prohibition on preparations for the manufacture of nuclear weapons by a non-nuclear-weapon state as long as such activity was carried on without any outside assistance. Articles I and II of the Non-Proliferation Treaty as finally agreed upon do not contain any reference at all to preparations for manufacture, either in relation to prohibited nuclear-weapon state assistance or to prohibited non-nuclear-weapon state activities. In view of this omission together with the historical background, it would appear that at least under Article II of the Treaty non-nuclear-weapon states would remain free to engage in many of those activities on the "long ladder" which stop short of actual manufacture, including perhaps a major portion of nuclear weapons research and development work.

70. Safeguards would not, however, be applicable under Article III to a nuclear weapons research program which did not constitute "manufacture." Moreover, if past IAEA practice is followed in implementing Article III, the specific agreements governing the application of safeguards to peaceful nuclear activities in a non-nuclear-weapon state will provide in general for termination on six months' notice at the option of the state concerned. See Szasz, *The Law of International Atomic Energy Agency Safeguards*, REV. BELGE DE DROIT INT'L 196, 219-20 (1967); Wilrich, *Safeguarding Atoms for Peace*, 60 AM. J. INT'L LAW 34, 50-51 (1966).

71. The concept of a prohibition on encouragement or inducement to manufacture nuclear weapons has its origin in Article I of the Limited Nuclear Test Ban Treaty, which, in addition to prohibiting nuclear weapon test explosions in the atmosphere, outer space and underwater in paragraph 1, also prohibits any Party from "causing, encouraging, or in any way participating in" a nuclear weapon test explosion conducted by any state in a prohibited environment. Limited Nuclear Test Ban Treaty, art. I, para. 2, [1963] 2 U.S.T. 1313, T.I.A.S. No. 5433, 480 U.N.T.S. 43 (1963).

words necessary? The range of possible activities by nuclear-weapon states which constitute assistance, encouragement or inducement under the Non-Proliferation Treaty might develop into a fertile field for future legal controversy, if the parties choose to pour the foreign policy process into this form.

There are also some important limitations on the scope of prohibited activity. Although the transfer of nuclear weapons is prohibited "to any recipient whatsoever," including a transfer from one nuclear-weapon state to another, nuclear-weapon states are prohibited from assisting only non-nuclear-weapon states in the manufacture of nuclear weapons. This leaves open the possibility that nuclear-weapon states could "assist" each other in their respective nuclear weapons programs in a variety of ways, short of transfer, without violating the Non-Proliferation Treaty. In particular, the so-called "special relationship" between the United States and the United Kingdom with respect to nuclear weapons cooperation is apparently unimpaired by Article I.⁷²

The undertaking by nuclear-weapon states not to assist non-nuclear-weapon states under Article I is universal and applies with equal force to all such states, whether or not they are parties to the Treaty. Indeed, any other result would constitute an inducement to non-nuclear-weapon states not to become parties to the Treaty. Article II, on the other hand, does not on its face prohibit a non-nuclear-weapon state from assisting *any* state in the manufacture of nuclear weapons. Article I does not prohibit a nuclear-weapon state from *receiving* such assistance. Therefore, the Treaty does not limit a nuclear-weapon state's ability to purchase uranium for its weapons program from any foreign supplier. On the other hand, assistance in the manufacture of nuclear weapons may not be given by a non-nuclear-weapon state to another non-nuclear-weapon state if the latter is a party to the Treaty without the recipient being in violation of its obligations under Article II not to seek or receive such assistance. But Article II does not expressly prohibit a non-nuclear-weapon party from giving assistance in the manufacture of nuclear weapons to another non-nuclear-weapon state which is not a party.

It might appear that this loophole in Article II is closed by Article III, since under paragraph 2 all parties undertake not to supply nuclear materials and equipment to non-nuclear-weapon states, whether or not

72. The basic United States-United Kingdom agreement for cooperation on the uses of atomic energy for mutual defense purposes entered into force Aug. 4, 1958. [1958] U.S.T. 1028, T.I.A.S. No. 4078, 326 U.N.T.S. 3. It was amended May 7, 1959, [1959] 2 U.S.T. 1274, T.I.A.S. No. 4267, 351 U.N.T.S. 458. For recent criticism of the "special relationship," see G. BALL, *THE DISCIPLINE OF POWER* 90-117 (1968).

parties, except under safeguards. But this argument fails because safeguards under Article III are applicable only to nuclear materials and equipment provided "for peaceful purposes." Therefore, under the Treaty as it stands, there would seem to be no legal obstacle to a non-nuclear-weapon party furnishing material assistance to another non-nuclear-weapon state not a party to the Treaty for a nuclear weapons program. In spite of the plain meaning of the Treaty's language in this regard, both the United States and the Soviet Union have tried to close this loophole by questionable interpretations.⁷³ Of course, the Treaty could have been amended to cover this problem clearly.⁷⁴ But such an amendment might well have resulted in pressure from other nations to have the Treaty bar assistance by non-nuclear-weapon states not only to other non-nuclear-weapon states, but also to the nuclear-weapon states themselves.

The prohibitions contained in Articles I and II of the Non-Proliferation Treaty thus far discussed have been directed at actions between states, including transfer and receipt of nuclear weapons and assistance

73. The United States has stated: "It seems clear that a non-nuclear-weapon state which accepts the treaty's restrictions on itself would have no reason to assist another country not accepting the same restrictions to gain advantage from that fact in the field of nuclear-weapon development. If a non-nuclear-weapon party did nevertheless attempt to provide such assistance in the territory of a non-party, the presumption would immediately arise that these acts had the purpose of developing nuclear weapons itself, in violation of the treaty." Statement by United States Representative to ENDC, ENDC/PV.370 (prov.), at 52-60. The Soviet Union has stated on the same point: "If a non-nuclear State were to give assistance to another non-nuclear State in producing or acquiring nuclear weapons, in that case, under the provisions of Article II and the preamble to the treaty, it would be viewed as a violation of the treaty." Statement by the Soviet Union Representative to ENDC, ENDC/PV.370 (prov.), at 41-44.

74. On two occasions the United Arab Republic suggested that Article II should be amended to ban assistance by one nuclear-weapon state to another (and also to amend Article I to ban expressly transfer by private organizations and individuals). Statements by Representative of United Arab Republic to ENDC, ENDC/PV.333, at 4ff; ENDC/PV.367 (prov.), at 12-16. Brazil and India supported the U.A.R. with regard to Article II. ENDC/PV.363 (prov.), at 32-35; ENDC/PV.368 (prov.), at 23-25. The United States draft treaty of August 17, 1965, covered the point nicely. Article II, paragraph 2, provided: "Each of the non-nuclear States Party to this Treaty undertakes not to seek or to receive assistance in the manufacture of nuclear weapons, or *itself to grant such assistance*." ENDC/162, Aug. 17, 1965; DOCUMENTS ON DISARMAMENT, 1965, at 347, 348 (emphasis added). The United States draft Article II as amended on March 22, 1966, also covered the point. ENDC/152/Add. 1, Mar. 22, 1966; DOCUMENTS ON DISARMAMENT, 1966, at 159. The Soviet Union draft treaty of September 24, 1965, was less clear, but Article II, paragraph 1, did prohibit non-nuclear-weapon states from manufacturing nuclear weapons "either independently or together with other States, in their own territory or in the territory of other States." U.N. Doc. A/5976, Sept. 24, 1965; DOCUMENTS ON DISARMAMENT, 1965, at 443, 444. The reluctance of the superpowers to amend their draft in this respect seems difficult to justify, especially if there was support for such an amendment from the non-nuclear-weapon states, and if there was no latent conflict between the superpowers as to interpretation. With reference to the statements by the United States and Soviet Union, at note 73 *supra*, the United Arab Republic Representative has stated that the fact that these statements were made by the co-Chairmen and co-authors of the Treaty "confers important weight upon them." Statement by Representative of United Arab Republic to ENDC, Feb. 27, 1968, ENDC/PV.370, at 31.

in the manufacture of such weapons. Of course the gut provision of the Treaty, directed at non-nuclear-weapon states individually, is the undertaking "not to manufacture or otherwise acquire" nuclear weapons or other nuclear explosive devices, even with indigenous resources and without any outside help. In effect, all the measures of nuclear disarmament which the nuclear-weapon states have been unable to agree upon in 23 years of almost uninterrupted negotiation would be applied prospectively to the non-nuclear-weapon states, including a comprehensive ban on all nuclear weapon tests and a halt in production of fissionable materials for use in weapons.⁷⁵ Non-nuclear-weapon parties must henceforth be satisfied with pursuing the peaceful uses of nuclear energy.⁷⁶

B. *Peaceful Nuclear Activities*

Since peaceful and warlike uses of nuclear energy spring from the same technology, the provisions of the Non-Proliferation Treaty concerned with peaceful nuclear activities (Articles III, IV, and V) are at least as important in the overall non-proliferation scheme as those focused directly on nuclear weapons. Article III provides for safeguards on peaceful nuclear activities in non-nuclear-weapon states to ensure that nuclear materials used in such activities are not diverted to use in weapons. Articles IV and V contain important undertakings regarding future cooperation in the peaceful uses of nuclear energy. Many of the undertakings concerning cooperation laid on the nuclear-weapon states, some hortatory and some real, have been inserted to reduce the discrimination inherent in asking non-nuclear-weapon states to pledge not to manufacture nuclear weapons, even out of their own resources. Furthermore, the opportunity of receiving expanded nuclear assistance for peaceful purposes provides a carrot for the non-nuclear-weapon states to accept safeguards, while the threat of a refusal of further cooperation unless such safeguards are accepted could be a rather effective stick.

1. *Treaty Safeguards*

The character of existing international safeguards systems has been previously outlined. A major part of the problem with implementing

75. In 1955 both the Soviet Union and the United States conceded that, as a technical matter, in view of the amounts of fissionable material that has already been produced, it would be impossible to provide assurance that all stockpiles of nuclear weapons had been eliminated under any practicable verification system. After 1955, therefore, talk of complete nuclear disarmament by the nuclear-weapon states became at most propaganda. For the text of the Soviet statement, see 1 DOCUMENTS ON DISARMAMENT, 1945-1959, at 456, 464-67 (U.S. Dep't of State No. 7008, 1960); and for the United States statement, see *id.* 510-13.

76. But the breadth of the pledge not to manufacture depends on the interpretation of "manufacture." See note 69 *supra*.

the Non-Proliferation Treaty will be to fit the Treaty safeguards requirements into the framework which already exists.

At the outset, it is important to stake out certain ground which is beyond the reach of any international inspection requirement under the Treaty. There is no verification of the undertakings by the parties under Articles I and II not to transfer or receive nuclear weapons.⁷⁷ Moreover, safeguards are not intended to ensure that a non-nuclear-weapon state does not establish a secret nuclear weapons program entirely outside and independent of its peaceful nuclear industry. A system for effective verification of these fundamental obligations would require access not only to declared peaceful nuclear activities within states, but also to all areas and activities suspected of being related to a nuclear weapons program. Such verification would probably be so intrusive and extensive as to render the Non-Proliferation Treaty unacceptable to some nuclear-weapon as well as many non-nuclear-weapon states.⁷⁸

Finally, safeguards are not required on peaceful nuclear activities within nuclear-weapon states. A logical reason for this exemption is that in a nuclear-weapon state verification that the nuclear materials used in the peaceful program are not diverted to weapons loses its non-proliferation purpose.⁷⁹ The political reason for the exemption is that an international inspection of civil nuclear activities in nuclear-weapon

77. Rumania and India questioned the absence of any method of assuring that the nuclear-weapon states and their non-nuclear-weapon allies were respecting their obligations under Articles I and II. Statement by Representative of Rumania to ENDC, ENDC/362 (prov.), at 12; Statement by Representative of India to ENDC, ENDC/PV.370 (prov.), at 17.

78. Article 16 of the Treaty of Tlatelolco, however, provides for "special inspection" when so requested "by any party which suspects that some activity prohibited by this Treaty has been carried out or is being carried out . . .," or when requested "by any party which has been suspected or charged with having violated the Treaty." The inspection is to be carried out in such a situation not by the IAEA which has general safeguards responsibilities with respect to declared peaceful nuclear activities in the territories of the parties, but by the Council of the Agency for the Prohibition of Nuclear Weapons in Latin America. The Council is composed of five of the parties, each elected for a four-year term. Therefore, although the Latin American nuclear free zone concept includes peremptory inspection for clandestine nuclear weapons facilities, the inspection agency is regional rather than global in make-up.

79. The logic, however, can be questioned. In the past, much of the plutonium produced in civil nuclear power reactors in the United Kingdom, and probably in the Soviet Union, has been used in nuclear weapons programs. In the United States one dual purpose power and plutonium production reactor was specially built at Hanford, Washington. The bulk of the plutonium produced in France's nuclear power reactors is being used in the French weapons program. For this reason, the French, on doubtful legal grounds, are believed not to have permitted Euratom inspection of most of their nuclear power reactors. These circumstances suggest that safeguards on reactors in nuclear-weapon states could force a clear separation between civil power and military production facilities and, in some cases, make the production of plutonium for weapons more expensive for nuclear-weapon states.

states is not acceptable to the Soviet Union. The absence of any requirement that the nuclear-weapon states accept safeguards on their peaceful nuclear activities creates another major political discrimination in the Treaty between nuclear-weapon and non-nuclear-weapon states.⁸⁰ Concern has also been expressed that nuclear industries in non-nuclear-weapon states would risk disclosure of industrial secrets in the international inspection process, while their commercial competitors in nuclear-weapon states would not.⁸¹ To meet this concern with possible

80. On May 30, 1967, before any superpower-agreed draft had been tabled, Sweden outlined five possible safeguards systems for a non-proliferation treaty in descending order of acceptability: (1) Universal and obligatory submission to safeguards of all nuclear industry of all states and of all transfers of nuclear materials between states. This would amount to a verified cut-off of further production of fissionable materials for weapons as well as assurance that civil nuclear industries were not diverted. It would stop vertical and horizontal proliferation. (2) Compulsory submission to safeguards of all peaceful nuclear activities of all states, and all transfers between all states. This would provide a complete stop to horizontal proliferation, including additions from abroad to the weapons programs of nuclear-weapon states. It would also provide non-discrimination and commercial equity in the peaceful nuclear sector. (3) Compulsory submission to safeguards of all peaceful nuclear activities in non-nuclear-weapon states and on all transfers between all states. This would stop horizontal proliferation, but would introduce the possibility of discrimination in regard to the commercial markets within the nuclear-weapon states between domestic and foreign suppliers. (4) Application of safeguards to all transfers between all states. This would be non-discriminatory in a sense, but would favor those states which were self-sufficient and would be ineffective from the standpoint of insuring against horizontal proliferation. (5) Application of safeguards to all peaceful nuclear activities in non-nuclear-weapon states and all transfers to non-nuclear-weapon states. This would stop horizontal proliferation to non-nuclear-weapon states, but would not prevent foreign contributions to nuclear weapons programs in nuclear-weapon states. It would also be commercially discriminatory. Sweden called the fifth alternative "very unsatisfactory" and "unbalanced in all respects." Statement by Representative of Sweden to ENDC, May 30, 1967, ENDC/PV.300, at 4-15; DOCUMENTS ON DISARMAMENT, 1967, at 239, 243-45. Nevertheless, the fifth alternative is essentially the alternative adopted in Article III of the Non-Proliferation Treaty.

81. The IAEA system itself gives broad protection to commercial and industrial secrets. Members of the Agency staff are prohibited from disclosing, except to authorized Agency officials, commercial secrets "or any other confidential information" coming to their knowledge by reason of safeguards administration. Specific information relating to the implementation of safeguards may be given to the Board of Governors and to staff members "only to the extent necessary for the Agency to fulfill its safeguards responsibilities." Summarized lists of items being safeguarded may be published upon Board decision, but publication of additional information requires the further consent of all states "directly concerned." I.A.E.A. INFCIRC/66, at para. 14 (1965).

The fear that implementation of safeguards could result in unwanted disclosure of valuable industrial secrets is probably derived in large measure from the international character of the inspectorate. Western and capitalist countries may be concerned that Agency inspectors who are nationals of Communist states would have little respect for property rights in information. Moreover, countries engaged in stiff technical competition in developing advanced reactor concepts might well be concerned about inspection by the national of a competitor, regardless of the economic ideology of his government.

The IAEA system also contains requirements that safeguards be implemented "in a manner designed to avoid hampering a State's economic or technological development," and "in a manner designed to be consistent with prudent management practices required for the economic and safe conduct of nuclear activities." I.A.E.A. INFCIRC/66, at paras. 9-10 (1965). A more specific provision dealing with a related question states that the Agency shall not request the state concerned "to stop construction or operation" of any nuclear facility "except by explicit decision of the Board." *Id.* para. 11. These "safeguards against safeguards" provided in the IAEA system are echoed in Article III, paragraph 3,

economic discrimination the United States has declared its intention, when safeguards are applied under the Treaty in non-nuclear-weapon states, to "permit the International Atomic Energy Agency to apply its safeguards to all nuclear activities in the United States—excluding only those with direct national security significance."⁸² The United Kingdom has made a parallel policy declaration.⁸³ Thus, argument by the non-nuclear-weapon states that Article III of the Treaty discriminates against them in this way should be primarily directed to the Soviet Union.

In spite of these several limitations on the application of safeguards, Article III would have a broad impact on peaceful nuclear activities within non-nuclear-weapon states, and on international nuclear commerce. Under paragraph 1 of Article III,⁸⁴ each non-nuclear-weapon

of the Non-Proliferation Treaty, which provides: "The safeguards required by this Article shall be implemented in a manner designed to comply with Article IV of this Treaty, and to avoid hampering the economic or technological development of the parties or international co-operation in the field of peaceful nuclear activities, including the international exchange of nuclear material and equipment for the processing, use or production of nuclear material for peaceful purposes in accordance with the provisions of this Article and the principle of safeguarding set forth in the preamble."

82. Address by President Johnson, Dec. 2, 1967, 57 DEP'T STATE BULL. 862, 863 (1967); DOCUMENTS ON DISARMAMENT, 1967, at 613-15. Previously, the United States attitude had been that "the application of a system of safeguards to all the peaceful activities of existing nuclear-weapon Powers would involve a tremendous strain on the safeguard system. A strict inspection of the peaceful nuclear activities of existing nuclear-weapon Powers when there is no restriction on their increasing their large nuclear stockpiles might well be described as straining at gnats while swallowing camels." Statement by United States Representative to ENDC, July 28, 1966, ENDC/PV.277, at 407; DOCUMENTS ON DISARMAMENT, 1966, at 482, 483-84.

83. For statement by United Kingdom Disarmament Minister Mulley to the House of Commons, Dec. 4, 1967, see ENDC/207, Dec. 5, 1967; DOCUMENTS ON DISARMAMENT, 1967, at 616.

84. "Each non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfillment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedures for the safeguards required by this article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere." Art. III, para. 1.

The question may be asked whether Article III incorporates by reference the IAEA safeguards system as it would exist when the Treaty enters into force. If such were the case, it might be argued that a Treaty amendment would be required to change the IAEA safeguards system applicable by virtue of Article III. The United States has stated that the Non-Proliferation Treaty should not be interpreted in this way. Statement by United States Representative to ENDC, Jan. 18, 1968, ENDC/PV.357, at 14, 16. The IAEA system itself contains provision for "periodic review in the light of the further experience gained by the Agency as well as of technological developments." I.A.E.A. INFCIRC/66, at para. 8 (1965). The Preamble to the Non-Proliferation Treaty also contains a paragraph: "Expressing their support for research, development and other efforts to further the application, within the framework of the International Atomic Energy

state undertakes to accept safeguards which would be applied "on all source or special fissionable material in all peaceful nuclear activities" within its territory or under its jurisdiction or control. Hence, safeguards would be applicable to the entire peaceful nuclear industries of all non-nuclear-weapon states which become parties to the Treaty. Widespread adherence to the Non-Proliferation Treaty would, therefore, constitute a major step toward international security regulation of the nuclear phase of the energy economy in many countries of the world, and in Eastern as well as Western Europe.⁸⁵

But the undertaking of the non-nuclear-weapon states under paragraph 1 to accept safeguards is imperfect. Since the "exclusive purpose" of safeguards under Article III is "verification of the fulfillment of [each non-nuclear-weapon state's] obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices," the Treaty safeguards do not necessarily prohibit diversion to any military purpose aside from nuclear weapons. Under paragraph 2 of Article III, which covers international nuclear transactions, safeguards are not required on imports for a military reactor program in a non-nuclear-weapon state.⁸⁶ Unless the safeguards concept is applied more broadly under paragraph 1 than under paragraph 2, therefore, safeguards would not follow nuclear materials transferred by a non-nuclear-weapon state

Agency safeguards system, of the principle of safeguarding effectively the flow of source and special fissionable materials by use of instruments and other techniques at certain strategic points." Under the IAEA safeguards system, however, the specific safeguards agreements would be negotiated with reference to the system as it exists at that time. Further modification in the IAEA system would not affect safeguards agreements already in effect unless so provided in the agreement or consented to by the state concerned. I.A.E.A. INF/CIRC/66, at para. 6 (1965). See also Statement by United States Representative to ENDC, ENDC/PV.368 (prov.), at 23-26.

85. Although in the past the Communist states have been adamant against arms control inspection, Eastern European states have declared their willingness to accept IAEA safeguards while West European states have been reluctant. At the Tenth General Conference of the IAEA (Sept. 21-28, 1966) East Germany, not an IAEA member, declared its willingness to "accede" to IAEA safeguards on condition that West Germany, an IAEA member, would do likewise. I.A.E.A. Doc. GC(x)/INF/91, Sept. 27, 1966; DOCUMENTS ON DISARMAMENT, 1967, at 640. Poland and Czechoslovakia made similar offers to place their nuclear facilities under IAEA safeguards if West Germany would reciprocate. *Id.* 642-43. West Germany responded that it had expressly renounced production of nuclear weapons in 1954, had already accepted Euratom safeguards on all its nuclear facilities, and would be willing to require IAEA safeguards on all its nuclear exports outside the Euratom area, "provided other supplying countries are willing to impose the same condition." I.A.E.A. Doc. GC(x)/OR.104, at 14; DOCUMENTS ON DISARMAMENT, 1967, at 644.

Participation of East Germany in the Non-Proliferation Treaty will raise some interesting problems. If East Germany joins the Treaty and accepts IAEA safeguards, its claim for membership in the IAEA would be strengthened. If East Germany is admitted to the IAEA it will be the first time that both halves of Germany have been members of the same international organization and the first time East Germany will be a member of a U.N.-related agency.

86. See pp. 1489-90 *infra*.

from a civil power reactor to a military propulsion reactor program, for example.⁸⁷

These are intricate but limited problems concerning the purpose of the safeguards. Under the word "verification" is buried the major part of a much larger and more politically charged problem. How should the global IAEA system of safeguards be related to the regional Euratom system within the framework of the Non-Proliferation Treaty?⁸⁸ Should "verification" require basically the same arrangements between

87. In connection with this problem, the United States has stated: "The present IAEA Statute and safeguards system do not provide for safeguards on military facilities" Statement by State Department Spokesman Robert McCloskey, Mar. 14, 1968 (unpublished). This statement can support a conclusion that safeguards under Article III do not apply to military non-weapon nuclear programs. However, the statement does not resolve the problem of whether a non-nuclear-weapon state would be free to transfer nuclear materials subject to safeguards into a military nuclear program. The IAEA is authorized to establish and administer safeguards designed to ensure that safeguarded nuclear materials and equipment "are not used in such a way as to further any military purpose." I.A.E.A. STAT. art. III, A, 5. If non-nuclear-weapon states were free at will to terminate a safeguards agreement as to particular nuclear material or a piece of equipment it wished to use for a military purpose, the purpose of IAEA safeguards would seem to be distorted. This potential conflict between the IAEA Statute and Article III of the Non-Proliferation Treaty may be eased somewhat by the limitation in I.A.E.A. STAT. art. II, that the IAEA shall ensure only "so far as it is able" against diversion to "any military purpose." Nevertheless, having accepted safeguards on their peaceful nuclear activities, the non-nuclear-weapon states might find that safeguards obstruct, to some extent, their ability to engage in military non-weapon nuclear programs or nuclear-weapon research programs which are not deemed to be manufacture. Of course, from the standpoint of non-proliferation policy, this seems a desirable effect.

88. Any relationship between Euratom and IAEA will raise a number of legal and political issues. From the Euratom perspective, do the Community and its member states have power under the Euratom Treaty to consent to the application of IAEA safeguards on peaceful nuclear activities with the Community, or would amendment to the Treaty be required? Assuming amendment would not be required, who would have to consent or be a party to an arrangement between Euratom and IAEA or the application of IAEA safeguards within a particular Euratom member state—the state concerned, other member states, the Commission, the Council? In general, there are a variety of legal roadblocks which could be thrown in the way of any arrangement which accorded IAEA a right for its inspectors to enter Euratom territory, even though the particular Euratom member state concerned agreed. Not the least of these is the fact that under Article 86 of the Treaty all fissionable material subject to Euratom safeguards is *ipso facto* owned by the Community. On the other hand, there appears to be enough flexibility in the constitutional arrangements to permit a variety of relationships such as according IAEA a right to enter Euratom territory as long as no single member state voices strong objection. Whether one Euratom member state could veto arrangements proposed to be concluded with the IAEA which would be applicable only to other consenting member states is problematic.

From the perspective of IAEA, the kind of arrangement with Euratom and/or some of its member states that the Agency could become a party to is limited by its statute. Unlike Euratom, however, the basis for IAEA safeguards jurisdiction is primarily consensual and *ad hoc*. The Board of Governors of the IAEA will have considerable flexibility in the kind of arrangements which it can properly approve under Article III. The present safeguards system provides that the IAEA will not assume safeguards responsibility for nuclear materials "unless the principles of the safeguards and the procedures to be used are essentially consistent with those set forth in this document." I.A.E.A. INFCIRC/66, at para. 5 (1965). However, the present system also includes provision for transfer of safeguarded nuclear material into a state if it will be subject in the recipient state "to safeguards other than those of the Agency but generally consistent with such safeguards and accepted by the Agency." *Id.* para 28(d). See also p. 1485-86 & note 90 *infra*.

the IAEA and all non-nuclear-weapon parties to the Treaty?⁸⁹ If so, the result could be the application of IAEA safeguards in parallel with, if not in lieu of, Euratom safeguards in the territory of non-nuclear-weapon Euratom members which adhered to the Non-Proliferation Treaty. Or, in the case of the five non-nuclear-weapon states whose peaceful nuclear activities are already subject to Euratom's system of safeguards, should "verification" be accomplished by an IAEA decision to accept Euratom safeguards in lieu of those of the Agency?⁹⁰ Between these extremes of parallel application of IAEA safeguards in Euratom territory on the one hand, and complete delegation of IAEA responsibilities to Euratom on the other, a range of intermediate possibilities exists.

89. Sweden has called for "the application of *one* system of safeguards to the activities of *all* countries." Statement by Representative of Sweden to ENDC, ENDC/PV.300, at 6-7. The United Arab Republic has similarly stated that a non-proliferation treaty should require "compulsory and uniform application" of IAEA safeguards to all non-nuclear-weapon states. Statement by Representative of United Arab Republic to ENDC, ENDC/PV.294, at 7. Section 11(E) of the United States Euratom Agreement for Cooperation provides: "In recognition of the importance of the International Atomic Energy Agency, the United States of America and the European Atomic Energy Community will consult with each other from time to time to determine whether there are any areas of responsibility with regards to safeguards and controls and matters relating to health and safety in which the Agency [IAEA] might be asked to assist." In an exchange of correspondence with reference to Section 11(E), the understanding was reached that "in the event of the establishment of an international safeguards and control system by the International Atomic Energy Agency, the United States and Euratom will consult regarding assumption by that agency of the safeguard and control over the fissionable material utilized or produced in implementation of the program contemplated by the Memorandum of Understanding." European Atomic Energy Community, Agreement for Cooperation between the European Atomic Energy Community and the Government of the United States of America and Related Documents, Nov. 8, 1958, at 45-48. The United States has been able to make no tangible progress in implementation of Section 11(E) and the understanding.

Until recently, in addition to the United States-Euratom Agreement for Cooperation, bilateral agreements for cooperation were in effect between the United States and the Euratom member states individually. Although various Euratom members would have preferred that these bilateral agreements continue, the United States adopted a "fold-in" policy of non-renewal upon expiration of their fixed terms, continuing the same nuclear cooperation, however, under the aegis of the overall United States-Euratom agreement. This move was designed to strengthen Euratom at a time when nuclear industries within the member states were tending to become increasingly nationalistic. The trend toward nuclear nationalism has not been substantially affected by the fold-in policy, but by adopting it the United States has given up a series of bilateral agreements. The responsibility for safeguards under these agreements might have been transferred from the AEC to the IAEA in accord with general United States safeguards policy, and by this time the problem of relating IAEA safeguards to peaceful nuclear activities in non-nuclear-weapon Euratom member states might have been largely resolved, at least in principle. The United States, however, did not get its priorities as between promoting European nuclear integration and global non-proliferation readjusted in time.

90. The present IAEA safeguards system would allow for this, upon a decision of the Board of Governors, as to transfers into the Community. The principle might be extended to safeguarding peaceful nuclear activities in a state. See Willrich, *Safeguarding Atoms for Peace*, 60 AM. J. INT'L L. 34, 49-50. Nevertheless, it seems unlikely the Board would ever make such a decision generally to abdicate its responsibilities in relation to Article III of the Non-Proliferation Treaty.

These possibilities will be analyzed in terms of the two basic requirements which both IAEA and Euratom safeguards systems include: first, that reports which reflect the running inventory of nuclear materials in various declared locations be submitted to an external authority; second, that the external authority have physical access to the declared locations to check by independent means the accuracy of the reports. There are many intermediate positions around which a Euratom-IAEA relationship could be built. With respect to reporting, declared locations could submit reports directly to the IAEA; they could submit reports to Euratom for forwarding to the IAEA; or they could submit reports only to Euratom, and Euratom could compile its own set of reports for submission to IAEA. All reporting requirements could be more or less based on the Euratom or on the IAEA system. With respect to physical access, declared locations could be open to IAEA inspection as prescribed under the IAEA safeguards system; they could be open to IAEA inspection on a less frequent basis than generally prescribed under the IAEA system; they could be open to IAEA inspection only if reports to the IAEA revealed a discrepancy; they could be closed to IAEA inspection as such, but IAEA inspectors could accompany Euratom inspectors on a limited basis; they could be closed to IAEA inspection, with IAEA inspectors being limited to consultation with Euratom inspectors and review of Euratom inspection procedures used. With respect to all IAEA access to declared locations, Euratom might or might not be given advance notice and a right to accompany IAEA inspectors.⁹¹

The governments concerned have disclosed little beyond general

91. In general, the IAEA system provides for the right of access at all times without advance notice to reactors capable of producing more than 60 kilograms of plutonium per year (which includes virtually all power reactors). Chemical processing plants with an annual throughput exceeding 5 kilograms of plutonium are subject to be "inspected at all times," and in such plants with a throughput exceeding 60 kilograms "the right of access at all times would normally be implemented by means of continuous inspection." See I.A.E.A. INFCIRC/66, at para. 57 (1965); I.A.E.A. Doc. GC(x)/INF/86, Annex, para. 3 & n.2 (1966). Thus, large nuclear facilities under IAEA safeguards are open to inspection at any time, and resident inspection is a distinct possibility.

IAEA inspectors for a particular state are designated by the Director General from a panel previously nominated by him and approved by the Board of Governors. In each case the state concerned must approve the identity of the inspectors designated. I.A.E.A. Doc. GC(v)/INF/39, Annex, paras. 1-3 (1961); see Szasz, *The Law of International Atomic Energy Agency Safeguards*, 3 REV. BELGE DE DROIT INT'L 196, 224-25 (1967). See also Statement by Department of State, DOCUMENTS ON DISARMAMENT, 1967, at 96, 97. In practice, therefore, a Western state could refuse to admit an IAEA inspector from a Communist state and vice versa. A Western state may also be reluctant to admit an inspector from another Western state with which it is in commercial competition. If these attitudes persist under the Non-Proliferation Treaty it would place a very large burden of inspection on neutral and developing states, some of which do not have available personnel or can ill afford to supply people well qualified to be inspectors.

positions as to the nature of the IAEA-Euratom arrangement that might emerge under Article III, leaving plenty of room for future conflict. On the one hand, the Soviet Union has characterized Euratom as a "closed organization of West Germany's allies in the military NATO bloc," and Euratom's safeguards as nothing more than self-inspection.⁹² Acceptable safeguards, in their view, are those of the IAEA, an organization in which all social and political systems are represented and in which all states can have confidence. On the other hand, Euratom member states have agreed among themselves that any arrangement between the IAEA and Euratom resulting from the Non-Proliferation Treaty "should concern the verification of Euratom control methods and not direct IAEA control."⁹³ Caught in the middle, the United States has stated that:

In order to avoid unnecessary duplication, the IAEA should make *appropriate* use of existing records and safeguards, provided that under such mutually-agreed arrangements IAEA can satisfy *itself* that nuclear material is not diverted to nuclear weapons or other nuclear explosive devices.⁹⁴ (Emphasis added.)

92. Statement by Representative of Soviet Union to First Committee of the U.N. General Assembly, Oct. 20, 1966, U.N. Doc. A/C.1/PV.1431, at 6-21 (1966); DOCUMENTS ON DISARMAMENT, 1966, at 657, 661. The element of self-inspection, while not a major concern in the present political context in Western Europe, would become increasingly important if progress toward the political integration of Western Europe were achieved. Secretary of State Rusk has also recognized the precedent the relationship of IAEA to Euratom would set for "other parts of the world who might wish to put together a little family group which would inspect itself and deny outside inspection on the grounds that it is up to each regional group to provide its own inspection." Television Interview with Secretary of State Rusk, Feb. 10, 1967, 56 DEP'T STATE BULL. 360 (1967). It is noteworthy in this regard that although the Treaty of Tlatelolco would establish an "Agency for the Prohibition of Nuclear Weapons in Latin America" with certain inspection functions, Article 13 of the Treaty also provides: "Each Contracting Party shall negotiate multilateral or bilateral agreements with the International Atomic Energy Agency for the application of its safeguards to its nuclear activities." Thus, the element of self-inspection will be avoided as to declared facilities in the Latin American nuclear free zone. For the treatment accorded inspection for possible clandestine facilities, see note 78 *supra*.

93. EUROPEAN COMMUNITY, Apr. 1968, at 17. West German Foreign Minister Brandt has stated that the IAEA could be related to Euratom by means of a "verification treaty." He has also said that under a non-proliferation treaty, "[t]he IAEA should be able to convince itself of the effectiveness of the other control systems." Statement by Foreign Minister Brandt to the Bundestag, Apr. 27, 1967, at 1-8; DOCUMENTS ON DISARMAMENT, 1967, at 206, 213. France has remained aloof during the course of discussions in Euratom and will probably not become a party to the Treaty. Even if it did, as a nuclear-weapon state, France would not be required to accept safeguards under Article III. While the objective of Euratom is intended to create one integrated legal and economic community as regards the peaceful uses of nuclear energy among its member states, the results of the Non-Proliferation Treaty will be to apply to peaceful nuclear activities in the five non-nuclear-weapon Euratom members certain measures not applied to similar activities in France.

94. Statement by the United States Representative to ENDC, Jan. 18, 1968, ENDC/PV.357, at 14, 17. Statement of this principal was the *quid* by which the United States was able to obtain the *quo* of Soviet agreement to a text for Article III which had been previously approved by the NATO Council. For a fascinating account of the history by

With these diverse viewpoints and interests involved, putting together a combination of reporting and access provisions from the possibilities outlined, and elaborating these into an overall relationship among IAEA, Euratom and the non-nuclear-weapon Euratom members will be a complicated process. However, it will revolve around one central question. Should the IAEA have access to declared locations within Euratom territory as a matter of right? Diplomats and their lawyers will perhaps invent solutions to obscure or gloss over this issue. But it can be avoided only if the participants in future negotiations agree to do so.

While paragraph 1 of Article III deals with acceptance of safeguards on peaceful nuclear activities within non-nuclear-weapon parties, paragraph 2 pertains to international transactions in nuclear materials and

a participant, see Testimony of Adrian S. Fisher, Deputy Director, United States Arms Control and Disarmament Agency, *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs, 90th Cong., 2d Sess. 61-62 (1968)*. In addition to the principle quoted above, the United States set forth two other principles as follows:

"There should be safeguards for all non-nuclear-weapon parties of such a nature that all parties can have confidence in their effectiveness. Therefore safeguards established by an agreement negotiated and concluded with the IAEA in accordance with the Statute of the IAEA and the Agency's safeguards system must enable the IAEA to carry out its responsibility of providing assurance that no diversion is taking place.

"In discharging their obligations under article III, non-nuclear-weapon parties may negotiate safeguards agreements with the IAEA individually or together with other parties; and, specifically, an agreement covering such obligations may be entered into between the IAEA and another international organization the work of which is related to the IAEA and the membership of which includes the parties concerned."

The United States is well aware of the difference between being convinced of the effectiveness of another safeguards system, as advocated by Euratom and West Germany in particular, and being satisfied that nuclear materials subject to another safeguards system are not being diverted to nuclear weapons, as advocated by the United States, from its own experience under the United States-Euratom Agreement for Cooperation. [1958] U.S.T. 1116, T.I.A.S. No. 4091, 335 U.N.T.S. 161 (1958); *as amended*, [1962] 2 U.S.T. 1403, T.I.A.S. No. 5103, 453 U.N.T.S. 390 (1962). Under Section 11(B) Euratom is given "the responsibility for establishing and implementing a safeguards and control system" which is "reasonably compatible" with the IAEA system. Section 11(D) provides: "There will be frequent consultations and exchanges of visits between the parties to give assurance to both parties that the Euratom safeguards and control system effectively meets the responsibility and principles stated in B above and that the standards of the materials accountability systems of the United States and Euratom are kept reasonably comparable." In an exchange of correspondence on June 18, 1958, the following understanding was reached with reference to Section 11(D): "[T]he consultations and exchanges of visits agreed upon in the referenced section and the assurance provided for therein include within those terms permission by each party for the other party to verify, by mutually approved scientific methods, the effectiveness of the safeguards and control systems applied to nuclear materials received from the other party or to fissionable materials derived from these nuclear materials." European Atomic Energy Community, Agreement for Cooperation between the European Atomic Energy Community and the Government of the United States of America and Related Documents, Nov. 8, 1958, at 45, 47. In implementing the understanding, the United States AEC has not been accorded a right of physical access to Euratom facilities, although it has been asserted that such access is a necessary part of verifying the effectiveness of Euratom safeguards by scientific methods.

equipment. Under paragraph 2 of Article III⁹⁵ each party to the Treaty, including a nuclear-weapon state, undertakes not to export or provide nuclear material or equipment for peaceful purposes to any non-nuclear-weapon state, whether or not a party, unless the materials or equipment are subject to safeguards. If the importing state is a nuclear-weapon state, however, safeguards are not required.⁹⁶

Safeguards apply only to a transaction "for peaceful purposes." International nuclear transactions entered into expressly for non-weapons military purposes are neither reached by any safeguards requirement under paragraph 2 of Article III, nor prohibited by any other provision of the Treaty. Thus, nuclear materials and equipment could be furnished free and clear of safeguards to a non-nuclear-weapon state

95. "Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) 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," Art. III, para. 2.

96. This exclusion is similar to the exclusion of nuclear-weapon states from the prohibition on receiving and giving assistance in the manufacture of nuclear weapons under Articles I and II. The United States position has not always been that which is embodied in paragraph 2 of Article III. Rather, the United States position on July 28, 1966, was that "in the transfer of such materials and equipment between States for peaceful purposes, all States would be treated alike" as regards safeguards. Statement by United States Representative to ENDC, July 28, 1966, ENDC/PV.277, at 4-7; DOCUMENTS ON DISARMAMENT, 1966, at 482, 485.

On June 3, 1965, the Government of Canada announced that, in the future, export permits covering sales of uranium will be issued only if the uranium is to be used for peaceful purposes, and that an agreement with the government of the importing state to this effect will be required together with "appropriate verification and control." Statement by Foreign Minister Martin in the Parliament of Canada, June 3, 1965. This policy was resisted by some firms within Canada which were seeking to negotiate long-term supply arrangements with France, which refused to accept any safeguards requirement. Under paragraph 2 of Article III, the Canadian Government may in the future be somewhat more hard pressed to refuse to approve a substantial uranium export contract to a nuclear-weapon state for lack of safeguards, especially if another seller such as South Africa is in competition for the business.

Although Article III, paragraph 2, itself permits unsafeguarded exports to nuclear-weapon states, the present IAEA system, in conjunction with Article III, may not permit such unsafeguarded exports to occur. Article III, paragraph 1, of the Non-Proliferation Treaty requires safeguards on "all source or special fissionable material in all peaceful nuclear activities" of a non-nuclear-weapon state. Once IAEA safeguards are applied to particular nuclear material it cannot, in general, be transferred to another state unless safeguards follow the material or an equivalent amount of material has been substituted for that upon which safeguards are to terminate. The IAEA system does not differentiate between nuclear-weapon and non-nuclear-weapon states in this regard as does the Non-Proliferation Treaty.

The possibility of terminating safeguards on material to be transferred to a nuclear-weapon state by substitution by the non-nuclear-weapon state of an equivalent amount of unsafeguarded material would not exist because safeguards would apply to all material in its jurisdiction under paragraph 1 of Article III. The possibility of the nuclear-weapon state providing material to the non-nuclear-weapon state desiring to export to it for purposes of substitution by the non-nuclear-weapon state does not exist because paragraph 2 of Article III requires safeguards on exports to non-nuclear-weapon states. See Szasz, *The Law of International Atomic Energy Agency Safeguards*, 3 REV. BELGE DE DROIT INT'L 196, 218 (1967); Willrich, *Safeguarding Atoms for Peace*, 60 AM. J. INT'L L. 34, 48 (1966).

for use by that state in a naval propulsion reactor program or a reactor for irradiating military equipment.⁹⁷

Excluding exports for military purposes from the safeguards requirements may appear to be a large loophole in Article III. The size of this loophole, however, is reduced by Articles I and II. The exporters, and the importers if parties to the Treaty, would violate their undertakings under Articles I and II if the materials and equipment provided pursuant to a military nuclear agreement were used for nuclear weapons. Moreover, the amounts of nuclear materials used in military programs in non-nuclear-weapon states will probably be very small compared with the amounts involved in their civil power programs. In any case, it would be extremely difficult, if not impossible, to develop and administer a system of international safeguards to verify that nuclear materials used in a classified military program in a non-nuclear-weapon state were not being diverted to a nuclear weapons program. It is doubtful whether the IAEA has the authority under its present statute to involve itself in such an activity. Therefore, it seems reasonable to leave it to the exporter to police transactions of this kind, at least until some experience has been gained with the Treaty in operation.

Finally, Article III applies to transactions in three kinds of subject matter: "source material," "special fissionable material," and "equipment or material especially designed or prepared for the processing, use or production of special fissionable material." It is the "source of special fissionable material" which is actually subject to safeguards. Consistent with the present IAEA and Euratom systems, the Non-Proliferation Treaty safeguards are based on accounting for the nuclear materials as they are used, produced or processed in principal nuclear facilities, and while they may be stored outside such facilities.⁹⁸

The operation of paragraph 2 of Article III can be illustrated by two examples. First, if either natural uranium ("source material") or enriched uranium ("special fissionable material") is provided by a party

97. Statement by State Department Spokesman, Mar. 14, 1968 (unpublished); *see* note 46 *supra*.

98. There are certain exemptions provided in the IAEA safeguards system for militarily insignificant quantities of nuclear materials. Above the exemption limit is a sliding scale of frequency of required reports and inspection up to a certain amount where access at all times must be permitted. There are no such exemptions in the Euratom system. *See* Willrich, *Safeguarding Atoms for Peace*, 60 AM. J. INT'L L. 34, 42 n.28 (1966). Rumania proposed that Article III be amended to provide that safeguards would apply only "to such peaceful nuclear activities of non-nuclear-weapon states as, by their nature and the quantities of source and special fissionable materials which they produce, process or use, may lead to the proliferation of nuclear weapons." ENDC/223/Rev.1, Mar. 8, 1968. The amendment was not accepted.

to the Treaty to any non-nuclear-weapon state, safeguards would be applied to the material. Safeguards, and associated reporting requirements and inspection rights, would be applied while the material was stockpiled after its arrival in the importing non-nuclear-weapon state, and would follow the material as it progressed through the nuclear fuel cycle in that state. While safeguarded nuclear material was being fabricated into reactor fuel elements, the fabrication plant would be open to inspection. Thereafter, while the fuel elements containing safeguarded nuclear material were being irradiated in a nuclear reactor, international inspectors would have access to that reactor. Moreover, safeguards would automatically attach to every gram of plutonium produced in safeguarded nuclear fuel irradiated in a reactor. When the irradiated fuel elements were removed from the reactor and sent to a processing plant to be chemically dissolved and separated into constituent elements, the plant would be open to inspection. After the depleted nuclear material and produced plutonium emerged from the chemical processing plant, safeguards would continue to apply to all that material wherever it went, at least until it was transferred to a nuclear-weapon state.⁹⁹

Second, suppose that a party to the Treaty provides a civil nuclear power reactor ("equipment . . . especially designed . . . for the . . . use or production of special fissionable material") to a non-nuclear-weapon state.¹⁰⁰ The importing state intends to supply its own nuclear fuel and process the fuel in its own fuel fabrication and chemical separation plants. Safeguards would be applied to fissionable material as it was

99. The difficulties which may be encountered if such a transfer is attempted under the existing IAEA system are outlined in note 96 *supra*.

100. Determination of what items of equipment and material are "especially designed or prepared for the processing, use or production of special fissionable material" will be a difficult task. Obviously, the drafters did not intend to require safeguards on all equipment and material flowing into a non-nuclear-weapon state. They clearly intended, however, to require safeguards on something less than an entire reactor or other principal nuclear facility. In many cases, a nuclear project in a particular state will utilize a variety of domestic and foreign manufacturers and suppliers in putting together a nuclear project. A detailed list of equipment and non-nuclear materials which will trigger safeguards has not been incorporated into the IAEA system because the Board of Governors has been unable to agree on the items which should be included. The present test under the IAEA system is whether the nuclear facility involved would be "substantially assisted." This imprecise criterion is applied by the IAEA Board of Governors on a case-by-case basis. See Willrich, *Safeguarding Atoms for Peace*, 60 AM. J. INT'L L. 34, 42-43 (1965). The Non-Proliferation Treaty represents an attempt to be somewhat more specific. However, the criteria there established—"especially designed or prepared for"—are perhaps unfortunate in that they seem to depend to some extent on the intent of the exporting or perhaps the importing state. Hopefully, in practice this provision will not cause difficulty, because nuclear projects are generally relatively large scale and each has some rather unique features. Therefore, it would seem that most international nuclear transactions will take place with specific nuclear projects in mind.

produced in all fuel loadings over the lifetime of the reactor and would follow that produced material throughout the fuel cycle as it was processed and recycled into other reactors. Furthermore, safeguards would be applied to all subsequent generations of fissionable material produced in fuel elements containing previous generations of fissionable material subject to safeguards.

From these two examples it becomes clear that if a non-nuclear-weapon state, even though not a party to the Treaty, were to import nuclear materials or equipment from any party, the potential reach of international safeguards into its civil nuclear industry could be very broad. Even if the state's nuclear imports were small, safeguards could in time creep throughout its civil nuclear industry. If it wishes to avoid the safeguards required by Article III, the non-party, non-nuclear-weapon state would be limited to importing from other non-parties to the Treaty. On the other hand, if such a non-nuclear weapon state decides to accept safeguards in order to import from a party to the Treaty, the importing state would have gone a long way toward accepting one of the most serious restraints in the Non-Proliferation Treaty.¹⁰¹

101. This may be a useful argument with India. However, nothing in the Treaty prevents a non-nuclear-weapon state which is not a party from importing nuclear materials subject to safeguards for use in its civil nuclear power program, thereby freeing its limited indigenous resources for concentration in a nuclear weapons program. In fact, if India does not become a party to the Treaty, this may be the strategy it will pursue with respect to utilization of its limited uranium resources.

The Indian view of safeguards has been colorfully put:

"Institution of international controls on peaceful reactors and power stations is like an attempt to maintain law and order in a society by placing all its law-abiding citizens in custody while leaving its law-breaking elements free to roam the streets. . . . Reactors engaged in peaceful pursuit, and atomic power stations of the developing countries, do not in themselves pose any threat to the security of the international society. It is the chemical separation plants and the gaseous diffusion plants which produce the fissile material used in bombs; and it is these facilities which need to be controlled in any system of controlled disarmament.

"Here . . . I am referring to international treaties and conventions as distinct from national decision. We in India, for example have with our friends who have assisted us in the past perfectly satisfactory arrangements for safeguards, and we are determined to observe and implement them. But that is entirely different from entering into an international instrument for International Atomic Energy Agency or other international safeguards over the reactors and power stations of the developing countries."

Statement by Representative of India to ENDC, Aug. 12, 1965, ENDC/PV.223, at 5-21; DOCUMENTS ON DISARMAMENT, 1965, at 326, 339. There is superficial logic in the Indian position since plutonium when it is encased in fuel elements lodged in a reactor cannot be used for nuclear weapons. It must first be separated from the depleted uranium and fission products. It is at the chemical separation and fuel fabrication plants that the major opportunities for diversion exist. However, there are good grounds for having safeguards apply to all facilities in the nuclear fuel cycle since this decreases the overall technical uncertainty in the system and forecloses the opportunity of diverting fuel elements from a reactor to a clandestine chemical separation plant. India has already agreed to accept IAEA safeguards, consistent with other treaty terms, on its major power reactor projects assisted by the United States and Canada. *E.g.*, United States-India Agreement for Cooperation, art. VIII, [1963] 2 U.S.T. 1484, T.I.A.S. No. 5446, 488 U.N.T.S. 21.

Few, if any, non-nuclear-weapon states will have a completely self-sufficient civil nuclear industry, at least in the near future. The safeguards requirements on all peaceful nuclear exports of parties could, therefore, become a powerful inducement to broad adherence to the Non-Proliferation Treaty once the substantial exporters of nuclear materials and equipment become parties. On the other hand, one or a few nuclear exporters which remained outside the Treaty and avoided the requirement of safeguards on their exports would be in a powerful position to spoil the operation of the Treaty in this respect.¹⁰²

2. *Sharing Peaceful Uses*

Paragraph 1 of Article IV¹⁰³ sets forth the "inalienable right" of all parties to continue to engage in peaceful nuclear activities under the Treaty, qualified only by the requirement that such activities be conducted in a manner "in conformity with" Articles I and II (pertaining to non-transfer and non-acquisition of nuclear explosives). While preservation of such a right is of cardinal importance to industrially advanced states, the undertakings in the Treaty to share the benefits of peaceful nuclear energy are of particular interest to the developing states.¹⁰⁴

(a) *Nuclear materials, equipment and information.* Under para-

102. It would seem difficult to maintain the Non-Proliferation Treaty in effect for very long if a comparatively few large exporters and some important importers remained outside. If all major exporters joined the Treaty, then all non-nuclear-weapon importers would have to accept safeguards on their imports whether or not they were parties. If some exporters, e.g., France or South Africa, stayed outside the Treaty and exported reactors or uranium to non-nuclear-weapon importers which were not parties to the Treaty, the unsafeguarded nuclear industries in these importing states could in time be perceived as a threat by neighboring non-nuclear-weapon states which had joined the Treaty and accepted safeguards.

In this connection, France's statement that, although it will not sign the Treaty, it "will behave in the future in this field exactly as the States adhering to the treaty" takes on both importance and ambiguity. Statement by Representative of France to U.N. General Assembly, June 12, 1968, U.N. Doc. A/PV.1672 (prov.), at 3, 6. Does this mean France will behave in accordance with Article III, as well as Articles I and II?

103. "Nothing in this Treaty shall be interpreted as affecting 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 this Treaty." Art. IV, para. 1.

104. West Germany has gone so far as to state that "the future of the Federal Republic of Germany as a modern industrial state depends on this principle." Statement by Foreign Minister Brandt to the Bundestag, Apr. 27, 1967, DOCUMENTS ON DISARMAMENT, 1967, at 211. India has made the same point more colorfully: "[T]he civil nuclear powers can tolerate a nuclear weapons apartheid, but not an atomic apartheid in their economic and peaceful development." Statement by Representative of India to ENDC, May 23, 1967, ENDC/PV.298, at 4-17; DOCUMENTS ON DISARMAMENT, 1967, at 229, 234. At the beginning of the nuclear era, when there was but one nuclear-weapon state, President Truman stated: "No nation could long maintain or morally defend a monopoly of the peaceful benefits of atomic energy." 13 DEP'T STATE BULL. 514 (1945).

graph 2 of Article IV¹⁰⁵ all parties have the right and undertake "to participate in the fullest possible exchange of equipment, materials and scientific and technological information." An important limitation on the undertaking and the right is that the subject matter of the exchange be "for the peaceful uses of nuclear energy."¹⁰⁶ Moreover, use of the word "exchange" means that the nuclear haves are not obligated to make a gift to the have-nots.

In addition to providing for exchange of peaceful nuclear materials, equipment and information, paragraph 2 of Article IV contains an important general undertaking to "cooperate in contributing" to peaceful nuclear development, "especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for

105. "All the Parties to the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also co-operate in contributing alone or together with other States or international organizations to 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, with due consideration for the needs of the developing areas of the world." Art. IV, para. 2.

The draft Treaty of March 11, 1968, provided only that all parties "have the right to participate in the fullest possible exchange." ENDC/225, Annex A, Mar. 14, 1968. The undertaking "to facilitate" such exchanges was originally proposed by Nigeria in the First Committee debate and finally incorporated by the United States and the Soviet Union as an amendment on May 31, 1968. "Thus, the right to such sharing is recognized explicitly not only as a right of non-nuclear Powers but also as a commitment to action by nuclear Powers and all others in a position to contribute thereto." Statement by United States Representative to First Committee of U.N. General Assembly, May 31, 1968, U.N. Doc. A/C.1/PV.1577 (prov.), at 77. Furthermore, in the draft Treaty of March 11, 1968, the exchange was limited to "scientific and technological information." In line with its long standing position, *see* note 110 *infra*, Italy took the lead in the First Committee debate in urging that the exchange provision be broadened by specifically including "equipment" and "materials" in addition to information. "This important clarification of article IV of the treaty considerably expands the scope of co-operation in the peaceful uses of nuclear energy which, without any doubt, would correspond to the interests of non-nuclear States." Statement by Soviet Union Representative to First Committee of U.N. General Assembly, May 31, 1968, U.N. Doc. A/C.1/PV.1577 (prov.), at 67.

106. In connection with assurances of their right to participate in the peaceful uses of nuclear energy, various non-nuclear-weapon states raised the question of "spin-off"—benefits that civil nuclear activities in nuclear-weapon states could derive from nuclear weapons programs. West Germany initially expressed particular concern in this regard. Statement by Foreign Minister Brandt to the Bundestag, Feb. 1, 1967, DOCUMENTS ON DISARMAMENT, 1967, at 48, 49. In reply Secretary of State Rusk stated: ". . . [T]he fact is that the non-proliferation treaty has nothing to do whatever with the use of nuclear materials for peaceful purposes, and that includes a wide range of industrial application. The actual industrial spin-off from so-called weaponry, that is, those items which are limited to the gadgetry of weapons, is very small, indeed, infinitesimal. And I think exchanges on the technical level will clarify that point." 58 DEP'T STATE BULL. 320-21 (1968). Nevertheless, to allay concern in this regard, the Preamble of the Non-Proliferation 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 to the Treaty, whether nuclear-weapon or non-nuclear-weapon States." The United States has also interpreted the exchange of information provisions in paragraph 2 of Article IV as covering information concerning peaceful applications of nuclear explosions. Statement by United States Representative to ENDC, ENDC/PV.378 (prov.), at 5-11.

the needs of the developing areas of the world.”¹⁰⁷ This particular undertaking exists for “Parties . . . in a position to do so” Thus paragraph 2 introduces a new category of states, broader than nuclear-weapon states and narrower than non-nuclear-weapon states, which we will call “contributing states.”

The contributing states are not specified, nor is any criterion established in the Treaty for identifying them.¹⁰⁸ Will each state make a unilateral determination whether and to what extent it is itself in a position to contribute to development of peaceful nuclear activities in non-nuclear-weapon states? An affirmative answer would seem to pull the teeth from the obligation to cooperate and would also run counter to the express undertaking “to facilitate . . . the fullest possible exchange.” On the other hand, should a non-nuclear-weapon state be able to direct a claim for cooperation at a contributing state of its own choice, a claim which the contributing state would have to honor? Would this mean, for example, that the United States or West Germany, in adhering to the Treaty, would become obligated to subsidize the export of its nuclear power reactor technology to any non-nuclear-weapon states which request it? An obligation of such breadth would not seem to be intended. The undertaking under the Treaty is “to *cooperate* in contributing.” Such an undertaking is less firm than one simply “to contribute,” or “to make available.”¹⁰⁹

107. The phrase “with due consideration for the needs of the developing areas of the world” was added to paragraph 2 of Article IV on May 31, 1968, based on a suggestion by Chile. Statement by United States Representative to First Committee of U.N. General Assembly, May 31, 1968, U.N. Doc. A/C.1/PV.1577 (prov.), at 77. Any general assumption that nuclear power will be a boon for the developing countries is, of course, erroneous, especially in view of the large plant size required to achieve the economies of scale.

108. Some guidance might be found in the composition of the IAEA Board of Governors. Under Article VI of the IAEA statute, the outgoing Board of Governors, by majority vote, makes the following designations of membership for the succeeding Board: “The five members most advanced in the technology of atomic energy”; the member most advanced in the technology of atomic energy, including the production of source materials, not represented by the original five in each of the following eight geographic regions: (1) North America, (2) Latin America, (3) Western Europe, (4) Eastern Europe, (5) Africa and the Middle East, (6) South Asia, (7) Southeast Asia and the Pacific, (8) Far East; two members from among Belgium, Czechoslovakia, Poland, and Portugal as producers of source material; and one additional member as a supplier of technical assistance. The General Conference elects the remaining 12 out of a total of 25 members on the basis of “equitable representation.” See also Willrich, *Safeguarding Atoms for Peace*, 60 AM. J. INT’L L. 34, 39 n.18 (1966).

109. Mexico proposed that the second sentence of Article IV, paragraph 2, be amended to read: “Those parties that are in a position to do so, *have the duty to contribute*, according to their ability, alone or in cooperation with other states or international organizations, to the further development of the production, industries, and other applications of nuclear energy for peaceful purposes specially in the territories of non-nuclear-weapon states.” (Emphasis added.) Mexico justified and interpreted its proposal as follows: “We believe that this duty can and should be enunciated as a true legal obligation, although the obligation is imperfect and general and its practical significance will continue to depend ultimately on the will of the nuclear powers. . . . The phrase “according to their

"Contributing" also raises a problem concerning the basis for co-operation. If contributing means "cost-free" to the recipients, expense to the contributing state could constitute a deterrent to cooperation rather than an incentive. On balance, the most that could probably be inferred from the Treaty is some generosity and perhaps a degree of departure from the normal pursuit of commercial profit in world nuclear trade on the part of the contributing states, especially in relation to developing countries.¹¹⁰

Although some doubt surrounds the basis of peaceful nuclear co-operation under paragraph 2 of Article IV, the Treaty clearly permits the parties to any cooperative arrangement to determine whether the channel for cooperation should be "alone or together with other States or international organizations." Such flexibility would seem to have advantages for both the supplier and recipient of peaceful nuclear assistance. There is already a trend, reinforced by Article III, toward organizing the administration of safeguards on a worldwide and centralized basis. There is no parallel trend, however, in the organization of actual international cooperation in peaceful uses of nuclear energy. Certain recipients of nuclear assistance may prefer to deal directly with the supplier, while others might prefer to have the supply channel run through an international organization such as the IAEA. The IAEA's role as a channel for the supply of nuclear materials and equipment, however, has thus far been limited to small research facilities.¹¹¹ The larger, more complex and costly transactions involving

ability" refers not only to the parties' financial and technical ability but also to their legal ability, since much of this knowledge is covered by patents owned by private persons." Statement by Representative of Mexico to ENDC, Sept. 17, 1967, ENDC/PV. 331, at 4-11; DOCUMENTS ON DISARMAMENT, 1967, at 395, 397-98.

Canada, a non-nuclear-weapon state which clearly falls into the category of contributing states, expressed concern that the Mexican suggestion might be construed as an unrestricted obligation to comply with all requests from non-nuclear-weapon states. ENDC/PV.336, at 6. The United States stated that while it "shares the objectives sought" by Mexico, "the precise terms of the Mexican formulation may in some respects create too sweeping and too general an obligation." Statement by United States Representative to ENDC, Oct. 12, 1967, ENDC/PV.338, at 7-10; DOCUMENTS ON DISARMAMENT, 1967, at 513, 514.

110. Italy proposed, as a measure that could be independent of the Non-Proliferation Treaty: "An agreement under which the nuclear powers would transmit periodically to the non-nuclear-states signatory to the treaty an agreed quantity of the fissile materials they produce [T]he non-nuclear countries . . . should pay a reduced price compared to the market value. Whereas part of this price would go to the nuclear producing powers, the other part could be paid into the United Nations funds for the progress of the developing countries." Statement by Italian Foreign Minister Fanfani to the ENDC, Aug. 1, 1967, ENDC/PV.318, at 6-9; DOCUMENTS ON DISARMAMENT, 1967, at 812, 813.

111. As of June 30, 1967, 13 project agreements were in effect between the IAEA and various countries covering primarily the supply of research reactors. Annual Report of the Board of Governors to the General Conference, 1 July 1966—30 June 1967, I.A.E.A. Doc. GC(xi)/355, at 32.

civil nuclear power reactors will probably occur in the future, as in the past, largely outside the IAEA framework.¹¹²

It seems, therefore, that paragraph 2 of Article IV is unlikely to have a major effect on either the volume or pattern of world trade related to the growth and spread of civil nuclear power. This conclusion is contrary to the official wisdom which maintains that the Treaty will provide a favorable basis for the spread of peaceful nuclear technology and implies that without the Treaty the spread might not occur. With or without the Treaty, the Soviet Union will, subject to a few exceptions, probably continue not to cooperate in peaceful nuclear power development outside Eastern Europe, and do so only half-heartedly within the Warsaw Treaty area. On the other hand, it seems inconceivable in view of the economic stakes that the United States would refrain from attempting to maintain a leading role in the future world market for peaceful nuclear technology, whether or not the Treaty enters into force.¹¹³ Moreover, the number of suppliers competing in each sector of the nuclear fuel cycle is increasing rapidly and the ability in such circumstances of the United States—or any other nuclear supplier alone—to influence the nature and rate of nuclear technological innovation by a policy of abstention is swiftly diminishing.¹¹⁴

Therefore, whether or not the Treaty enters into force, international nuclear commerce will probably increase dramatically in the coming years, and states “in a position to do so” will facilitate and contribute to peaceful nuclear power development throughout the world primarily because it will be in their economic or political interests to do so. Al-

112. For example, the United States has entered into 13 bilateral agreements for co-operation involving power applications (not all of which have involved actual transfer of power reactors as yet). No power reactors have yet been supplied through the IAEA. U.S.A.E.C., Major Activities in the Atomic Energy Programs, January-December 1967, at 345 (1968).

113. At power costs of 4.5 mills per kilowatt hour (a conservative figure) the value worldwide of the annual production of electricity from nuclear power sources in 1970 is estimated to reach about \$1 billion, and in 1975 about \$5 billion. Capital costs of the nuclear plants to produce this power will be about \$3 billion and \$5 billion, respectively. The value of the plutonium produced annually in power reactors has been estimated to reach \$0.5 billion by 1975. Taylor, *The Rapid Growth of Nuclear Technology—Implications for Nuclear Safeguards*, INT'L RESEARCH & TECHNOLOGY J., Jan. 1, 1968, at 9.

114. While at the outset nuclear power plants and their initial fuel loadings were sold as a unit under “turnkey” contracts, now there is an increasing trend to shop around for “bits and pieces.” The implications are that no single nuclear supplier will be able to control the supply policy of other suppliers, and dependence on imports in sectors of the nuclear fuel cycle where multiple sources of supply exist should not be too risky. The limited sources of enrichment services—primarily the United States—may constitute political incentive in favor of natural uranium reactors, especially in developing states where a civil nuclear power program frequently serves political as well as economic objectives. See also Willrich, *International Control of Civil Nuclear Power*, BULL. ATOM. SCI., March 1967, at 31, 35.

though the Treaty may not substantially affect the rate of diffusion of peaceful nuclear technology, it will improve the possibilities for keeping the potential security costs within acceptable limits as the economic benefits of nuclear power come to be widely shared.

(b) *Plowshare projects.* Under the Treaty, the right to develop or otherwise acquire Plowshare explosive devices is excluded from the general "inalienable right" of all non-nuclear-weapon states to develop and use nuclear energy for peaceful purposes under Article IV. To this extent the Treaty would again discriminate against non-nuclear-weapon states with respect to peaceful nuclear activities. In return for renunciation of their rights to develop this aspect of nuclear technology for themselves, however, the non-nuclear-weapon states would receive under Article V¹¹⁵ important undertakings by the nuclear-weapon states concerning access to any potential Plowshare benefits.

Under Article V, "benefits" from "explosions" would be made available to non-nuclear-weapon states, but not nuclear explosive devices themselves. Articles I and II of the Treaty deal with Plowshare explosive devices as with nuclear weapons and require that the supplier of Plowshare devices retain "control" of them throughout any project until detonation.

The United States and the Soviet Union are likely to be the only two states which will develop and be able to supply Plowshare explosives in the near future. The "appropriate measures" which the two super-

115. "Each Party to the Treaty undertakes to take appropriate measures to ensure that, in accordance with this Treaty, under appropriate international observation and through appropriate international procedures, potential benefits from any peaceful applications of nuclear explosions will be made available to non-nuclear-weapon States Party to the Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices used will be as low as possible and exclude any charge for research and development. Non-nuclear-weapon States Party to the Treaty shall be able to obtain such benefits, pursuant to a special international agreement or agreements, through an appropriate international body with adequate representation of non-nuclear-weapon States. Negotiations on this subject shall commence as soon as possible after the Treaty enters into force. Non-nuclear-weapon States Party to the Treaty so desiring may also obtain such benefits pursuant to bilateral agreement." Art. V.

In the agreed draft treaty of August 24, 1967, the Plowshare provision appeared in a much less specific form as a declaration of intention in the Preamble. ENDC/192, ENDC/193; DOCUMENTS ON DISARMAMENT, 1967, at 338-39. The agreed draft treaty of January 18, 1968, contained an Article V in which the parties undertook "to cooperate to insure" that potential Plowshare benefits will be made available. ENDC/192/Rev. 1; ENDC/193/Rev.1. Although this version of Article V was attacked repeatedly at the ENDC by the non-nuclear-weapon states—principally Brazil and India—for a variety of reasons, it was retained intact in the draft treaty of March 11, 1968. After further criticism in the First Committee and concrete suggestions from Mexico, however, the United States and the Soviet Union finally rewrote it and in the process substantially strengthened their supply obligations and clarified the channels through which non-nuclear-weapon states could claim Plowshare benefits. Nevertheless, the changes were apparently insufficient to induce either Brazil or India to change their positions on the Treaty.

powers will be obligated to undertake to make Plowshare benefits available remain to be spelled out in a "special international agreement or agreements." The potential suppliers of Plowshare explosions will have a large influence over the details of any such agreement. But the principle that non-nuclear-weapon parties to the Treaty "shall be able to obtain such benefits . . . on a non-discriminatory basis" is clearly established.¹¹⁶ Moreover, the cost to non-nuclear-weapon states of nuclear explosive devices is fixed with some certainty. The charge must be "as low as possible" and must exclude "research and development" costs. Inclusion of an allocable share of the acquisition cost of the thermonuclear weapons technology which underlies Plowshare would, of course, render the whole scheme uneconomic. On the other hand, the charges for nuclear explosives, even though based on production costs alone, will in many cases constitute a relatively small fraction of the total costs of a Plowshare project. Production costs of the nuclear explosives used will be far outweighed by the costs of engineering and safety surveys, drilling emplacement holes, possibly moving local inhabitants, and clean-up operations.¹¹⁷ Nevertheless, the price established for Plowshare explosions under Article V is in fact favorable to the recipient.

Another aspect of Article V concerns the channels through which Plowshare explosions could be made available. The non-nuclear-weapon states have the option to obtain Plowshare benefits either "through an appropriate international body with adequate representation of non-nuclear weapon States," or on a bilateral basis.¹¹⁸ The Treaty, however,

116. The United States has stated that Article V "binds the parties clearly and emphatically." Statement by United States Representative to First Committee, May 31, 1968, U.N. Doc. A/C.1/PV.1577 (prov.), at 78. Early in the ENDC discussions of this subject Mexico stated: "[A]lthough the details . . . must be regulated in a separate agreement, the actual right to enjoy the benefits of peaceful explosions must be recognized and enunciated in the non-proliferation treaty itself." Statement by Representative of Mexico to ENDC, Sept. 19, 1967, ENDC/PV.331, at 4-11; DOCUMENTS ON DISARMAMENT, 1967, at 395, 398.

117. The United States has stated it will charge the same price for nuclear explosives to foreign and domestic users. Statement by United States Representative to ENDC/PV. 369 (prov.), at 32-35. The AEC currently projects that charges for nuclear explosives will range from \$350,000 for a 10-kiloton yield to \$600,000 for a two-megaton yield. The larger the yield the cheaper the cost per unit of energy released. Gerber, Hamburger & Hull, Plowshare 50 (U.S.A.E.C. Div. of Technical Information 1966). Cost estimates for nuclear excavation of a sea-level canal across the Isthmus of Panama show that charges for explosive and firing services will amount to roughly 15 per cent of the total project costs. See *Hearings on Peaceful Applications of Nuclear Explosives—Plowshare—Before the Joint Comm. on Atomic Energy*, 89th Cong., 1st Sess. 376 (1965).

118. With bilateral channels of supply open as well as a channel through the international body, the issue has arisen whether the same international supervision should apply to both cases. Sweden argued that an international authority should license each Plowshare project; bilateral arrangements should receive the same treatment as arrangements through the international body; and there should be international supervision of

contains no guidance for determining the composition of the international body and no indication whether "adequate representation" for the non-nuclear-weapon states would amount to control of the decision-making process in such a body. Moreover, it is not clear which of the two potential Plowshare suppliers would be obligated by an affirmative decision of the international body in a particular case.¹¹⁹

Finally under Article V, Plowshare benefits must be made available "under appropriate international observation and through appropriate international procedures." The United States has stated that "procedures for international cooperation . . . should be developed in full consultation with the non-nuclear-weapon States."¹²⁰

peaceful nuclear explosions in nuclear-weapon states to prevent suspicion that such explosions were nuclear weapon tests. Statements by Representative of Sweden to ENDC, ENDC/PV.364 (prov.), at 16-20; ENDC/PV.373 (prov.), at 11-20. As a matter of interpreting Article V, it seems clear that the "appropriate international observation" and "appropriate international procedures" mentioned in the first sentence are intended to apply to whatever benefits from peaceful nuclear explosions are made available, regardless of the channel. Use of the word "appropriate," however, may allow in each case some differentiation in the treatment accorded depending on the channel.

119. The United States has assured the non-nuclear-weapon states that there would be no scarcity of devices once peaceful explosions became practical. Statement by United States Representative to ENDC, ENDC/PV.369 (prov.), at 28ff. Both superpowers might be eager to supply explosions for a particular project in which case the "international body" would have to choose between the two. Or, neither superpower might wish to supply the project, in which case the "international body" would have to choose one that was unwilling, and an element of compulsion would enter into performance of the arrangement. These are the kinds of decisions, however, that international organizations are reluctant to make. Sweden has suggested that Plowshare devices "might be committed to a formal pool for allocation, by this body, to interested customers." Statement by Representative of Sweden to ENDC, June 6, 1967, ENDC/PV.302, at 4-8; DOCUMENTS ON DISARMAMENT, 1967, at 248-49. While prior allocation of Plowshare explosives might ease the decision-making problem, it would not dispose of it. Of course, if there were a willing supplier and a willing receiver, a bilateral arrangement might well suffice.

120. Statement by United States Representative to ENDC, June 8, 1967, ENDC/PV.303, at 4-11; DOCUMENTS ON DISARMAMENT, 1967, at 252, 255. The United States has stated: "The international body might consider such matters as the feasibility of requested projects, priority among such requests, and necessary safety precautions." Statement by United States Representative to ENDC, Mar. 21, 1967, ENDC/PV.295, at 23-26; DOCUMENTS ON DISARMAMENT, 1967, at 172-73. In an effort to minimize the fact that the Non-Proliferation Treaty would exclude non-nuclear-weapon states from a proprietary role in relation to peaceful nuclear explosives, the United States has emphasized the relatively large role the recipient of Plowshare explosions would have with respect to all phases of particular projects other than control over the device, its emplacement and detonation. For example: "The type of international procedures we have in mind would permit countries to perform their own engineering work, utilizing nuclear explosives detonated under the control of a nuclear-weapon state [N]uclear-weapon states would merely provide nuclear explosive services, and the country in which the project was conducted would be responsible for the remainder of the project, if that was its choice. In essence, this would not be different from a situation in which conventional explosives or other equipment are purchased abroad." Statement by United States Representative to ENDC, June 8, 1967, ENDC/PV.303, at 4-11; DOCUMENTS ON DISARMAMENT, 1967, at 252, 256. The analogy between nuclear explosive services and purchase of conventional explosives abroad should not be accepted uncritically. Given the complexity of the tasks involved, the intimate relationship of the device to other parts of a Plowshare project, the risks of major harm if something goes wrong, and the technical uncertainties involved, both the supplier and the recipient will have a major political stake in any Plowshare application. Success would seem to

Health and safety aspects of Plowshare projects are one area of international concern which might be subject to appropriate procedures under Article V.¹²¹ For instance, it would be necessary to make careful and objective assessments of fall-out levels anticipated from surface excavation projects. Likewise, underground natural resource development projects close to national borders would need to be monitored since they could contaminate water flowing under the surface into an adjacent state.¹²² Should the international procedures include a requirement for review and approval of Plowshare projects on safety grounds? Without such authority, the effectiveness of international safety procedures would be greatly reduced. But the possibility of disapproval of Plowshare projects at the international level on safety grounds might increase the risk that political considerations would enter into the review process. Should provisions for on-site safety inspection of the Plowshare project be included? Safety review only "on the record" would be likely to be little more than a formality, while international on-site inspection might be a sensitive issue with some states.

The economic feasibility of Plowshare projects proposed by non-nuclear-weapon states, might also be subject to review as a part of the procedures under Article V. An unfavorable international assessment of the economic merits of a project would give Plowshare suppliers a basis for resisting pressures to assist projects of doubtful value. But an international approval of the economic aspects of a particular project would strengthen the claim of a non-nuclear-weapon state to Plowshare benefits.¹²³

depend on close international cooperation and a sharing of responsibilities throughout all phases of a project.

121. Some form of international review could have several advantages. First, concern with the health and safety implications of Plowshare will be a major focus of public resistance, both within the recipient state and elsewhere. External review and approval would be perhaps the best way of establishing public confidence in Plowshare. Second, certain non-nuclear-weapon states might view an attempt by Plowshare supplier states to require their own health and safety standards as an obnoxious interference, whereas non-nuclear-weapon states would be more willing to conform to an "impartial" set of standards developed by an international body. Third, from the perspective of the Plowshare supplier states, it would be preferable if each knew that the other was bound by the same technical standards. Finally, in light of the uniqueness of each project it would be preferable to have a central repository of information concerning health and safety experience.

122. Safety issues are likely to be more substantial and certainly more dramatically raised in relation to surface excavation projects than in underground engineering. The presence of unique elements in each Plowshare application coupled with the fact that large scale applications are not likely to be frequent, at least during the initial phases of technological innovation and public acceptance, will make general criteria for determining whether a particular project is "safe" not only difficult to develop, but also of limited utility in concrete cases. Plowshare applications will also raise serious difficulties in allocating the risk of loss and in providing adequate indemnity for loss.

123. If and when we move closer to Plowshare applications, the United States Government may have to make some difficult choices between protecting its own natural re-

"International observation" and review procedures might be used to ensure that a Plowshare project in a non-nuclear-weapon state did not conceal or serve a military purpose of the supplier, the recipient, or both in collusion.¹²⁴ And if the Limited Nuclear Test Ban Treaty is broadened in the future into a comprehensive ban on all nuclear weapon tests, it would become especially important to establish procedures to provide assurance that the supplier nuclear-weapon state does not derive any information from Plowshare projects that would be useful for nuclear weapons development.¹²⁵

Who would be the administering authority for the "international procedures" under Article V? The "international body" that serves as a possible supply channel for Plowshare benefits might also administer the international procedures. Such a body might exist apart from or within the IAEA.¹²⁶ The monitoring activities concerning Plowshare projects, however, would be quite different from the IAEA's present responsibilities to foster peaceful nuclear research and power projects and to administer safeguards with respect to these activities. New procedures based on different technical concepts would be required. Although such procedures could be administered within the IAEA framework, a new organizational set-up would probably be needed.¹²⁷

source extraction industries operating in both domestic and foreign markets and its responsibilities to assist non-nuclear-weapon states in their own national development using Plowshare explosions. In this respect, surface excavation projects for harbors, canals, and rail cuts would seem likely to pose fewer conflicts with private United States interests than underground resource development and extraction projects.

124. The Soviet Union has stated that the purpose of international supervision is "to exclude the possibility of using peaceful nuclear explosions as a means for non-nuclear-weapon States to obtain special information necessary for the production of nuclear weapons." Statement by Representative of Soviet Union to First Committee, May 31, 1968, U.N. Doc. A/C.1/PV.1577 (prov.), at 68-70.

125. This is not a current issue since the Limited Nuclear Test Ban Treaty permits underground nuclear weapon tests. If a comprehensive nuclear test ban is ever achieved, however, Plowshare would become the only form of legitimate nuclear explosions. The incentives to use Plowshare for a double purpose in these circumstances would seem to increase. Moreover, the development and applications of surface excavation technology will generate cratering information, some of which might be of use to a military program.

The United States has stated that Article V of the Non-Proliferation Treaty is compatible with a comprehensive test ban. "If under a comprehensive test ban treaty, international approval were needed for the conduct of a nuclear explosion for peaceful purposes, such approval would constitute an 'appropriate international procedure' applicable to services conducted bilaterally or through an appropriate international body." Statement by United States Representative to ENDC, ENDC/PV.369 (prov.), at 28.

126. The United States and others have supported using the IAEA for this purpose. Statement by United States Representative to ENDC, Mar. 21, 1967, ENDC/PV.295, at 23-26; DOCUMENTS ON DISARMAMENT, 1967, at 172, 174.

127. A further issue is the extent to which Plowshare projects in nuclear-weapon states would be subject to the "international procedures" of Article V. Sweden in particular has urged that there be no differentiation between projects in nuclear-weapon and non-nuclear-weapon states in this regard. See Statement by Representative of Sweden to ENDC, June 6, 1967, ENDC/PV.302, at 4-8; DOCUMENTS ON DISARMAMENT, 1967, at 248, 251. As to health and safety, and verifying the exclusively peaceful purpose of the project in

The undertaking to share Plowshare benefits enshrined in Article V amounts to a "carrot" for the non-nuclear-weapon states to chew on. Such states could not develop their own Plowshare devices without incurring the enormous costs of acquiring a capability in nuclear explosive technology on a par with the United States and the Soviet Union. Thus, under the Non-Proliferation Treaty the non-nuclear-weapon states simply concede a Plowshare duopoly which they are incapable of breaking.¹²⁸ In return, the United States and the Soviet Union make a major political concession to the concerns of the non-nuclear-weapon states by undertaking a firm legal obligation to share that area of peaceful nuclear technology where the economic uncertainties are largest.¹²⁹

the event of a comprehensive test ban, it would seem that there would be good reason to subject Plowshare projects in the United States and the Soviet Union to the same international procedures applied to projects in non-nuclear-weapon states. There would be little point however, in having an international review of the economic feasibility of projects within the territory of the Plowshare supplier state. In any event, it is doubtful that the Soviet Union will agree to any Plowshare supervision in its territory.

128. The position of the non-nuclear-weapon states in bargaining for an equitable distribution of Plowshare benefits is further strengthened by present restraints imposed on future Plowshare applications by the Limited Nuclear Test Ban Treaty with respect to surface excavation. It is clear that if nuclear surface excavation techniques prove feasible and economical, the Limited Nuclear Test Ban Treaty will have to be amended at least in order for the United States to use nuclear excavation for a sea-level trans-Isthmian canal. Article II of the Limited Nuclear Test Ban Treaty provides for amendments "by a majority . . . of all the parties . . . including the votes of all of the original parties [the United States, the Soviet Union, and the United Kingdom]." Thus, to the extent that Plowshare programs conflict with the Limited Nuclear Test Ban Treaty as it stands, the United States and the Soviet Union each have a veto over the other's program. Moreover, a simple majority of the total number of signatories, which could be constituted entirely of developing and "mini-" states, have a veto over both United States and Soviet programs.

129. "It is a fact that the United States has not yet demonstrated that the technology for any—I repeat, any—specific peaceful application of nuclear explosions is technically and economically feasible. Some private companies in the United States and elsewhere and some foreign governments have evaluated certain applications of nuclear explosions for peaceful purposes and have made assessments that the technology, if successfully developed, would have economic potential in certain applications. Whether those evaluations will be confirmed requires further development, such as additional experiments with nuclear explosives." Statement by United States Representative to ENDC, June 8, 1967, ENDC/PV.303, at 4-11; DOCUMENTS ON DISARMAMENT, 1967, at 252, 257.

The Plowshare development which is probably the closest to realization is the use of nuclear explosives to stimulate natural gas production. The United States Bureau of Mines estimates that if nuclear explosions prove successful in stimulating gas production, United States recoverable gas reserves would more than double from under 300 trillion cubic feet to about 600 trillion cubic feet. *Hearings on AEC Authorizing Legislation Fiscal Year 1968 Before the Joint Comm. on Atomic Energy*, 90th Cong., 1st Sess., pt. 3, at 1797 (1967). On December 10, 1967, a nuclear explosion of approximately 26 kilotons yield was detonated by the AEC at a depth of 4240 feet in a natural gas field in New Mexico (Project Gasbuggy sponsored jointly by the AEC and El Paso Natural Gas Company). The purpose of the experiment was to determine to what extent a low permeability natural gas formation can be stimulated by an underground nuclear detonation. See generally *Hearings on AEC Authorizing Legislation Fiscal Year 1969 Before the Joint Comm. on Atomic Energy*, 90th Cong., 2d Sess., pt. 2, at 1915-2022 (1963). Results of the explosion are not yet available.

C. *Durability*

Issues related to the durability¹³⁰ of the Non-Proliferation Treaty magnify the difficulty of predicting the outcome of many of the major problems previously discussed. Yet these issues are among the most important to be considered in determining the scope and effect of the Treaty.

It is by no means certain that the Treaty will ever enter into force, and putting it into effect will probably, in itself, be a time consuming process involving significant political costs. Article IX provides that the Treaty will enter into force upon ratification by the "Depositaries"—the Soviet Union, the United Kingdom and the United States—and forty non-nuclear-weapon states.¹³¹ Thus all five nuclear-weapon states need not become parties for the Treaty to become effective—a necessary provision since France and China have clearly stated they will not adhere to the Treaty.¹³² The number forty has no particular magic to it

130. I am grateful to the National Policy Panel convened by the United Nations Association of the United States of America for the term "durability" in this connection, although I have grouped procedural issues under it as well as the major substantive problems discussed by the Panel. See REPORT OF A NATIONAL POLICY PANEL ESTABLISHED BY THE UNITED NATIONS ASSOCIATION OF THE UNITED STATES OF AMERICA, STOPPING THE SPREAD OF NUCLEAR WEAPONS 26 *et seq.* (1967).

131. Article IX, paragraph 1, of the Treaty provides in part: "This Treaty shall be open to all States for signature." The Limited Nuclear Test Ban Treaty, art. III, para. 1, contains the same provision. There are a number of practical legal problems encountered in giving any treaty potentially global coverage these days. For globally oriented international organizations the usual method is to open the treaty to "all States Members of the United Nations or of any of the specialized agencies." I.A.E.A. STAT. art. XXI, para. A. Under such formulas the Western-oriented halves of divided countries such as Germany, China, Korea and Vietnam have generally been admitted to membership in the U.N. specialized agencies while the Communist halves have been excluded. Neither half of any divided country except Nationalist China is a member of the United Nations itself. For arms control treaties, it is important that status as parties not be denied to entities not recognized as states by all the major powers, and that the challenged status of certain regimes not prevent those regimes from acting as governments of states for purposes of becoming parties. The way around the difficulty, first adopted in the Limited Nuclear Test Ban Treaty and now followed in the Non-Proliferation Treaty, is to make the Treaty open to all states and provide three depositary governments, the United States, the United Kingdom and the Soviet Union. A particular entity unrecognized by one or more of the depositaries can become a party to the Treaty by depositing instruments with that depositary which is friendly to it. Since each depositary keeps its own list, no single agreed list of parties exists. Problems may well arise under the Non-Proliferation Treaty in connection with whether particular entities are entitled to participate in review conferences and whether amendments have received the requisite majority. On the question whether recognition is accorded to an unrecognized regime that subscribes to the Nuclear Test Ban Treaty, see Opinion of the Legal Adviser, Aug. 12, 1963, *Hearings on the Nuclear Test Ban Treaty Before the Senate Comm. on Foreign Relations*, 88th Cong., 1st Sess. 15 (1963).

132. "France, for its part, which will not sign the non-proliferation treaty, will behave in the future in this field exactly as the States adhering to the treaty." Statement by Representative of France to U.N. General Assembly, June 12, 1968, U.N. Doc. A/PV.1672 (prov.) at 6.

China's attitude toward the Treaty is illustrated by their reaction to the draft treaty of August 24, 1967: "Obviously, Washington and Moscow are hoping to use the draft treaty as a means of pushing their criminal activity against communism, against the

as far as the non-nuclear-weapon states are concerned. It seems to have been selected simply as a substantial number, but one which will permit the Treaty to enter into force without undue delay. Ratification by any forty non-nuclear-weapon states, regardless of their nuclear capabilities, will be sufficient to bring the Treaty into force.

The United States, the Soviet Union and the United Kingdom, after signing the Treaty, can each block entry into force until it is satisfied with the identity as well as numbers of non-nuclear-weapon parties. The Soviet Union may be among the first to sign the Treaty, but might delay ratification until West Germany becomes a party. Moreover, certain non-nuclear-weapon states might make their own signature or ratification contingent on ratification by one or more other states. For example, Israel and the United Arab Republic might await each other's pleasure. Pakistan might wish to follow India.¹³³ Nothing in the Treaty precludes such procedures.

The Treaty's requirements that non-nuclear-weapon states negotiate with the IAEA and conclude agreements accepting safeguards could also delay its early entry into force. Under paragraph 4 of Article III,¹³⁴ negotiations must begin within six months after the Treaty is in force. States which become parties more than six months after the Treaty's effective date, however, must commence negotiation simultaneously with their ratification. Safeguards agreements with the IAEA must become effective within eighteen months after the date of initiation of negotiations, giving original parties as long as two years to negotiate and

people, against revolution and against China, in an attempt to stem the revolutionary tide in the world But atom bombs, guided missiles and hydrogen bombs were possessed by the Chinese people before their treaty was drawn up. This magnificent achievement of the Chinese people dealt a death-blow to the U.S.-Soviet policy of nuclear monopoly and nuclear blackmail and has encouraged the revolutionary people of the world tremendously. Thus, Washington and Moscow had to come up with the treaty in the hope of using it as a means of agitation against China and to contain socialist China's influence abroad Obviously, the U.S. imperialists and Soviet revisionists concocted the treaty to put all non-nuclear countries in a subordinate position, that of being 'protectorates,' so that they may maintain their special status as big nuclear powers and remain 'nuclear overlords.'" Chinese Communist Comment, Sept. 3, 1967, *PEKING REV.*, Sept. 8, 1967, at 34; *DOCUMENTS ON DISARMAMENT*, 1967, at 380, 381.

133. India has stated that its present intention is not to become a party to the Treaty. Statement by Representative of India to First Committee, U.N. Doc. A/C.1/PV.1567, at 82.

134. "Non-nuclear-weapon States Party to the Treaty shall conclude agreements with the International Atomic Energy Agency to meet the requirements of this article either individually or together with other States in accordance with the Statute of the International Atomic Energy Agency. Negotiation of such agreements shall commence within 180 days from the original entry into force of this Treaty. For States depositing their instruments of ratification or accession after the 180-day period, negotiation of such agreements shall commence not later than the date of such deposit. Such agreements shall enter into force not later than eighteen months after the date of initiation of negotiations." Art. III, para. 4. This paragraph of the Non-Proliferation Treaty is based on Article 13 of the Treaty of Tlatelolco.

conclude a safeguards agreement with the IAEA. Such agreements can be concluded "either individually or together with other States," so the five Euratom members that are non-nuclear-weapon states can negotiate as a bloc with the IAEA.¹³⁵

What would happen if a non-nuclear-weapon state which had become a party did not conclude an agreement with the IAEA within the prescribed time limits? No provision in the Treaty deals with this question. The recalcitrant state would possibly have breached an important obligation under the Treaty, but it would not automatically cease to be a party. Nor would IAEA safeguards be automatically applied to that state's peaceful nuclear activities.¹³⁶

Even though the deadline for IAEA negotiations may be unenforceable, some non-nuclear-weapon states might prefer to negotiate their safeguards agreements before ratifying the Treaty rather than after: the subject matter involved is complex and technical, and the commitments required are substantial and controversial. If the non-nuclear-weapon states with major civil nuclear industries become reluctant to sign the Treaty until the nature of their agreements with the IAEA becomes more precisely defined, the Treaty's entry into force will be substantially delayed at least as to this most important category of states.

After the Treaty enters into force, paragraph 2 of Article X¹³⁷ provides that the initial term will be twenty-five years, subject at that time to two options which are exercisable by a simple majority of the parties:¹³⁸ first, the Treaty may be renewed for a fixed period or periods;

135. Article III(D) and Article XIV(A) of the IAEA Statute provide ample authority for the IAEA to conclude an agreement with Euratom.

136. Earlier proposals for Article III, which were never officially published, included a clause which required the IAEA system automatically to enter into force at the end of three years if no agreement had been reached with IAEA in the interim. Euratom member states objected strongly to this "guillotine clause," and it was deleted from the version of Article III which was tabled on January 18, 1968. EUROPEAN COMMUNITY, April 1968, at 17.

137. "Twenty-five years after the entry into force of the Treaty, a Conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods. This decision shall be taken by a majority of the Parties to the Treaty." Art. X, para. 2.

Article VII of the draft treaty of August 24, 1967, provided for "unlimited duration." ENDC/192; ENDC/193; DOCUMENTS ON DISARMAMENT, 1967, at 338, 341. Italy characterized the provision for unlimited duration in the August 24, 1967, draft as an "iron corset." Statement by Representative of Italy to ENDC, ENDC/PV.341, at 5-6. The government of Switzerland suggested a treaty for a definite period with a review conference at the end, stating: "The non-nuclear-weapon states certainly cannot take the responsibility of tying their hands indefinitely if the nuclear-weapon states fail to arrive at positive results 'in the direction of nuclear disarmament measures.'" ENDC/204. There has been little objection to the twenty-five year period specified in the draft treaty of January 18, 1968, and subsequent versions. Article IV of the Limited Nuclear Test Ban Treaty specifies "unlimited duration." Article 30 of the Treaty of Tlatelolco specifies that the Treaty shall remain in force "indefinitely."

138. It might be argued that the decision to extend the duration of the Treaty

second, the Treaty may be continued indefinitely. Once the Treaty enters into force, therefore, a few more than a majority of the non-nuclear-weapon parties can control how long the Treaty will remain in effect after the initial twenty-five year period.

Since some rather severe stresses on the Treaty can be anticipated during its first twenty-five years of operation, it is well that it contains rather liberal provisions for review in the interim.¹³⁹ Paragraph 3 of Article VIII¹⁴⁰ contains requirements that five years after entry into force, and at five-year intervals thereafter at the request of a majority of the parties, a conference of the parties "shall be held" in Geneva "to review the operation" of the Treaty "with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realized." The Treaty offers no guidance concerning the form of the assurance or what would be the effect of the decision by a majority of the parties at such a conference that certain parts of the Treaty were not working well. Indeed, there is no specific authorization for the five-year review conferences to make any decisions at all. A specific proposal that the review conference adopt "findings" by "a majority of the signatory states present"¹⁴¹ was not accepted by the drafters. Such a conference would, however, at least offer a forum for any party to propose, discuss and perhaps obtain initial approval of amendments to the Treaty.

Under paragraph 1 of Article VIII,¹⁴² any party is authorized to propose amendments to the Treaty at any time. At the request of one-

constitutes an amendment to the Treaty which could not take effect under paragraph 2 of Article VIII, note 143 *infra*, as to any non-consenting party. However, this would distort paragraph 2 of Article X, which clearly seems intended to place the decision concerning this particular phase of the Treaty in the hands of a majority of the parties and to make that decision effective against all parties.

139. The nuclear era is barely twenty-five years old. The changes probable in the next twenty-five years due to nuclear research, development and innovation seem at least as great as those which have occurred in the first twenty-five year period. For a stimulating glimpse into the future concerning peaceful uses of nuclear energy, see Weinberg, *The Coming Age of Nuclear Energy*, I.A.E.A. BULL., Dec. 1967, at 11-21.

140. "Five years after the entry into force of this Treaty, a conference of Parties to the Treaty shall be held in Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realized. At intervals of five years thereafter, a majority of the Parties to the Treaty may obtain, by submitting a proposal to this effect to the Depositary Governments, the convening of further conferences with the same objective of reviewing the operation of the Treaty." Art. VIII, para. 3.

141. Statement by Representative of Nigeria to ENDC, ENDC/PV.371 (prov.), at 17.

142. "Any Party to the Treaty may propose amendments to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments which shall circulate it to all Parties to the Treaty. Thereupon, if requested to do so by one third or more of the Parties to the Treaty, the Depositary Governments shall convene a conference, to which they shall invite all the Parties to the Treaty, to consider such an amendment." Art. VIII, para. 1.

third of the parties, a conference must be convened to consider the proposed amendment. Any amendment would have to be approved by a majority vote of all parties, including the affirmative votes of all nuclear-weapon parties and all other parties which were members of the IAEA Board of Governors on the date the amendment was circulated. Each amendment would enter into force, assuming the requisite majorities were obtained, only as to those parties that specifically consented by ratifying the amendment. Presumably, the unamended version of the Treaty would remain in force among parties which did not consent and between consenting and non-consenting parties.¹⁴³ The requirement that the major nuclear powers, in both military and civil fields, must approve each amendment provides stability to the Treaty and probably eliminates the danger of its being reduced by amendment to a set of conflicting and unworkable obligations.

The analysis of the Non-Proliferation Treaty so far has been primarily directed at provisions intended to prevent the spread of nuclear weapons in the horizontal plane to additional states. But proliferation also has a vertical dimension—the build-up of nuclear armaments within the nuclear-weapon states. These two dimensions are generally perceived as dependent variables in any nuclear security equation.¹⁴⁴ Thus, the

143. Article VIII, paragraph 2, provides: "Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to the Treaty, including the votes of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. The amendment shall enter into force for each Party that deposits its instrument of ratification of the amendment upon the deposit of such instruments of ratification by a majority of all the Parties, including the instruments of ratification of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. Thereafter, it shall enter into force for any other Party upon the deposit of its instrument of ratification of the amendment."

Article V, paragraph 2, of the draft treaty of August 24, 1967, had provided that upon obtaining the requisite majorities amendments would enter into force *as to all parties*, whether or not they had consented. Rumania and others criticized this provision, and it was changed in the draft of January 18, 1968. Statement by Representative of Rumania to ENDC, ENDC/PV.348, at 7-8. The Treaty's amendment process is sanctioned and described in Article 36 of the Draft Articles on the Law of Treaties of the International Law Commission. 21 U.N. GAOR, Supp. 9, at 15, U.N. Doc. A/6309/Rev.1 (1966).

Rumania criticized this provision for giving the members of the IAEA Board of Governors a privileged position. Statement by Representative of Rumania to ENDC, ENDC/PV.348, at 7-8. Certainly, the Non-Proliferation Treaty amendment process will add a major new factor to the designation and election of members of the IAEA Board of Governors. It is interesting that *no* member of the IAEA Board has a veto over decisions by the Board concerning peaceful uses of nuclear energy, many affecting the Non-Proliferation Treaty, while *every* member of the IAEA Board that is a party to the Treaty will have a veto over amendments to it circulated at that time.

144. Although the interaction between horizontal and vertical proliferation is recognized, the conclusion is not inevitable that nuclear-weapon states must reduce their nuclear armaments if they expect to prevent further proliferation. Rather than minimizing the gap between nuclear-weapon and non-nuclear-weapon states—a "low posture"—a nuclear-weapon state might choose to widen the gap to make it unbridgeable—a "high

durability of the Treaty and the underlying policy of preventing further horizontal proliferation will depend, perhaps decisively, on the future success of efforts to control the nuclear arms race among the nuclear-weapon states. Article VI of the Treaty obligates all parties, including the two superpowers, "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" ¹⁴⁵

Present trends in nuclear weapons capabilities, however, fly in the face of these words on paper.¹⁴⁶ Moreover, nuclear power politics is

posture." For good analysis pro and con of each alternative and a conclusion in favor of a low posture, see Bull, *The Role of Nuclear Powers in the Management of Nuclear Proliferation*, in *ARMS CONTROL FOR THE LATE SIXTIES* 143 (Dougherty & Lehman ed. 1967).

145. "Each of the Parties to the Treaty undertakes 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." Art. VI.

The undertaking regarding "general and complete disarmament" is propaganda. In addition to these undertakings, the Preamble contains declarations of intention regarding nuclear disarmament, general and complete disarmament, and achievement of "the discontinuance of all test explosions of nuclear weapons for all time." "As has been pointed out by many non-aligned delegations, a non-proliferation treaty must . . . embody an article of solemn obligation under which the state possessing nuclear weapons would negotiate a meaningful programme of reduction of existing stockpiles of weapons and their delivery systems. This provision cannot be merely a pious preambular platitude like the unfulfilled 'determination' in the four-year-old partial test-ban treaty." Statement by Representative of India to ENDC, May 23, 1967, ENDC/PV.298, at 4-17; *DOCUMENTS ON DISARMAMENT*, 1967, at 229, 238.

From time to time various states proposed the inclusion of references in Article VI to various specific measures of control on vertical proliferation, including a comprehensive nuclear test ban, cut-off of production of fissionable materials for use in weapons, and a freeze on further production of nuclear weapon delivery systems. The United States has stated: "We all know why it would not be feasible to incorporate specific obligations to that end in the treaty itself. The differences that have prevented agreement on these measures have not yet been resolved. Any attempt to incorporate specific nuclear arms limitation obligations in the treaty would inevitably also inject these differences into the consideration of the treaty itself and could only jeopardize its prospects." Statement by United States Representative to ENDC, Aug. 24, 1967, ENDC/PV.325, at 4-11; *DOCUMENTS ON DISARMAMENT*, 1967, at 342, 346. The Soviet Union Representative to ENDC made a statement to the same effect. ENDC/PV.361 (prov.), at 5-22. Moreover, it has been suggested that the view held by some non-nuclear-weapon states—requiring nuclear disarmament as a *quid pro quo* for accepting the Non-Proliferation Treaty—overlooks the fact that the Treaty is intended to enhance the security of all states, and in particular the non-nuclear-weapon states. See Statement by United States Representative to ENDC, ENDC/PV.362 (prov.), at 21-23. In a recent speech, Secretary of State Rusk listed the following as possible next steps: "achieving an understanding with the Soviet Union to halt the strategic missile arms race," including "control of both offensive vehicles and antiballistic missiles;" a cut-off of production of fissionable materials for weapons; and a comprehensive nuclear test ban. Address by Secretary of State Rusk, May 2, 1968, 58 *STATE DEPT BULL.* 632, 633-34 (1968).

146. For example, in the United States during the eight years, FY 1962—FY 1969, approximately \$78.7 billion will have been spent on strategic nuclear forces. In the last three years the trend is as follows: FY 1967, \$6.9 billion; FY 1968, \$7.9 billion; FY 1969, \$9.6 billion. Statement by Secretary of Defense Robert S. McNamara on the Fiscal Year 1969-73 Defense Program and the 1969 Defense Budget, Table 1, at 214 (1968). In mid-1967 a \$100.5 million project to provide additional nuclear weapons production facilities was authorized for the AEC in support of the decision to deploy an anti-ballistic missile defense system. U.S.A.E.C., *Major Activities in the Atomic Energy Programs*, January-December 1967, at 60 (1968).

not within the control of the United States and the Soviet Union, individually or collectively. China, in particular, is moving into a position of pivotal importance. On the one hand, China's nuclear weapons program has already triggered a decision to deploy a ballistic missile defense system in the United States and could in the future catalyze a full-scale renewal of the nuclear arms race between the United States and the Soviet Union. On the other hand, China's growing nuclear power will increase the problems for India and Japan in maintaining their own nuclear security.¹⁴⁷ Even if the United States and the Soviet Union play down China's nuclear power and, under the injunction of Article VI, freeze the nuclear arms build-up between themselves, this would not resolve the difficulties of those non-nuclear-weapon states which feel menaced by China.¹⁴⁸

The withdrawal provision of the Treaty and the security assurances that the United States, the Soviet Union and the United Kingdom have extended to non-nuclear-weapon parties are intended to deal with the potential insecurity of those non-nuclear-weapon states which give up their nuclear weapons options. Paragraph 1 of Article X¹⁴⁹ provides that a party may withdraw from the Treaty if it decides that "extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country." This provision is identical with Article IV of the Limited Nuclear Test Ban Treaty.¹⁵⁰ However, the

147. "India's peculiar position with regard to the nonproliferation treaty . . . is that it is a nonaligned country, not in military alliance with any country nor under the nuclear umbrella of any country. Secondly, India is far advanced in nuclear research, and third, it is under the continuing threat and menace of China, which has already become a nuclear power." News Conference Remarks by External Affairs Minister Chagla of India, April 27, 1967, DOCUMENTS ON DISARMAMENT, 1967, at 204.

148. For further analysis see Willrich, *ABM and Arms Control*, 44 INT'L AFFAIRS 228 (1968); Rothstein, *The ABM, Proliferation and International Stability*, 46 FOREIGN AFFAIRS 487 (1968).

149. "Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall 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 it regards as having jeopardized its supreme interests." Art. X, para. 1.

150. The withdrawal clause in the Non-Proliferation Treaty was a United States suggestion. Testimony of Adrian S. Fisher, Deputy Director, United States Arms Control and Disarmament Agency, *Hearings on Arms Control and Disarmament Act Amendments, 1968, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 70 (1968).

The notion of an express provision for withdrawal when one's "supreme interests" are jeopardized may well have had its origins in another agreement for quite another purpose. The Nassau agreement provided that certain existing United Kingdom nuclear forces and the United Kingdom Polaris submarine forces to be built with United States assistance "would be assigned as part of a NATO nuclear force and targeted in accordance with NATO plans." "The Prime Minister made it clear that except where Her Majesty's Government may decide that *supreme national interests* are at stake, these British forces will be used for the purposes of international defense of the Western Alliance in all circumstances." (Emphasis added.) Statement on Nuclear Defense Systems, paras. 6, 8, Nassau

provisions for notice accompanying withdrawal differ by requiring the withdrawing state to give three months' notice to the Security Council, in addition to all other parties, and to identify the events it regards as having jeopardized its supreme interests.¹⁵¹

The "extraordinary events" justifying withdrawal must not only be determined by the withdrawing party to have jeopardized its "supreme interests," but must also be "related to the subject matter of this Treaty." Thus, India might be justified in withdrawing from the Treaty on the basis of a nuclear threat from China, while Israel might not be justified in withdrawing on the basis of a growing conventional threat from the Arab states.

The withdrawal clause provides a revolving door in the Non-Proliferation Treaty, a feature that seems to be essential if the Treaty is to be a viable political structure, since it touches vital security interests. If a party believed its security was seriously threatened and it could not withdraw, it would probably either secretly circumvent or openly abrogate the Treaty. In these circumstances, the withdrawal clause serves two important functions. First, by providing a legitimate avenue of escape, it should make it easier for key states such as West Germany, Japan, Sweden, and perhaps India to become parties to the Treaty. Second, it should provide an important channel in which the political process can operate in the event a party should feel its security threatened. Although the withdrawal clause provides a means of escape, in another sense it is legitimate, even desirable, for a non-nuclear-weapon state to view it as a type of nuclear security guarantee, particularly since the Treaty itself provides no specific guarantee.¹⁵²

Communique by President Kennedy and Prime Minister Macmillan, Dec. 21, 1962, 48 DEP'T STATE BULL. 43-45 (1963); DOCUMENTS ON DISARMAMENT, 1962, at 1274, 1276 (U.S. Arms Control & Disarmament Agency Pub. No. 19, 1963). Article 30, paragraph 1, of the Treaty of Tlatelolco contains a provision analogous to the Non-Proliferation Treaty.

151. Rumania objected to the requirement of submitting a statement to the Security Council concerning the basis for withdrawal, maintaining that the right of withdrawal was within the exclusive competence of every state and no other state or international organization was qualified to discuss it. Statements by Representative of Rumania to ENDC, ENDC/PV. 362 (prov.), at 12; ENDC/PV.376 (prov.), at 22. As discussed *infra*, the procedural requirement—that a statement of justification be submitted to the Security Council—can be made to work in favor of a party considering withdrawal for legitimate security reasons. The Security Council would probably become involved, in any event, if a state sought to withdraw from the Treaty, if not to assist the party considering withdrawal, then to consider sanctioning it for creating a situation endangering the peace.

152. As the Treaty was being drafted and debated, a number of non-nuclear-weapon states proposed that a specific guarantee be included that would protect the non-nuclear-weapon states from nuclear attack or "blackmail" by the nuclear-weapon states. The United States, in particular, resisted the incorporation of any security guarantee into the Treaty, because the issues involved were "too difficult and complicated to be reduced to a treaty provision" and should be dealt with in the context of the United Nations, which had primary responsibility for the maintenance of peace and security. Statement by

In order to obtain the benefits of the guarantee implicit in the withdrawal clause, a non-nuclear-weapon state would first have to become a party to the Treaty. Once a party, the non-nuclear-weapon state which believed itself threatened by another state's nuclear capabilities or intentions could begin the process of withdrawal, perhaps with a simple statement of its concern rather than a formal notice. If the Treaty was working well, the statement from the threatened non-nuclear-weapon party should generate a prompt response from some or all of the parties to which it was addressed, possibly including one or more of the nuclear-weapon states. If, however, the initial response of the other parties was insufficient to allay the concerns of the threatened non-nuclear-weapon party, it could proceed to give formal notice of its intention to withdraw. Notice as required in the withdrawal process would dramatize the plight of the withdrawing state, and the Security Council would be a suitable forum in which to generate an adequate response.¹⁵³

Outside the Treaty framework but related to it, a resolution on "security assurances," sponsored by the United States, the Soviet Union, and the United Kingdom, has been adopted by the Security Council.¹⁵⁴ This is intended to provide a new basis for responding to acts or threats of "aggression with nuclear weapons" against non-nuclear-

United States Representative to ENDC, ENDC/PV.368 (prov.), at 17. In addition, incorporation of a specific security commitment into the Non-Proliferation Treaty could cause substantial complications for the United States Government in obtaining Senate consent to ratification.

The Soviet Union has declared its willingness "to include in the draft treaty a clause on the prohibition of the use of nuclear weapons against non-nuclear states parties to the Treaty which have no nuclear weapons in their territory." Message from Premier Kosygin to ENDC, Feb. 1, 1966, ENDC/167, Feb. 3, 1967; DOCUMENTS ON DISARMAMENT, 1966, at 9, 11. In this proposal the Soviet Union combined two favorite foreign policy themes. In the first place, the proposal is aimed at West Germany which is a non-nuclear-weapon state that would clearly not qualify for preferred treatment. Second, the proposal plays to "world public opinion" which will support "ban the bomb" resolutions in the U.N. General Assembly and is unsympathetic to United States reluctance in this regard. The concept of an affirmative guarantee of the security of a state against attack should be carefully distinguished from the negative concept of a restraint in the use of a particular weapon.

153. But the process could also lead in a different direction. It might be suggested that one effect of the Treaty would be to make the act of withdrawal by a party in order to acquire nuclear weapons a "situation which might lead to international friction" justifying an investigation by the Security Council under Article 34 of the U.N. Charter. The entire situation might be, thereafter, characterized as a "threat to the peace" under Article 39, justifying the application of appropriate sanctions under Articles 40, 41, and 42. Of course, the target state would not necessarily be the state which had just withdrawn and declared its intention to acquire nuclear weapons, but it could be.

154. The operative paragraphs are:
"[Each Council member] 1. Recognizes that aggression with nuclear weapons or the threat of such aggression against a non-nuclear-weapon state would create a situation in which the Security Council, and above all its nuclear-weapon state permanent members, would have to act immediately in accordance with their obligations under the United Nations Charter;

weapon parties to the Treaty. Paragraph 2 of the resolution envisages declarations of "intention" in support of the assurances. In conjunction with Security Council action on their proposed resolution, each of the three sponsors has declared: "[A]ggression with nuclear weapons, or the threat of such aggression, against a non-nuclear-weapon state would create a qualitatively new situation . . . ;" and affirmed "its intention, as a permanent member of the United Nations Security Council, to seek immediate Security Council action to provide assistance in accordance with the Charter to any non-nuclear-weapon state party to the Treaty on the Non-Proliferation of Nuclear Weapons that is a victim of an act of aggression or an object of a threat of aggression in which nuclear weapons are used."¹⁵⁵ Will it follow from such a resolution that, as declared by the three proponents, "any state which commits . . . or . . . threatens such aggression, must be aware that its actions are to be countered effectively . . ." ¹⁵⁶ Would such Security Council action constitute a reliable nuclear security "umbrella" over the non-nuclear-weapon states which become parties to the Non-Proliferation Treaty?¹⁵⁷ Action "through" the Security Council under the assurances resolution will require the support or acquiescence of the other two permanent members of the Security Council, France and Nationalist China. Since Nationalist China is both a non-nuclear-weapon state and a prime target for nuclear threats from Communist China, it will probably support action under the security assurances resolution. It is not so clear where France's interests will lie. But the resolution will give France, which has refused to subscribe to the Non-Proliferation

"2. Welcomes the intention expressed by certain states that they will provide or support immediate assistance, in accordance with the Charter, to any non-nuclear-weapon state party to the Treaty on the Non-Proliferation of Nuclear Weapons that is a victim of an act or an object of a threat of aggression in which nuclear weapons are used;

"3. Reaffirms in particular the inherent right, recognized under Article 51 of the Charter, of individual and collective self-defense if an armed attack occurs against a member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security." 58 DEP'T STATE BULL. 401-03 (1963) (complete text and U.S. statement).

155. *Id.* 402.

156. *Id.*

157. A United States official has stated that the security assurances resolution "does not involve a new commitment but it is a statement of the ways we would act under the charter of the U.N. and a statement which would be meaningful as far as the nonaligned are concerned, if a similar statement was made by the Soviet Union." Testimony of Adrian S. Fisher, Deputy Director, United States Arms Control and Disarmament Agency, *Hearings on Arms Control and Disarmament Act Amendments, 1963, Before the House Comm. on Foreign Affairs*, 90th Cong., 2d Sess. 78 (1968). On October 18, 1964, following China's first nuclear explosion President Johnson stated: "The nations that do not seek national nuclear weapons can be sure that, if they need our strong support against some threat of nuclear blackmail, then they will have it." 50 DEP'T STATE BULL. 610-14 (1964); see Willrich, *Guarantees to Non-Nuclear Nations*, 44 FOREIGN AFFAIRS 683 (1966).

Treaty, a large influence over the effectiveness of the security assurances which are viewed by many non-nuclear-weapon states as a vital, if not integral, aspect of the Treaty.

A major substantive weakness of the Security Council resolution on security assurances is that the events which will bring it into operation are "aggression" or "the threat of aggression" with nuclear weapons against a non-nuclear-weapon state. Thus, the resolution rests on all the unresolved problems of defining aggression and identifying the aggressor, and determination of the threshold question whether "aggression with nuclear weapons" has occurred in a particular case will be by the usual Security Council procedures, including the veto of any one of the five permanent members.

The thrust of the first two paragraphs of the security assurances resolution is action through the Security Council. Paragraph 3, however, reaffirms the right to individual or collective self-defense under Article 51 of the Charter. This reaffirmation may be viewed as serving two purposes. On the one hand, it seems to offset any suggestion, which might be inferred from the pledges by the three nuclear-weapon parties to the Treaty to seek action through the Council, that they had delegated any veto-free power to the Security Council. On the other hand, the reaffirmation of the rights of individual and collective self-defense provides a "fall-back" assurance to the non-nuclear-weapon states if assistance from or through the Security Council is not forthcoming.¹⁵⁸ Such an affirmation recognizes, but does not seem to add to or detract from, the credibility of nuclear security guarantees which already exist in collective security agreements.

The withdrawal clause of the Treaty and the Security Council security assurances resolution are directed at different kinds of circumstances, but share a common purpose—preserving the Treaty. The "extraordinary events" which a non-nuclear-weapon state might consider to have "jeopardized the supreme interests of its country," thereby justifying its withdrawal from the Treaty, might well fall short of what the Security Council might determine "aggression with nuclear weapons or the threat of such aggression." Thus, the Treaty's withdrawal clause coupled with the Security Council resolution on assurances might seem to provide a gradation of responses applicable to a broad range of events which, if they occurred, would challenge the continued existence

158. Assuming United States-Soviet cooperation, the veto of another Security Council permanent member or the absence of sufficient time for Security Council action would not necessarily block coordinated superpower action outside the Security Council on the basis of the right to collective self-defense.

of the Treaty. The umbrella of the security assurances resolution, however, extends only to non-nuclear-weapon states which are parties to the Treaty. This limitation is intended to create incentives, first, to adhere to the Treaty and, thereafter, to remain a party. But it will also undercut any assurance effect of the withdrawal clause for non-nuclear-weapon states, since the benefit of the resolution can not be claimed after withdrawal from the Treaty.

What, in practice, might the resolution on security assurances accomplish? The veto which each permanent member possesses limits the possible target of Security Council action to China, and no other potential nuclear aggressor. In this respect, the Security Council may become a principal organ for future collaboration between the United States and the Soviet Union in the containment of China—as long as China is not a member of the United Nations.¹⁵⁹ Such open and institutionalized collaboration seems an important ingredient of any meaningful security assurance to non-aligned non-nuclear-weapon states such as India. It is too early to tell, however, whether the security assurances resolution constitutes a real move by the United States and the Soviet Union towards this kind of cooperation or merely a short-term expedient to obtain subscriptions to the Non-Proliferation Treaty.

V. Assessment

The competitive forces inherent in the existing international system, reinforced by conflicts over basic values among competing states in the system, have greatly accelerated the exploitation of nuclear energy. A series of upward and outward trends are established in both the military and the peaceful nuclear fields. The Non-Proliferation Treaty is an attempt to reverse the military trends, confirm the peaceful trends and establish a barrier between the two. In short, the Treaty is a major attempt to achieve political control on a global scale over the scientific and technological processes by which nuclear energy is exploited.¹⁶⁰

159. China sees the Non-Proliferation Treaty as just such collusion between the super-powers. See note 132 *supra*. United States-Soviet collaboration in this respect will be a mixed blessing, as far as future accommodation with China is concerned, and like so much else in the non-proliferation field, it seems primarily intended to buy a few years time.

160. "This treaty confronts us in this form for the first time with the problem of finding a political solution to the mass of information and knowledge brought to us by science and technics, knowledge which we can no longer remove from our world. This makes the help and the counsel of science indispensable in the political field. But it also raises the problem to a new and somewhat unsure level, that of insuring the primacy of the political. The political requires the helping partnership of the scientific, but the responsibility of the final determination—even in regard to important detailed decisions—cannot be taken away from the political leadership." Statement by Foreign Minister

The attempt is justified mainly by the increasing probability of nuclear war if nuclear energy continues to be exploited in a largely uncontrolled manner within the present international system.

Each government faced with the issue of whether or not to become a party to the Treaty will strike the balance among nuclear incentives and disincentives for itself, and assess the consequences of the Treaty from its own peculiar perspective. This will be a difficult political task, in particular for such non-nuclear-weapon states as West Germany, Japan, India and Israel, which are faced with major security problems and already possess technological capabilities to seek nuclear solutions. But no decision by any government regarding the Non-Proliferation Treaty can be taken in isolation. As with a decision to acquire nuclear weapons, a decision to accept or reject the Treaty might well have a chain reaction effect. Assessment of the consequences of the Treaty by any particular state, therefore, should be made with the general implications of the Treaty firmly in mind.

The Non-Proliferation Treaty implies that nuclear weapons will remain under the exclusive control of the present five nuclear-weapon states for the indefinite future. The Treaty is intended to prohibit any sixth state from acquiring nuclear weapons and forecloses the possibility of transferring nuclear weapons to multilateral structures, even though no increase would occur in the number of powers in the global system having control of nuclear weapons.

The Non-Proliferation Treaty leaves the freedom of action of nuclear-weapon states relatively untouched. But along with this freedom come serious responsibilities. The nuclear-weapon parties to the Treaty, in particular the United States and the Soviet Union, will have to control their development, procurement and deployment of nuclear armaments if they expect the non-nuclear-weapon parties to continue to abide by their pledge of nuclear weapons abstinence. At the same time, the nuclear-weapon parties will have to make the system of security assurances credible both to the non-nuclear-weapon beneficiaries and to all potential nuclear-weapon aggressors. How the United States and the Soviet Union can resolve the long-term contradiction between simultaneous calls for nuclear disarmament and for effective security assurances against China's growing nuclear threat is by no means clear. What is clear, however, is that the superpowers cannot avoid shared responsibility for effecting such a resolution.

Brandt to the Bundestag, Apr. 27, 1967, News from the German Embassy, May 5, 1967, at 1-8; DOCUMENTS ON DISARMAMENT, 1967, at 206-07.

Nuclear Weapons

Nuclear weapons will remain contained within the existing international structure for only a limited period of time. A question of fundamental importance is whether new solutions embracing necessary structural change can be found or will emerge during the period in which the rule of nuclear weapons containment established by the Treaty lasts. Perhaps the greatest risk related to the Treaty is that the search for new forms will be unsuccessful. Having maintained the status quo against increasing pressures, if the Treaty structure then breaks down, the ensuing instabilities could be more severe and dangerous than if the natural course of nuclear weapons proliferation had not been interrupted. This does not mean that the risks inherent in the Treaty outweigh the risks without the Treaty, but it highlights the need for receptivity to structural innovation in the international system in the critical interim period.

While the Treaty confirms the status quo regarding nuclear weapons, it looks forward to change concerning the peaceful uses of nuclear energy. Under the Treaty, civil nuclear industries throughout the world, except in the Soviet Union, will be open to international inspection. Non-nuclear-weapon states will come to rely mainly on an international system of accountability for assurance against nuclear weapons manufacture in other non-nuclear-weapon states. A new multilateral decision-making framework for peaceful application of nuclear explosives is established.

The provisions concerning the application of safeguards and the range of international nuclear transactions permitted when a nuclear-weapon state is the recipient are, however, more discriminatory than they need be. Civil nuclear industries within states and nuclear commerce between states should be placed on the same footing throughout the world as soon as possible. The exclusions presently in the Treaty with respect to these matters may be justified as expedients to obtain its initial acceptance, but the question whether such exclusions ought to continue should be placed high on the agenda of the first review conference under the Treaty.

We look forward to a world in which plutonium will be available in very large quantities in all industrially advanced states and in many developing states.¹⁶¹ Safeguards on peaceful nuclear activities will at most serve to flash a red warning light if this material is diverted from

161. For an excellent description and analysis, see Gilinsky, *Fast Breeder Reactors and the Spread of Plutonium*, RAND Memorandum RM-5148-PR (1967).

peaceful uses.¹⁶² There is nothing that safeguards alone can do to prevent diversion from occurring once a non-nuclear-weapon state decides to embark on a nuclear weapons program. Thus, safeguards are but a part of, not a complete response to, the challenge to the international system presented by continuing peaceful nuclear innovation.¹⁶³ Here again, an adequate response to nuclear energy will require further structural innovation in the international political system.¹⁶⁴

162. There is not even a clear red light in the safeguards system. If a state was bent on diverting nuclear material from a safeguarded nuclear facility, the only signal the international inspectorate could count on receiving would be a series of yellow warning lights as a result of statements by the host state that inspection would be inconvenient.

Concerning sanctions, the IAEA Board of Governors has not ventured beyond references to the relevant statutory provisions in its development of a system of Agency safeguards. Article XII, paragraph C, sets forth procedures to be followed in the event of non-compliance. These include: a report by the inspectors to the Director General; the transmittal of the report by the Director General to the Board of Governors; a call upon the state concerned to remedy the situation if non-compliance is found by the Board; a report by the Board to the members of IAEA and to the U.N. Security Council and General Assembly; and the Board's decision to curtail or suspend assistance in event of failure of the state concerned to take "fully corrective action within a reasonable time," or to call for the return of materials and equipment made available. Provision is also made for suspension of the non-complying state from membership in the IAEA. For discussion, see Szasz, *The Law of International Atomic Energy Agency Safeguards*, 3 REV. BELGE DE DROIT INT'L 196, 220-23 (1967).

163. One observer has concluded: "The proposed nonproliferation treaty must be judged primarily for its effect on the growing threat of a worldwide diffusion of plutonium. If it reinforces the false security of the safeguards system by persuading the legalists that no country which has signed is ever capable of building nuclear weapons, it will do a grave disservice to the cause of nonproliferation. . . . [U]nder the placid rule of safeguards as they are now understood, the plutonium will spread far and wide. When the collapse comes, no one will remember how easy it might have been to hold a narrow ring." Beaton, *Nuclear Fuel-For-All*, 45 FOREIGN AFFAIRS 662, 669 (1967). However, holding "a narrow ring" based on international ownership and processing control in addition to safeguards accountability control over plutonium, as Beaton suggests, does not seem to be a solution easily achieved either.

It has also been suggested that detailed studies will reveal that: "There is some optimum way for the elements of nuclear energy systems to be distributed throughout the world. If facilities are collected together into too small a number of "closed fuel cycle" systems, then unattainable surveillance accuracies are likely to be required to detect diversion from a single facility at levels that correspond potentially to many nuclear explosives. At the other extreme, however, nuclear facilities might be so widely dispersed that high surveillance accuracies and effective physical security measures become too costly, and the possibility of open, armed theft of enough material to produce a few nuclear explosives for criminal purposes could become intolerably large." Taylor, *The Rapid Growth of Nuclear Technology-Implication for Nuclear Safeguards*, INT'L RESEARCH & TECHNOLOGY J., Jan. 1, 1968, at 16. The problem with such a suggestion is that economic and political forces will probably cut in a different direction and the result will not approximate the optimum from the safeguards standpoint.

164. As the availability of plutonium increases, the threat will become as much a problem of internal as external security. Recently a United States contractor operating a fuel fabrication plant reported losses in excess of 100 kilograms of uranium-235 over a period of years. Address by John T. Conway, Executive Director, Joint Committee on Atomic Energy, to 7th Annual Meeting, Institute of Nuclear Materials Management, June 14, 1966. This triggered the convening of an outside review panel, the establishment of a new Office of Safeguards and Materials Management within the AEC, A.E.C. Press Release No. K-108, May 3, 1967, and the stationing of a resident AEC inspector at four private facilities in the United States which process significant quantities of fissionable material. A.E.C. Press Release No. K-121, May 12, 1967.

Einstein once said: "The unleashed power of the atom has changed everything save our modes of thinking, and thus we drift to unparalleled catastrophe." The Non-Proliferation Treaty could give us some additional time to change our modes of thinking.