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DRAFT FOR DISCUSSION PREPARED BY
THE INTERNATIONAL PANEL ON FISSILE MATERIALS

A Fissile Material (Cut-Off) Treaty

A Treaty Banning the Production of Fissile Materials for Nuclear Weapons or Other Nuclear Explosive Devices

with article-by-article explanation

16 March 2009

International Panel on Fissile Materials
www.fissilematerials.org

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Introduction

A treaty banning the production of fissile materials[1] for nuclear weapons is essential to constraining nuclear arms races and to achieving the goal of nuclear disarmament. Negotiation of such a treaty was endorsed without a dissenting vote in 1993 by the United Nations General Assembly.[2]

The Review Conference of the Parties to the Non-Proliferation Treaty (NPT) in 2000 agreed that negotiations "on a non-discriminatory, multilateral and internationally and effectively verifiable treaty banning the production of fissile materials for nuclear weapons or other nuclear explosive devices" should commence immediately in the multilateral Conference on Disarmament (CD) in Geneva, "with a view to their conclusion within five years."[3] Nevertheless, the CD has, for various reasons, not yet formally launched negotiations on such a treaty.

In the discussion of the proposed treaty at the CD, two issues have been especially contentious: verification and pre-existing stocks. The debate over whether the treaty should involve a ban on the use of some pre-existing stocks for weapons has even led to the use of two different names for the proposed treaty: Fissile Material Cutoff Treaty and Fissile Material Treaty. Here, we will use a name that makes this unresolved issue explicit: Fissile Material (Cutoff) Treaty, or FM(C)T.

We present below a draft FM(C)T based on discussions within the International Panel on Fissile Materials (IPFM). It is an alternative to the draft treaty with limited scope and without verification submitted by the Bush Administration to the CD on May 18, 2006.

Verification. There are strong reasons to prefer a verified treaty:

- Agreed verification measures are essential to creating confidence and trust in an FM(C)T;

- The non-nuclear-weapon states (NNWS) Parties to the Non Proliferation Treaty (NPT) have accepted comprehensive safeguards, implemented by the International Atomic Energy Agency (IAEA), on their civilian nuclear programs to verify their commitments not to divert nuclear materials to weapons. Many of these states have repeatedly expressed concerns that, because the nuclear-weapon states are not required to have similar safeguards on their civilian nuclear activities, the NPT puts NNWS at a competitive disadvantage in the development

[1] Fissile materials are materials that can sustain a fission chain reaction, in practice, primarily plutonium and highly enriched uranium.

[2] UN General Assembly Resolution 48/75L, 1993, www.ipfmlibrary.org/unga4875.pdf.

[3] *2000 NPT Review Conference Final Document,* "Article VI and Preambular, Paragraphs 8 to 12," 15.3, see e.g. www.armscontrol.org/act/2000_06/docjun.asp.

of civilian nuclear power. A verified FM(C)T would go far toward redressing this inequity; and

- Interest in nuclear disarmament has recently revived. Much deeper cuts in the nuclear stockpiles will require expanded inspections of nuclear activities in the states possessing nuclear weapons. International verification of an FM(C)T would make an important contribution to establishing an effective verification system for future nuclear disarmament measures.

The IPFM believes that an FM(C)T could be verified as well as the Nonproliferation Treaty. Our draft treaty therefore requires verification. As with the NPT, the draft treaty calls upon the IAEA to implement the needed verification arrangements, but these arrangements are not spelled out in the treaty itself.[4] The Panel has developed specific ideas on verification, however. Some of these have been laid out in our *Global Fissile Material Report 2008* (*GFMR08*).[5]

We have assumed that the IAEA would take on responsibility for verification. The IAEA has extensive experience in inspecting nuclear installations and nuclear materials, including in the NPT nuclear-weapon states under their voluntary safeguards agreements. The obligations of nuclear-weapon states under the FM(C)T will overlap strongly with the obligations of non-weapon states under the NPT and will become more similar as nuclear disarmament proceeds. The IAEA, advised by national experts, might begin the development of a model protocol in advance of the completion of an FM(C)T.

To undertake the new responsibilities, the IAEA's Safeguards Division will have to grow substantially. Additional funding will be required for such an expansion but it will be miniscule in comparison, for example, with the cost either of nuclear-weapon programs or of the production of nuclear energy.[6]

Pre-existing stocks. The FM(C)T could focus exclusively on a cut-off of future production of fissile materials for nuclear weapons or other nuclear explosive devices – or it could include also undertakings not to use for weapons pre-existing non-weapon stocks of fissile materials, including civilian stocks, stocks declared excess to military purposes, and stocks of highly enriched uranium declared for use as fuel for naval-propulsion and other military reactors.

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[4] In contrast, both the Chemical Weapons Convention and the Comprehensive Nuclear-Test-Ban Treaty have extensive verification provisions in the treaty texts.

[5] *Global Fissile Material Report 2008: Scope and Verification of a Fissile Material (Cutoff) Treaty,* available at www.fissilematerials.org.

[6] IAEA expenditures on safeguards in 2007 were $0.115 billion, *IAEA Annual Report, 2007,* Tables A1 and A2. Estimated U.S. expenditures on nuclear weapons and related programs in fiscal year 2008 were $52.8 billion, Stephen Schwartz and Deepti Choubey, *Nuclear Security Spending: Assessing Costs, Examining Priorities* (Carnegie Endowment, 2009). One hundred million dollars per year would correspond to 0.004 cents per nuclear kilowatt-hour, about one thousandth the generation cost of nuclear electricity, for the 2,608 billion kilowatt-hours of nuclear electricity produced in 2007, *Energy, Electricity and Nuclear Power Estimates for the Period up to 2030* (IAEA. 2008), Table 4.

In a verified treaty, future production of fissile material for civilian purposes would in any case be under safeguards to prevent this material from being used in weapons. It would be unnecessarily complicated to keep separate unsafeguarded pre-existing civilian fissile material and safeguarded post-treaty civilian fissile material. It would be better to ask countries to decide at the beginning what pre-existing fissile material they wished to keep available for weapons and to put all other fissile materials under international safeguards. The IPFM's draft Treaty therefore requires states to separate military materials from their civilian nuclear sectors before the Treaty comes into force for them.

The draft Treaty also asks states to declare and submit to IAEA monitoring fissile materials from weapons that are excess to their military requirements, as well as future excess materials resulting from unilateral, bilateral, or multilateral nuclear disarmament measures.

A system could also be developed that would place under IAEA monitoring fissile material stored for future use as fuel for naval-propulsion or other military reactors. Such a system will in any case have to be developed if, after the FM(C)T comes into force, HEU is produced for military reactors.

Below, we present the draft IPFM Treaty article-by-article in italics within boxes, followed, where necessary, by brief explanations of the choices we have made.

Draft Treaty and article-by-article explanation

Preamble

The States Parties to this Treaty (hereinafter referred to as "the States Parties"),

a) *Certain of the unparalleled dangers that nuclear weapons pose to humankind and the environment, and of the consequent need to achieve nuclear disarmament, the prevention of further proliferation of nuclear weapons and the prevention of nuclear terrorism,*

b) *Desiring to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of existing stockpiles, and the elimination from national arsenals of nuclear weapons and the means of their delivery,*

c) *Confident that the participation of all States in a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices, taking into consideration both disarmament and nonproliferation objectives, will serve to lay the basis for the irreversible reduction of the stocks available for nuclear weapons through permanent transfers of fissile materials to non-weapon use or disposal,*

d) *Convinced that actions by and agreements between relevant States on their stocks of fissile materials including their size, disposition and protection, would contribute to achieving the goals of this Treaty,*

e) *Committed to ensuring that the peaceful use of nuclear energy should not contribute to the manufacture of nuclear weapons and that fissile material used for peaceful purposes should be protected from diversion or theft for use in the manufacture of nuclear weapons or other nuclear explosive devices or for purposes unknown, and that strong international cooperation is needed in this respect,*

f) *Desiring in this connection that the use of highly enriched uranium for peaceful purposes and for military non-explosive use be minimized and in time abandoned, and seeking to universalize the commitment made by certain countries in 1997 to minimizing stockpiles of separated civilian plutonium,*[i]

g) *Recognizing that the International Atomic Energy Agency (hereafter called the IAEA) is the appropriate body to undertake the verification of this Treaty, and*

h) *Determined that all nuclear materials in all States be progressively brought under effective non-discriminatory safeguards by the IAEA.*

Have agreed as follows:

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i. Belgium, China, France, Germany, Japan, Russia, Switzerland, the United Kingdom, the United States, see IAEA document INFCIRC/549.

Article I: Basic Undertakings

I.1. *Each State Party undertakes not to produce fissile material for nuclear weapons or other nuclear explosive devices.*

I.2. *Each State Party undertakes not to acquire from any source or to transfer to any recipient fissile material for nuclear weapons or other nuclear explosive devices;*

I.3 *Each State Party undertakes not to assist, induce or encourage in any way anyone to engage in any activity prohibited under this Treaty;*

I.4. *Each State Party undertakes either to promptly disable and decommission and, when feasible, dismantle its fissile-material production facilities, or to reconfigure and use these facilities only for peaceful or military non-explosive purposes.*

I.5. *Each State Party undertakes not to use for nuclear weapons or other nuclear-explosive devices fissile materials:*

- ***i.*** *In its civilian nuclear sector*
- ***ii.*** *Declared as excess for all military purposes*
- ***iii.*** *Declared for use in military reactors.*

I.6*. Each State Party undertakes that any reduction in its stockpile of nuclear weapons will result in a declaration of the fissile material recovered from those weapons as excess for weapon purposes.*

Article I.1 lays out the *cutoff* obligations of the Treaty. The ban of the production of fissile material is only for weapons or other nuclear-explosive devices. This recognizes that some states choose to separate plutonium for recycle in civilian power reactors and/or produce highly enriched uranium (HEU) for use in naval fuel.

Article I.2 is a non-circumvention requirement, adding to the ban on production a prohibition on the acquisition of fissile materials for weapons purposes by other means, as well as transfers for weapon use to other states or non-state actors. Transfers of fissile materials between states for weapons use have reportedly occurred in the past.

Article I.3 adds the requirement not to assist, induce or encourage other states or non-state actors to engage in activities that are prohibited by the Treaty.

Article I.4 requires that reprocessing facilities and enrichment plants that have been used to produce fissile materials for weapons be converted to the production of material for civilian or military non-explosive uses or be shut down and decommissioned and

ultimately dismantled. The purpose is to avoid having unnecessary production facilities kept in a standby mode.

Sub-article I.5.i requires that fissile materials in the civilian sectors of the Parties at the time the Treaty comes into force may not be used in nuclear weapons. Without this obligation, fissile material in the civilian sector produced before the Treaty's entry into force for a country could be used for nuclear weapons and, for a verified treaty, it would be necessary to undertake and maintain a complex segregation of fissile materials in the civilian sectors according to whether they were produced post- or pre-Treaty. It would be far simpler for a country, before joining the Treaty, to segregate all pre-existing fissile material for which it wants to preserve the option of weapon use.

Sub-article I.5.ii requires that all fissile materials declared excess to weapons and other military purposes remain so irreversibly. The Russian Federation, the United Kingdom, and the United States, the countries that have made such declarations, have committed that they are irreversible.

Sub-article I.5.iii. The United States has declared a large stock of HEU excess for weapon use but has reserved much of it for future use as fuel for naval-propulsion reactors. The quantities involved are comparable to those in the weapon stockpiles (see *GFMR08,* chapter 1) and could become an obstacle to further reductions unless made unavailable for weapons purposes. Other states may do the same. They could also reserve HEU to fuel reactors for other military purposes that are not banned by the Treaty, such as producing tritium for nuclear weapons. This sub-paragraph requires that this material—although reserved for military purposes—will not be used in nuclear weapons or other nuclear-explosive devices.

Article I.6 would require States Party to declare excess for weapon purposes fissile material recovered from reductions in their nuclear-warhead stockpiles through unilateral actions or bilateral or multilateral agreements and arrangements. After it has been converted to unclassified form, this material would be placed under the same IAEA safeguards that are used for civilian materials. It could also come under IAEA monitoring at an earlier stage with arrangements to protect classified information (see *GFMR08,* Chapter 6). It could subsequently be used for either civilian or military non-explosive purposes (see also the discussion of Article III.3.ii.c below).

Article II: Definitions

II.1. *"Fissile material" means:*[ii]

i) *Plutonium of any isotopic composition except plutonium that contains 80 percent or more plutonium-238*

ii) *Uranium containing uranium-235 and/or uranium-233 in a weighted concentration equivalent to or greater than 20 percent uranium-235.*[iii]

iii. *Neptunium-237 and americium-241 and -243, and any other fissionable isotope suitable for the manufacture of nuclear weapons*

iv. *Material containing any combination of the foregoing.*

II.2. *"To produce fissile material" means:*

i. *To separate fissile materials from irradiated nuclear material through reprocessing or any other process*

ii. *To increase the weighted concentration of uranium-235 and uranium-233 of any mixture of uranium isotopes to a level equivalent to or greater than 20 percent*

iii. *To increase the fraction of plutonium-239 in plutonium by any isotopic separation process.*

II.3. *A "production facility" means any facility capable of producing fissile materials.*

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ii. See the corresponding definition of "direct use" material in: *IAEA Safeguards Glossary, 2001 Edition,* International Nuclear Verification Series, No. 3, International Atomic Energy Agency, Vienna, 2002, §4.25,
iii. The weighting is as follows: $F_{235} + (5/3) F_{233}$, where F_{235} is the fraction of U-235 atoms in the mix and F_{233} the fraction of U-233 atoms.

Sub-article II.1.i. The definition of plutonium conforms to the IAEA definition of "direct-use material," i.e. "nuclear material that can be used for the manufacture of nuclear explosive devices without transmutation or further enrichment."[7] Plutonium containing more than 80 percent Pu-238 is used in thermoelectric generators for space and other applications and generates so much radioactive decay heat that it is considered unusable as a weapons material.

Sub-article II.1.ii. The IAEA defines a mixture of uranium-235 and uranium-238 enriched to 20 percent or more in U-235 to be "direct use material."[8] It does not have a corresponding definition of a mixture of uranium isotopes containing U-233, although U-

[7] *IAEA Safeguards Glossary, op. cit.*

[8] *Ibid.*

233 has been used in at least one experimental nuclear weapon.[9] Since a mixture of 12-percent U-233 with U-238 has the same critical mass as a mixture of 20-percent U-235 with U-238, we have assumed that each atom of U-233 is equivalent to 20/12 = 5/3 atoms of U-235.[10]

Sub-article II.1.iii. Although the most common fissile materials are HEU and plutonium, neptunium-237 and americium also could be used be used for weapons manufacture and are therefore sometimes referred to as "alternative nuclear [weapon] materials" (see *GFMR08,* Appendix).[11]

Article II.2 defines the production of fissile material as either:

- Its separation from irradiated nuclear material; or
- The enrichment of uranium in the isotopes U-235 and/or U-233 to the equivalent of 20 or more percent of U-235; or
- The enrichment of plutonium in the isotope Pu-239.

The effect is to prohibit not only the production of highly enriched uranium or plutonium for nuclear weapons or nuclear explosive devices but also the further enrichment for these purposes of pre-existing highly enriched uranium or plutonium. Thus, for example, a State Party may not increase the enrichment of uranium-235 in unsafeguarded HEU from 21 to 90-percent U-235 for nuclear explosive purposes. It would be permitted, however, to chemically purify fissile materials of their decay products, e.g. americium-241 in the case of weapons plutonium.

Article II.3 defines facilities that can produce fissile materials, i.e., enrichment and reprocessing facilities, including hot-cells with reprocessing capabilities.

[9] The United States carried out a nuclear weapon test on 15 April 1955 (the MET test in the "Teapot" series) using a composite plutonium and uranium-233 core, with a yield of 22 kilotons, see www.nuclearweaponarchive.org. There may have been other tests using uranium-233; T. B. Cochran, W. Arkin, and M. M. Hoenig, *U.S. Nuclear Forces and Capabilities,* Nuclear Weapons Databook, Vol. 1, Ballinger, Cambridge, 1984, p. 23. See also, D. R. Tousley, C. W. Forsberg, and A. M. Krichinsky, "Disposition of Uranium-233," International High-Level Radioactive Waste Management Conference, American Nuclear Society, Las Vegas, Nevada, 11–14 May 1998.

[10] See e.g. the curves showing critical masses of U-235/U-238 and U-233/U-238 mixtures as a function of enrichment in Jungmin Kang and Frank von Hippel, "U-232 and the Proliferation-resistance of U-233 in Spent Fuel," *Science & Global Security,* Vol. 9, 2001, Figure 7.

[11] *IAEA Safeguards Glossary, op. cit.*, §4.18 and §4.19.

Article III: Verification

III.1. *Each State Party undertakes to accept IAEA safeguards to verify its obligations under Article I as described in this Article.*

III.2. *States Parties that have in force with the IAEA a comprehensive safeguards agreement that satisfies the requirements of IAEA-document INFCIRC/153 (corrected) and an Additional Protocol that satisfies the requirements of INFCIRC/540 (corrected), have no further verification obligations under this Treaty, unless that State Party intends to use fissile materials for military non-explosive purposes, in which case additional safeguards or arrangements are needed.*

III.3. *States Parties not having a comprehensive safeguards agreement with the IAEA and possessing at least one significant quantity of unsafeguarded fissile material undertake to accept safeguards in an appropriate safeguards agreement to be concluded with the IAEA to verify their obligations under Article I, including:*

i) *The non-production of fissile materials for nuclear weapons or other nuclear explosive devices and to that end:*

a) *The disablement, decommissioning and dismantlement of production facilities or their use only for peaceful or military non-explosive purposes, and*

b) *The absence of any production of fissile materials without safeguards.*

ii) *The non-diversion to nuclear weapons, other nuclear explosive devices or purposes unknown of:*

a) *All civilian fissile materials, including in spent fuel,*

b) *All fissile materials declared excess to any military purpose.*

c) *All fissile materials declared for military non-explosive purposes*

III.4. *Negotiation of agreements and arrangements referred to in Paragraph III.2 and III.3 shall commence within [180] days from the entry into force of this Treaty. For States depositing their instruments of ratification or accession after the [180]-day period, negotiation of such agreements or arrangements shall commence not later than the date of such deposit. Negotiations of these agreements and arrangements shall be conducted in consultation with the Executive Secretary. Such agreements or arrangements shall enter into force not later than [18] months after the date of initiation of negotiations*

Article III.1 calls for the States Party to the treaty to accept the safeguards required to verify the main obligations of Article I of the Treaty. There are obligations in Article I, however, that cannot easily be verified by safeguards such as in Article I.3. Article III.3 therefore enumerates those obligations under Article I that should be verified by the IAEA.

Article III.2 recognizes that States Parties that have a comprehensive or full-scope safeguards agreement based on the NPT Model Agreement INFCIRC/153 (corrected) already are fully covered by safeguards on all their declared fissile materials and declared production facilities. These states include all the Non-Nuclear Weapon States (NNWS) party to the NPT having significant nuclear activities.[12]

Effective verification of a production cut-off, however, also requires measures to ensure that there are no undeclared prohibited activities. The Additional Protocol (AP) was specifically designed for this purpose.[13] Article III.2 therefore requires that all States that have a comprehensive agreement also ratify the Additional Protocol. For the non-nuclear-weapon states that have not yet ratified the Additional Protocol, this would be their only new obligation under the FM(C)T.

For non-weapon states that decide to use fissile materials for military, non-explosive purposes (such as naval propulsion), which is allowed under the NPT and its comprehensive safeguards agreement, special arrangements would have to be made to verify that such material is not used for weapons. This issue is discussed under Article III.3.ii.c.

Article III.3 describes the verification measures needed in those States Parties that do not fall under Article III.2, i.e., countries that do not have a safeguards agreement covering all their fissile materials but have at least one significant quantity of such material.[14] Sub-article III.3.i provides for the verification of the non-production of fissile materials for nuclear weapons or other nuclear explosive purposes while allowing the production of fissile material under safeguards.

Sub-article III.3.ii covers the non-diversion to use in nuclear weapons of different categories of fissile materials submitted to IAEA monitoring.

In the civilian sector, the safeguards needed for these States Parties could be patterned on IAEA safeguards in non-weapon states. In other cases, such as excess weapon materials that are still in classified form or materials for non-explosive military uses, the IAEA, the governments of the states concerned and perhaps the governments of other interested

[12] Although the NPT requires that all NNWS should have a comprehensive Safeguards Agreement, some states with no significant nuclear activities have yet to conclude such an agreement with the IAEA.

[13] After the discovery of Iraq's clandestine nuclear program in 1991, the Additional Protocol (INFCIRC/540) was devised to provide the IAEA more information about nuclear-related activities in non-weapon states and to allow it to verify the correctness and completeness of such information including by the use of environmental sampling at undeclared locations such as swipes of surfaces to detect micron-sized particles of enriched uranium and plutonium. As of 21 January 2009, eighty-five non-nuclear-weapon states plus the five NPT nuclear-weapon states and Euratom had an Additional Protocol in force, www.iaea.org/OurWork/SV/Safeguards/sg_protocol.html.

[14] This group consists today of China, India, Israel, France, North Korea, Pakistan, Russia, the United Kingdom, and the United States. However, North Korea committed in September 2005 to returning "at an early date" to the NPT as a non-weapon state and to reactivating its Comprehensive Safeguards agreement, "Joint Statement of the Fourth Round of the Six-Party Talks," Beijing, 19 September 2005.

states could develop model agreements. Verification measures may vary considerably among countries, however, and some may have to be adapted to different situations.

Nuclear-weapon states party to the NPT have already accepted some international safeguards on their civilian nuclear material and facilities. The United States has offered all its civilian facilities for safeguards under its voluntary safeguards agreement with the IAEA, while France and the United Kingdom have all their peaceful nuclear activities under EURATOM safeguards.[15]

States with a significant quantity of fissile material that do not have a Comprehensive Safeguards Agreement with the IAEA, namely the NPT nuclear-weapon states and the non-parties to the NPT, would also have to accept an Additional Protocol in order to provide the IAEA the access to detect clandestine production activities prohibited by the Treaty. Some NPT nuclear-weapon states have already concluded an Additional Protocol with the IAEA, but because of the limits they place on IAEA inspections, these agreements fall far short of those in INFCIRC/540. The U.S. Additional Protocol is the closest to the Additional Protocol for non-weapon states but allows the U.S. Government to prevent IAEA access "to activities with direct national security significance to the United States or to locations or information associated with such activities."[16]

Under an FM(C)T, the relevant states and the IAEA would have to conclude "managed access" arrangements to protect sensitive national or commercial information while allowing IAEA inspectors to satisfy themselves that no clandestine production of fissile material is taking place (see *GFMR08,* chapter 8).

Sub-article III.3.i refers to the obligations under Article I.1 and I.4. The IAEA should verify the disablement, decommissioning, and dismantlement in time of all enrichment and reprocessing facilities used for pre-Treaty production of fissile materials for nuclear-weapons purposes unless they are converted to the production of nuclear materials for civilian and/or non-explosive military purposes and placed under safeguards. The rationale is that an FM(C)T should not allow plants for which there is no foreseeable alternative use to remain in a state ready for production of fissile materials for weapons.

All enrichment and reprocessing plants should be brought under safeguards, and any fissile materials that they produce should remain under safeguards. Since it is unlikely for the foreseeable future that highly enriched uranium will be produced in more than a few states, the safeguards in most enrichment plants could be restricted to verifying that only

[15] Under a Voluntary-Offer Agreement, a nuclear-weapon state gives the IAEA the opportunity to inspect specified civilian facilities and nuclear materials. These offers are meant to reduce the differences in the safeguards burdens on nuclear and non-nuclear weapon states but, in practice, the IAEA does not have sufficient funds to safeguard more than a few nuclear facilities in the weapon states. For an overview of these agreements, see *Global Fissile Material Report 2007,* International Panel on Fissile Materials, Princeton, NJ, 2007, pp. 61–81.

[16] Protocol Additional to the Agreement Between the United States of America and the International Atomic Energy Agency for the Application of Safeguards in the United States of America, Article I.c, www.ipfmlibrary.org/gov98.pdf.

low-enriched uranium is being produced. The IAEA already has extensive experience in this field but special issues would arise at enrichment plants that have produced HEU in the past (see *GFMR08,* chapter 4).

Sub-article III.3.ii refers primarily to the obligations under Article I.5, but also to those under Articles I.2 and I.6. It mandates that all the fissile materials mentioned in Article I.5 should come under some kind of safeguards regime. Since the status of each category of fissile materials is different and some can be in forms with classified designs, they are discussed separately below:

a) Civilian materials. The extension of IAEA safeguards to all civilian fissile material in all FM(C)T parties should not create major problems except increased cost. Safeguarding large already-operating reprocessing plants whose designs are not "safeguards friendly" could be the biggest challenge (see *GFMR08,* chapter 5). During a transition period, the safeguards goals in the States Parties falling under Article III.3 might be somewhat less strict than for those under III.2. Over time, however, the safeguards regimes for the different categories of states should converge, since it will be important to reduce the inequality in safeguards commitments on civilian nuclear power in different classes of states and because the ultimate goal is a world in which all states are non-weapon states.

We recommend placing civilian plutonium and HEU in spent fuel under IAEA monitoring. With time, the radiation field around some of this fuel will decline to the point where it can no longer be considered "self-protecting" by the standards established by the IAEA.[17]

b) Excess weapon materials. Russia, the United Kingdom and the United States have already declared large quantities of weapons fissile materials excess for any military purpose. Russia and the United States have agreed to dispose of their excess weapon-grade plutonium irreversibly under international safeguards once the material is in unclassified form.[18] Furthermore, the two governments and the IAEA also undertook a joint multi-year study (the Trilateral Initiative) to develop techniques to permit the IAEA to verify through an "information barrier" whether containers declared to hold plutonium in classified forms contain more than an agreed threshold amount of weapon-grade plutonium. This study identified and developed technical, legal, and financial approaches

[17] 1 Gray or 100 rads per hour at a distance of one meter, see IAEA-document INFCIRC/225, Rev.4, section 5.2, Footnote b. Below the self-protection level, it might be possible to separate HEU or plutonium out of spent fuel in a facility with less shielding than is required in a reprocessing plant.

[18] "Each Party shall begin consultation with the International Atomic Energy Agency (IAEA) at an early date and undertake all other necessary steps to conclude appropriate agreements with the IAEA to allow it to implement verification measures beginning not later in the disposition process than: (a) when disposition plutonium or disposition plutonium mixed with blend stock is placed into the post-processing storage location of a conversion or conversion/blending facility; or (b) when disposition plutonium is received at a fuel fabrication or an immobilization facility, whichever (a) or (b) occurs first for any given disposition plutonium, *Agreement between the Government of the United States of America and the Government of the Russian Federation Concerning the Management and Disposition of Plutonium Designated as no Longer Required for Defense Purposes and Related Cooperation,* 2000, www.ipfmlibrary.org/doe00.pdf, Article VII.3.

to accomplish the verification without compromising national security information (see *GFMR08,* chapter 6). During the 1990s, Russian and American weapons experts also developed, on a bilateral basis, ambitious verification procedures under which Russia and the United States could monitor the dismantlement of each other's excess warheads without revealing sensitive weapon-design information.[19]

Sub-sub-article III.3.ii.b commits the Parties to develop with the IAEA appropriate monitoring arrangements on excess fissile material. Such arrangements could build on the Trilateral Initiative and the bilateral Russian-U.S. studies. Even if it proves impossible to agree on such arrangements while the fissile material remains in classified form, however, standard IAEA safeguards should be applied as soon as the fissile material is converted into unclassified form.

c) Fissile material for military non-explosive purposes. The draft FM(C)T, like the Non-Proliferation Treaty, allows a Party to produce and use fissile material for military non-explosive purposes—notably fueling naval-propulsion or tritium-production reactors. In the model-agreement for NPT non-nuclear weapon states (INFCIRC/153, Article 14) the possibility was created for safeguards on nuclear material to be temporarily suspended while the material is being used for a non-peaceful, non-explosive activity.

The state involved must provide information, however, that gives confidence that the material is not being used for nuclear weapons. It must also provide data on the "total quantity and composition" of the unsafeguarded material and bring it back under safeguards as soon as its permitted military use ends. Thus, a special agreement relating to this material must be negotiated with the IAEA. To date, no NNWS has asked for such an arrangement; nor have the specifics of an arrangement been worked out. Brazil is pursuing a naval-reactor program, however, which may soon require one. Under even the narrowest definition of an FM(C)T that focused only on fissile material produced after the Treaty came into force, such an arrangement would be required for fissile material newly produced to fuel military reactors. The IPFM Draft FM(C)T would subject pre-existing HEU reserved for military reactor fuel to the same requirement.[20] (Some ideas for how to approach this challenge are presented in *GFMR08,* chapter 7.)[21]

The use of HEU for naval-reactor fuel would be a potential threat to the integrity of the FM(C)T, however. If the sensitivity of the designs of both naval reactors and their fuels

[19] Most of this work is recorded only in "official-use-only" reports. Some of the ideas are reported, however, in Nicholas Zarimpas, ed., *Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions*, SIPRI, Oxford University Press, 2003; and *Monitoring Nuclear Weapons and Nuclear-explosive Materials: An Assessment of Methods and Capabilities,* National Academy Press, Washington, D.C., 2005.

[20] To date, the United States is the only country that has declared a reserve of excess weapon HEU for future use in naval-reactor fuel. In the past, the United States has provided the United Kingdom with HEU for naval-reactor fuel.

[21] Russia, the United Kingdom and the United States all have large stockpiles of pre-existing HEU that could be used to fuel their naval reactors for decades. India probably does not have such a stockpile for its nuclear-submarine program. Whether China uses LEU or HEU for its naval-reactor fuel is not known.

forces too great compromises in IAEA monitoring of the naval fuel cycle, it will be difficult to assure that some HEU withdrawn from safeguards for use in naval fuel has not been diverted to weapons. For this reason and because of the usability of HEU for terrorist nuclear weapons, states should make every effort to minimize their use of HEU for military as well as civilian purposes. States with nuclear navies should design their future naval reactors to use low enriched uranium (LEU) fuel. France is believed to have nearly completed a transition of its naval nuclear propulsion reactors to LEU fuel.

Article III.4 sets a timetable for conclusion of the safeguards agreements similar to that in the Non-Proliferation Treaty. The IAEA, advised by national experts, might begin the development of a model protocol in advance of the completion of an FM(C)T.

Article IV: Reporting

IV.1. *Each State Party undertakes to publish, annually update and present to the Conference of States Parties national inventories of all fissile materials, in its possession or under its control, by category: in civilian, nuclear-weapon and military non-explosive use.*

IV.2. *Each State Party undertakes to report progress on measures it has taken nationally, bilaterally, and multilaterally to reduce national inventories of fissile materials available for nuclear weapons and other explosive devices.*

Article IV.1 would create transparency in the various inventories of fissile materials. Two nuclear-weapon states have already published such inventories once (see *GFMR07,* Chapter 6).[22] These data would provide a good basis for further arms control and disarmament measures.

Article IV.2 is a logical follow-up of Article IV.1, requiring reports on the progress made in decreasing the amounts of fissile materials available for weapons use.

[22] The United States and the United Kingdom, except that the U.K. did not divide its military HEU declarations into weapons and fuel stocks. The U.S. declarations were in, *Plutonium: The First 50 Years: United States Plutonium Production, Acquisition and Utilization from 1944 through 1994,* U.S. Department of Energy, DOE/DP-0137, 1996, www.ipfmlibrary.org/doe96.pdf; and *Highly Enriched Uranium: Striking a Balance: A Historical Report of the United States Highly Enriched Uranium Production, Acquisition, and Utilization Activities, 1945 through September 30, 1996,* U.S. Department of Energy, 2001 (revision 1, redacted for public release), www.ipfmlibrary.org/doe01.pdf. They contain much more information than would be required by Article IV.1. The U.K. declarations of its military stocks of fissile material were in its *Strategic Defence Review,* Ministry of Defence, 1998, subsequently supplemented in *The United Kingdom's Defence Nuclear Weapons Programme: A Summary Report by The Ministry of Defence on the Role of Historical Accounting for Fissile Material in the Nuclear Disarmament Process, and on Plutonium for the United Kingdom's Defence Nuclear Programme, http://www.mod.uk/NR/rdonlyres/C4840896-90AD-4A8C-BF8D-C2625C7C1DD8/0/historical_accounting.pdf***,** Ministry of Defence, 2000 and *Historical Accounting for U.K. Defense Highly Enriched Uranium,* Ministry of Defence, 2006, www.ipfmlibrary.org/mod06.pdf. The U.K. publically declares its civilian stocks of HEU and separated plutonium annually to the IAEA in its INFCIRC/549/Add.8.

Article V: The Conference of States Parties

V.1. *The Conference of States Parties (hereinafter referred to as "the Conference") shall be composed of all States Parties.*

V.2. *The initial session of the Conference shall be convened by the Depositary no later than 30 days after entry into force of the Treaty. By a majority of [three-fourths] of States Parties present and voting, this Conference shall establish its own Rules of Procedure. The Conference shall meet in regular sessions that shall be held [annually] [just before or after the General Conference of the IAEA], unless the Conference decides otherwise*

V.3. *A Special Session of the Conference shall be convened:*
(a) When decided by the Conference;
(b) When requested by any State Party and supported by [one-fourth] of the States Parties.

V.4. *The Conference may also be convened in the form of an Amendment Conference, in accordance with Article X, or as a Review Conference, in accordance with Article XII.*

V.5. *The Conference shall oversee the implementation of, and review compliance with this Treaty, and act in order to promote its object and purpose. To this end, the Conference shall establish a Secretariat in Vienna, Austria, headed by an Executive Secretary, and provide for a Bureau and subsidiary bodies of the Conference as required to carry out its responsibilities.*

V.6. *The Conference shall conclude agreements with the IAEA to undertake the verification responsibilities of this Treaty and may conclude other agreements as appropriate with other international organizations.*

V.7. *The Conference shall receive reports from States Parties, the Executive Secretary, and the IAEA Director General on the implementation of the Treaty. It shall oversee the activities of the Secretariat and may issue guidelines for the exercise of its functions.*

Article V. The FM(C)T would need its own – modest - organization. The IAEA would take on the verification responsibilities of the Treaty. The Board of Governors of the IAEA could not handle all FM(C)T issues, however, because the Treaty covers more than safeguards. Also, issues related to the Non-Proliferation Treaty (NPT), which has no permanent organization, are handled with difficulty or not at all by the NPT Review Conferences, which are only held every five years. The Chemical Weapons Convention (CWC) has – and the Comprehensive Nuclear-Test-Ban Treaty (CTBT), after its entry into force, will have – a permanent implementation body, a yearly Conference of States Parties, an Executive Council and a permanent Secretariat.

Also, in the early years of the NPT, there were conflicts between the NPT Parties and members of the IAEA Board of Governors (BoG) that were not yet NPT parties, inter alia over the financing of NPT safeguards. Until all important members of the BoG are Parties to the FM(C)T, similar difficulties could arise.

Finally, the IAEA BoG is bound by the Statute of the IAEA, which was designed without consideration of the possibility of non-compliance by the veto-wielding members of the UN Security Council (see also the discussion of Article VI).

It is not proposed, however, to create a major bureaucracy parallel to the IAEA but merely a forum for FM(C)T Parties to discuss matters that cannot be handled by the IAEA and its BOG.

Article V.1. As with other treaties, the Conference consists of all Parties to the Treaty.

Article V.2. It is left to the Conference to establish its own Rules of Procedure. To avoid vetoes, however, decisions on the Rules of Procedure should be made by a super-majority and not by consensus. Because of the strong links of the FM(C)T with the IAEA, it may be easiest to organize meetings of the Conference just before or after the annual General Conference of the IAEA (normally in Vienna).

Article V.3. This paragraph provides the opportunity to convene special sessions of the Conference if and when the need arises.

Article V.4. The Conference can also be convened when there has been a proposal for an amendment to the Treaty, or in the form of a Review Conference. If the Conference meets regularly, there may not be a need for Review Conferences. It is noted, however, that review conferences are provided for in both the CWC and the CTBT despite the regular meetings of Conferences of States Parties. See also Article XII.2.

Article V.5. The main functions of the Conference are described here as well as in Article V.7 and Article VI. A small Secretariat in Vienna would prepare and organize meetings of the Conference. It would be useful to have an Executive Secretary in Vienna to keep in close contact with the IAEA. If need be, a bureau and/or special committees could be established by the Conference, with staff support provided by the Secretariat. If a bureau is required, its members could include the representatives in Vienna of the members of the IAEA Board of Governors that are Parties to the FM(C)T.

Article V.6. A formal agreement on the tasks of the IAEA with regard to the FM(C)T would be necessary. Whether there is a need to make agreements with other organizations remains to be seen, but that possibility should not be excluded.

Article V.7. To be able to function, the Conference needs reports on the implementation of the Treaty and has to give guidance to the Secretariat.

Article VI: Measures to Redress a Situation and to Ensure Compliance

VI.1. *The Conference shall take the necessary measures, as set forth in paragraphs 2 and 3, to ensure compliance with this Treaty and to redress and remedy any situation that contravenes the provisions of this Treaty. The Conference shall consider any concern raised by a State Party or the Director General of the IAEA about possible non-compliance with this Treaty. The Conference shall take appropriate steps to ensure consultation, clarification and investigation of such a concern, and may request the IAEA to conduct appropriate inspections as soon as possible.*

VI.2. *In cases where a State Party has been requested by the Conference to redress a situation raising problems with regard to its compliance and fails to fulfil the request within the specified time, the Conference may, inter alia, decide to restrict or suspend the State Party from the exercise of its rights and privileges under this Treaty until the Conference decides otherwise.*

VI.3. *In cases where damage to the object and purpose of this Treaty may result from non-compliance with the obligations of this Treaty, the Conference may recommend to States Parties collective measures that are in conformity with international law.*

VI.4. *The Conference may bring the issue, including relevant information and conclusions, to the attention of the United Nations.*

The Conference would have to consider any questions related to non-compliance with the Treaty. The Statute of the IAEA demands that any violation of a safeguards agreement shall be reported to the UN Security Council, which can then decide to take further action in accordance with the Charter of the United Nations, such as obligatory sanctions (or even military intervention) under Chapter VII of the Charter. However, neither the IAEA Statute nor the NPT-safeguards regime include obligatory safeguards for the five NPT nuclear weapon states, which are also permanent members of the Security Council with veto powers.

Under an FM(C)T, possible violators of the Treaty may have veto power in the UN Security Council. It is therefore necessary that all FM(C)T Parties have an equal opportunity to discuss any suspected violation and that the UN as a whole, including the General Assembly, be able to receive a referral by the Conference of States Party to the FM(C)T.

This Article is based on similar provisions in the Chemical Weapons Convention (CWC) and in the Comprehensive Test Ban Treaty (CTBT), where similar problems could arise.

Article VI.1 describes the primary procedures to obtain clarifications on possible non-compliance concerns. In this connection, there would have to be an agreement that the Director General of the IAEA would report any possible non-compliance with FM(C)T

safeguards to the Executive Secretary of the Conference as well as to the IAEA Board of Governors.

Article VI.2 and the remaining paragraphs of Article VI are largely derived from the CWC and CTBT.

Article VI.3 provides for the possibility of collective measures by the Parties against a violator of the Treaty. Although the Conference would not have the rights of the UN Security Council under Chapter VII of the Charter, Parties could agree on voluntary sanctions or other measures.

Article VI.4 provides that, if and when it is not possible to deal with an issue of non-compliance through the procedures and actions of the Conference, the issue may be reported to the General Assembly and/or the Security Council of the United Nations.

Article VII: National Implementation Measures

VII.1. *Each State Party shall, in accordance with its constitutional processes, take any necessary measures to implement its obligations under this Treaty. In particular, it shall:*

i. *Prohibit natural and legal persons anywhere on its territory or in any other place under its jurisdiction or control from undertaking any activity prohibited to a State Party under this Treaty;*

ii. *Not permit on its territory or in any other place under its jurisdiction or control any activity prohibited by this Treaty;*

iii. *Enact proper penal legislation with respect to all activities prohibited by this Treaty;*

iv. *Extend such legislation, in conformity with international law, to any activity prohibited by this Treaty undertaken anywhere by natural persons possessing its nationality and to vessels flying its flag; and*

v. *Undertake to maintain the highest standards of security and effective physical protection of fissile materials and relevant facilities and equipment to prevent theft or unauthorized use and handling. To that end each Part, inter alia, undertakes to apply measures of physical protection at least equivalent to those provided for in the Convention on Physical Protection of Nuclear Material and in recommendations and guidelines developed by IAEA for that purpose.*

VII.2. *Each State Party shall distribute the text of this Treaty in its official national language(s).*

Article VII.1.i-iv has been taken to a large extent from other multilateral treaties such as the CTBT. It is essential that natural and legal persons of a State Party, wherever they are, be prohibited by national legislation from engaging in activities that are contrary to the goals of and obligations under the Treaty. Also, State Parties should prohibit activities contrary to the Treaty on their territories, vessels etc., including by non-nationals.

Article VII.1.v establishes an obligation for all States Parties to use at least minimum agreed standards of physical security of fissile materials because of the danger if such materials fell into the hands of terrorists or other sub-national groups. Parties should at least implement the levels of physical protection identified in the IAEA Convention on Physical Protection of Nuclear Materials[23] as well as the physical protection measures identified in IAEA guidelines in this field.[24]

Article VII.2 obliges each State Party to distribute the text of the FM(C)T in its national language(s) to ensure that its citizens in general – and those involved in nuclear activities in particular are aware of the obligations that the State has accepted.

Article VIII: Settlement of Disputes

VIII.1. *Disputes that may arise concerning the application or the interpretation of this Treaty which cannot be settled under the Statute of the IAEA, shall be settled in accordance with the relevant provisions of this Treaty and in conformity with the provisions of the Charter of the United Nations.*

VIII.2. *When such a dispute arises between two or more States Parties, the parties concerned shall consult together with a view to the expeditious settlement of the dispute by negotiating or by other peaceful means of the parties' choice, including using the good offices of the Conference and, by mutual consent, referral to the International Court of Justice in conformity with the Statute of the Court.*

VIII.3. *The Conference shall consider questions related to disputes raised by States Parties or brought to its attention by the Executive Secretary or by the Director General of the IAEA. The Conference shall, as it finds necessary, establish or entrust subsidiary bodies with tasks related to the settlement of these disputes in conformity with Article V.5.*

VIII.4. *The Conference is empowered, subject to authorization from the General Assembly of the United Nations, to request the International Court of Justice to give an advisory opinion on any legal question arising within the scope of the activities related to this Treaty.*

VIII.5. *This Article is without prejudice to Article VI.*

[23] IAEA-document INFCIRC/274/Rev.1

[24] IAEA-document INFCIRC/225/Rev.4 (corrected)

Article VIII is inspired by similar provisions in other relevant treaties and conventions, such as the CWC and CTBT.

Article IX. Protocols

IX.1. *In order to progressively bring all nuclear materials in all States under effective non-discriminatory safeguards by the IAEA, and to advance other purposes of this Treaty, the Conference may, at any regular session, adopt protocols to the Treaty.*

IX.2. *The text of any proposed protocol shall be communicated to the States Parties by the Executive Secretary at least 180 days before such a session.*

IX.3. *The requirements for entry into force of any protocol shall be established by that instrument.*

IX.4. *Only States Parties to this Treaty may be states parties to a protocol.*

IX.5. *Decisions under any protocol shall be taken by the states parties to that protocol.*

Article IX.1 makes it possible for the Conference to adopt Protocols. This may facilitate the development of further specifics concerning the implementation of the Treaty or allow additional commitments to be made by sub-groups of countries without having to amend the Treaty itself. Depending upon the circumstances, the Protocols may therefore apply to all States Parties or to only a relevant group of parties.

Article IX.3 gives flexibility to the negotiators of a specific protocol to decide the conditions under which it will enter into force.

Article IX.5 indicates that a protocol is the "property" of its parties.

Article X. Amendments

X.1. *At any time after the entry into force of this Treaty, any State Party may propose amendments to the Treaty. Any such proposal shall be communicated to the Executive Secretary, who shall circulate it to all States Parties and the Depositary and seek the views of the States Parties on whether an Amendment Conference should be convened to consider the proposal. If [one-third] of the States Parties notify the Executive Secretary no later than [90] days after its circulation that they support further consideration of the proposal, the Executive Secretary shall convene an Amendment Conference to which all States Parties shall be invited.*

X.2. *The Amendment Conference shall be held immediately following a regular session of the Conference unless all States Parties that support the convening of an Amendment Conference request otherwise. In no case shall an Amendment Conference be held less than [180] days after the circulation of the proposed amendment.*

X.3. *Amendments shall be adopted by the Amendment Conference by a positive vote of a majority of the States Parties with no State Party casting a negative vote.*

X.4. *Amendments shall enter into force for all States Parties 30 days after deposit of the instruments of ratification or acceptance by [two-thirds] of those States Parties casting a positive vote at the Amendment Conference.*

Article X is a more or less standard text on possible amendments to a Treaty. However, protocols would be a much more feasible route to evolving the Treaty.

Article XI. Funding

[The additional safeguards costs needed for the implementation of this Treaty shall be met from the [regular] [safeguards] budget of the IAEA. The cost of the Conferences shall be met by the States Parties in accordance with the United Nations scale of assessments adjusted to take into account differences in membership between the United Nations and the Conference.]

or

[The costs of the implementation of this Treaty shall be met by the States Parties in accordance with the United Nations scale of assessments adjusted to take into account differences in membership between the United Nations and the Conference.]

or

[The costs of the Conference shall be met by the States Parties in accordance with the United Nations scale of assessments adjusted to take into account differences in membership between the United Nations and the Conference. The additional safeguards costs needed for the implementation of this Treaty in the States Parties with at least one significant quantity of fissile material not under IAEA safeguards shall be met by these States Parties using a scale of assessments to be developed [taking into account the United Nation scale of assessments and the capacity of their enrichment and reprocessing plants operating under safeguards.]

Article XI describes different options for funding the Conference and, more significantly, the additional safeguards needed for this Treaty. The extra safeguards costs would be considerable – perhaps equal to those of the safeguards currently implemented by the IAEA in Non-Nuclear Weapon States.[25] Each of the listed options has its advantages and disadvantages.

Under the first option, all IAEA member States would have to pay for the extra safeguards effort. Not all members of the IAEA would initially be parties to the FM(C)T, however. Also, safeguards and technical assistance in the application of peaceful nuclear technologies accounted for three quarters of the IAEA budget in 2007, with information and administrative overheads constituting almost all of the remainder.[26] Since an understanding has developed within the IAEA Board of Governors that expenditures for safeguards and for technical assistance will be kept approximately equal, doubling the IAEA safeguards budget might require doubling the entire IAEA budget.

[25] It should be noted that the Nuclear Weapon States have voluntary offered to accept safeguards in most or some of their civilian nuclear facilities. Currently, however, due to its lack of financial and human resources, the IAEA is inspecting only a few of these facilities.

[26] *IAEA Annual Report, 2007,* Table A1.

Under the second option, all States Parties to the FM(C)T would pay the additional safeguards costs. This would seem fair since disarmament is a common interest and the safeguards in Non-Nuclear Weapon States have been financed also by the Nuclear Weapon States on that basis.

Under the third option, the nuclear-weapon states would pay for the extra safeguards costs. How the costs would then be shared among them would be a matter for further negotiation. One formula might be based on the scale of the FM(C)T-related activities on the territories of the nuclear-weapon states, for example, the production capacities of their enrichment and reprocessing plants.

Article XII. Duration, Review and Withdrawal

XII.1*. This Treaty shall be of unlimited duration.*

XII.2*. Unless otherwise decided by a majority of the States Parties, five years after the entry into force of this Treaty, a Conference of the States Parties shall be held to review the operation and effectiveness of this Treaty, with a view to assuring itself that the objectives and purposes in the Preamble and the provisions of the Treaty are being realized. In this context, it shall review how to promote the universality and effectiveness of the Treaty*

XII.3. *At intervals of [five] years thereafter, further Conferences may be convened with the same objective, if the Conference so decides in its preceding session.*

XII.4. *Each State Party shall have the right to withdraw from this Treaty if it decides that extraordinary events related to the subject matter of this Treaty have jeopardized its supreme interests.*

XII.5. *Withdrawal shall be effected by giving twelve months' notice to all other States Parties, the Board of Governors of the IAEA, the Depositary and the United Nations. Notice of withdrawal shall include a statement of and explain the extraordinary event or events that the State Party regards as jeopardizing its supreme interests.*

On receiving a notice of withdrawal, the Executive Secretary shall, within three months, convene a special session of the Conference of States Parties, in order to consider an appropriate response to the notice.

Article XII.1. Since this Treaty is meant to halt the production of fissile materials for weapons forever, it would make no sense to put a time limit on it. This paragraph is the same as the corresponding paragraphs in the CWC and CTBT.

Article XII.2 provides for a Review Conference five years after entry into force of the Treaty. Since, according to Article XIII, the Treaty could come into force with relevant countries not yet Parties, the Review Conference would have to look particularly at how such non-adherence, if continued indefinitely, could undermine the FM(C)T.

Article XII.4 requires, as in other arms control and disarmament agreements, that withdrawal from the Treaty can only occur under very serious circumstances.

Article XII.5. Contrary to other treaties in this field, which have three-month (six months in the CTBT) withdrawal notice, in this draft Treaty the withdrawal only takes effect 12 months after notification. Moreover, a special meeting of the Conference is required to be convened within three months to consider the withdrawal notice and what can be done about it.

Article XIII. Entry into Force

This Treaty shall enter into force after its ratification and the deposit of their instruments of ratification by [forty] States including at least [four] states with at least one significant quantity of unsafeguarded fissile material as determined by the IAEA Director General.

Article XIII. A significant number of States would have to ratify, including at least a minimum number that are nuclear-weapon states. The rigid entry into force provision in the CTBT, where 44 specific countries have to ratify has kept that Treaty in limbo since 1996. It would be important for the FM(C)T that it start operating quickly for at least those States that have already unilaterally halted production of fissile materials for weapons. This would provide the opportunity to develop the additional safeguards provisions and techniques needed for this Treaty. During Review Conferences (see Article XII.2) an assessment could be made whether non-universality is harmful to the stability of the Treaty in the long run.

Article XIV. Reservations

The Articles of this Treaty shall not be subject to reservations.

Article XIV. Reservations could undermine the Treaty if they reduced the obligations of one or more States Parties.

Article XV. Depositary

The Secretary-General of the United Nations shall be the Depositary of this Treaty.

Article XV is now a standard provision in multilateral treaties and conventions. The Secretary General would *inter alia* be responsible for maintaining a list of Parties and informing States Parties about new ratifications.

Article XVI. Authentic Texts

The Treaty, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

Article XVI is also a standard provision for multilateral treaties. The listed languages are the official languages of the United Nations.

About the IPFM

The International Panel on Fissile Materials (IPFM) was founded in January 2006. It is an independent group of arms-control and nonproliferation experts from both nuclear weapon and non-nuclear weapon states.

The mission of IPFM is to analyze the technical basis for practical and achievable policy initiatives to secure, consolidate, and reduce stockpiles of highly enriched uranium and plutonium. These fissile materials are the key ingredients in nuclear weapons, and their control is critical to nuclear weapons disarmament, to halting the proliferation of nuclear weapons, and to ensuring that terrorists do not acquire nuclear weapons. IPFM research and reports are shared with international organizations, national governments and nongovernmental groups.

The Panel is co-chaired by Professor R. Rajaraman of the Jawaharlal Nehru University of New Delhi, India and Professor Frank von Hippel of Princeton University. Its members include nuclear experts from sixteen countries: Brazil, China, France, Germany, India, Japan, Mexico, the Netherlands, Norway, Pakistan, South Korea, Russia, South Africa, Sweden, the United Kingdom and the United States.

Princeton University's Program on Science and Global Security provides administrative and research support for IPFM.

For further information about the International Panel on Fissile Materials, see its website at www.fissilematerials.org. Contact IPFM via the Program on Science and Global Security, Princeton University, 221 Nassau Street, 2nd floor, Princeton, NJ 08542, or by email at ipfm@fissilematerials.org.