
**BASIC DOCUMENTS OF THE CONFERENCE ON DISARMAMENT
RELATED TO THE PROHIBITION OF THE PRODUCTION OF
FISSILE MATERIAL FOR NUCLEAR WEAPONS OR OTHER
NUCLEAR EXPLOSIVE DEVICES**

Compilation prepared by the Secretariat

Addendum

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| CD/1776 | United States of America | Draft Mandate for an Ad Hoc Committee on a "Ban On the Production of Fissile Material for Nuclear Weapons or Other Nuclear Explosive Devices." |
| CD/1777 | United States of America | Draft Treaty on the Cessation of Production of Fissile Material for Use in Nuclear Weapons or Other Nuclear Explosive Devices |
| CD/1782 | United States of America | White Paper on a Fissile Material Cutoff Treaty |

CANADA

WORKING PAPER

Elements of an Approach to Dealing With Stocks of Fissile Materials for Nuclear Weapons or Other Nuclear Explosive Devices

Canada continues to be of the view that an FMCT is an integral part of a comprehensive nuclear disarmament and nuclear non-proliferation program directed to the elimination of nuclear weapons and of any associated stockpiles of fissile material for that purpose. The value of an FMCT therefore increases if it is able to adequately address the question of existing stockpiles. In 1999, Canada presented Working Paper CD/1578, which explored an approach to the question of stocks of fissile material for nuclear weapons or other nuclear explosive devices. As a contribution to the CD's consideration of the FMCT issue, Canada has reviewed and updated this paper to account for developments over the past seven years and to ensure that the recommendations are relevant to the current international environment.

CD/1578 recognized the sensitivities surrounding the issue of stocks. We continue to be mindful of the fact that any likely FMCT would confer obligations primarily on those states currently possessing fissile material not under IAEA safeguards or other comparable verification arrangements. We are equally aware of the necessity to find a compromise between those states that consider existing stocks of fissile material for nuclear weapons or other nuclear explosive devices as appropriate for treatment by an FMCT and states that do not.

CD/1578 proposed consideration of the stocks issue in a process that would be separate but parallel to FMCT negotiations, on the assumption that the Shannon mandate would be the basis for the latter. A key development since 1999 is that the Shannon mandate for commencing FMCT negotiations no longer enjoys consensus in the CD. Should another formulation for FMCT negotiations ultimately command consensus within the CD, this approach of separate, parallel consideration of the stocks issue may also require re-examination.

Canada's approach in CD/1578 was to look at four categories of possible measures complimentary to an FMCT, and this approach is carried over in this working paper. The four categories are:

- a) increasing transparency
- b) declarations of excess fissile material
- c) placing excess fissile materials under verification
- d) disposition of excess fissile material

A. INCREASING TRANSPARENCY

Since CD/1578 was circulated, the four nuclear weapon states that had before that time announced unilateral moratoria on production of fissile material for use in nuclear weapons have indicated that they have maintained these moratoria. Some have presented detailed inventories of their separated plutonium and highly-enriched uranium (HEU) holdings. These are welcome developments and point the way for other states with stocks of fissile material not currently subject to IAEA safeguards or other comparable verification arrangements to do likewise.

It is assumed that the stocks held by the United States and by the Russian Federation remain considerably larger than the combined total of the rest of the world. This, however, obviously cannot be confirmed without the full disclosure of information indicated above. It would be logical for these two states, working together, to take the lead role in providing transparent information about their stocks. Such a cooperative effort would not only benefit treatment of this particular issue but could also be an important contribution to wider non-proliferation and disarmament efforts, as well as an important confidence-building measure.

Among the other states possessing fissile material outside of verification, while their stocks are much smaller than those of the United States or the Russian Federation, they are still substantial. The UK has set an excellent example by providing historical accounting reports of its HEU and plutonium stocks. Other states in this category could benefit from a review of the UK documentation and prepare their own processes internally so that they are in a position to make such a declaration of their own (if they are not already capable of doing so). A further model for reporting could be INFCIRC/549, which is currently being used by states to declare stockpiles of civilian separated plutonium (and, in some cases, HEU). Such a mechanism could be expanded to cover all national stockpiles of separated plutonium and HEU, both civilian and military. As noted in CD/1578, it is important to lay the groundwork for such a declaration now, even if a declaration is not immediately forthcoming, lest time and personnel changes render difficult the process of reconstructing historical developments at a later stage.

Recommendations:

1. All states in possession of stocks of fissile material for use in nuclear weapons or other explosive devices should undertake to do the following, either unilaterally or in conjunction with others as a confidence-building measure:

- a) develop and publish a detailed list of their stocks (including type, quantity, etc.); and
- b) regularly update and publicize this information as an important transparency measure.

The United States and the Russian Federation, as the states with the largest such stocks, have a special responsibility to continue to work together in this regard.

2. States in this category not in a position to publish such information should nevertheless conduct a thorough audit of their stocks as a step towards developing such a mechanism, taking particular care to protect valuable historical information for future use.

B. DECLARATIONS OF EXCESS FISSILE MATERIAL

CD/1578 noted that as of 1999, the United States, the UK and the Russian Federation had made declarations that they possessed fissile material that is in excess of that identified for nuclear weapons or other nuclear explosive devices. Since that time, there has been one additional declaration by the United States in 2005 of an additional 200 tons of HEU as excess. There have been no other new declarations of excess fissile material, either by the UK or the Russian Federation, or by other states that possess stocks for use in nuclear weapons or other explosive devices.

It is furthermore uncertain whether any of these states, aside from the United States, have seriously evaluated the possibility of making any such (additional) declarations over the past seven years. Even if such a review concluded that there is no material which can be declared excess for the time being, there would be benefits to making this conclusion public, particularly if accompanied by confirmation that these states are maintaining only a credible minimum nuclear deterrent capability. Such a "no-excess" declaration would have the benefit of providing evidence that a) the state in question has carefully considered the matter, b) that a thorough count of the stock has taken place and appropriate records are being kept, and (c) no significant increase in its nuclear arsenal is contemplated.

Recommendation:

3. All states maintaining fissile material outside of appropriate verification should conduct careful analyses of their current stocks of fissile material, and publicize either the appropriate (additional) amounts of fissile materials to be in excess of that identified for nuclear weapons or other nuclear explosive devices, or that the review showed that there is no excess material at this time, and that there are no plans for significant increases in nuclear weapons inventories.

C. PLACING EXCESS FISSILE MATERIALS UNDER VERIFICATION

Declared excess material should be considered as civilian and thus subject to the application of IAEA safeguards. Such verification would be facilitated if, at the time of declaration, the locations/facilities where the excess material is located were to be also indicated. Any concerns regarding its verification should be limited since we are dealing solely with material already voluntarily declared as excess, meaning the amount of such material is publicly available information. Such concerns could be further reduced by ensuring that verification activities began only at the stage where the nuclear material is no longer of a quality or form useful for weapons purposes, e.g. during the down-blending stage.

Of the states that have declared excess fissile materials, the UK has indicated that all of its declared 4.4 tons of excess plutonium are under Euratom safeguards, while 10 tons of excess U.S. HEU and 2 tons of excess U.S. plutonium remain under IAEA monitoring. Russian excess material is not subject to formal safeguards but the blending-down of excess HEU is being done in conjunction with the United States.

Unfortunately the Trilateral Initiative, which had sought, inter alia, to provide for international verification of excess US and Russian plutonium while protecting classified details, has not been brought to fruition. Although a model agreement has been developed by the United States, the Russian Federation and the IAEA, including appropriate verification procedures, no fissile material has so far been provided pursuant to this arrangement. Nevertheless, the Trilateral Initiative not only represents a logical means of ensuring that Russian and U.S. declared excess fissile material did not return to weapons programs, but could also be used as a model for other states which declare excess fissile material.

As pointed out in CD/1578, the financial implications of the active verification of excess stocks must be evaluated.

Recommendations:

4. States which have declared excess fissile material should place this material under international verification if they have not already done so.
5. Negotiations on the model Trilateral Initiative agreement should be completed, and agreements between the United States, the Russian Federation and the IAEA concluded. The Trilateral Initiative model agreement should also serve as a model for other states declaring excess fissile material.

D. DISPOSITION OF EXCESS FISSILE MATERIAL

Fissile material declared as excess must then be disposed of in a manner that will make it unfeasible to reuse in nuclear weapons or other nuclear explosive devices. Since 1999, experience has shown

that disposition of HEU and disposition of plutonium present different levels of challenge. While results to date have shown much faster progress in HEU disposal, recent developments associated with new nuclear fuel cycle initiatives show promise for increased opportunities for plutonium disposition.

In both the United States and the Russian Federation, HEU disposition is proceeding apace, primarily via blending down the excess HEU into low-enriched uranium to be used in civilian reactors. As of end-2005, the Russian Federation had reportedly blended down approximately 269 of the 500 tons declared excess in 1993, while the United States has done the same for approximately 60 of the total 174 tons declared excess prior to 2005 (i.e. not including the most recent declaration). Approximately 20 tons of that earlier amount the United States declared excess however is not suitable for this method of disposition. The final disposition of the 200 tons of the most recent U.S. declaration in 2005 has not been confirmed, but it is understood that at least 20 tons are planned for blending down for civilian use; the remaining 180 are slated for use as naval and other reactor fuel. The role of commercial industry in the down-blending and marketing of this material has provided an additional confidence-building benefit by necessitating increased openness and transparency.

Plutonium disposition has proven more complicated, and thus has been slower to realize. In a bilateral agreement made in September 2000, both the United States and the Russian Federation agreed to dispose of 34 tons of weapons-grade plutonium. The Russian Federation and the United States have also agreed to convert some of their excess plutonium stocks through conversion to oxide form and mixing with uranium oxide, thereby fabricating mixed-oxide (MOX) fuel for use in reactors. However, construction of the facilities required for actual conversion has not begun, despite the welcome commitment of the states participating in the Global Partnership Programme to support the disposition of excess plutonium in the Russian Federation. There has been no indication of the disposition of the material declared excess by the UK.

Recommendations:

6. States with declared excess stocks of fissile material should commit to the active and early disposition of such stocks, and their safe storage until that time, preferably in forms less suitable for nuclear weapons.
 7. HEU disposition programmes should be accelerated to blend down excess HEU by the earliest possible date.
 8. The implementation of the United States-Russian Federation Plutonium Disposition Agreement, with the assistance of the other G8 states, should begin immediately.
 9. Development of new technical solutions to the problem of disposing excess plutonium should continue in the context of new nuclear fuel cycle initiatives.
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SWITZERLAND

WORKING PAPER

A PRAGMATIC APPROACH TO THE VERIFICATION OF A FMCT¹

The verification of a FMCT is impossible, some have said. Is it really so?

Taken as a blanket statement, this is wrong. The verification of nuclear materials is much easier than the verification of chemical and biological agents. The radioactivity (in essence, a radio signal betraying the presence of suspected materials) is a determining advantage in any kind of nuclear verification. For a FMCT, the verification of ALL nuclear facilities in the eight States of interest may well lead to financial costs that would make the proposal practically "impossible". In last analysis, a proper *technical* verification is always possible with the help of several hundred inspectors supported by top-notch detection systems - on site or remotely controlled - if cost is of no relevance. This would also be true for the mostly very old nuclear facilities that would come under a FMCT. To achieve a given level of non-diversion assurances in an old facility, the verification agency may have to install more surveillance equipment and pay more frequent visits. But, possible, it is.

Yet, is there a pragmatic approach to the verification of a FMCT? Any consideration of proper verification mechanisms for a FMCT must start with the question: what kind of FMCT needs to be verified? It is pointless to argue whether a treaty is verifiable or not from a technical point of view and whether the costs of verification are acceptable or not, without knowing what is the objective. Indeed, the process of negotiation of a FMCT would probably begin with some understanding on the objective of the treaty and on the scope to be verified. The debate on verification would follow.

For now, in the absence of objective and scope, one needs to presuppose a tentative FMCT model in order to address some of the verification parameters that could come into play.

¹ This Working Paper has been prepared by Mr. Bruno PELLAUD, Nuclear Consultant and former Deputy-Director General of the IAEA and does not necessarily represent in all aspects the official position of the Swiss Government.

Scope of a FMCT: a tentative working model

This working paper is based on the following proposition:

Core objective: a worldwide cut-off of all production of fissile materials for weapons, and the placement under FMCT verification of all civil stocks of fissile material and of non-civil stocks declared as "excess".

In other words, the treaty envisaged here would ban the future production and would contain a clause by which parties could place irreversibly "excess" and civil stocks under the treaty¹.

In parallel to the negotiation of this core objective, the parties would seek an appropriate framework within or without the FMCT to implement confidence-building measures and subsidiary objectives that would strengthen the FMCT (and indirectly the NPT itself), such as

- (a) Declarations by Russia, the United States and the United Kingdom of their total fissile-material stockpiles, as already done partially, as a pace-setter and model for others to follow;
- (b) Agreements to limit the number of national fissile production facilities for civil applications - enrichment and reprocessing plants - through "*multinational nuclear approaches*" incorporating the joint operation of such facilities in a regional context²;
- (c) Near-total elimination of the use of highly-enriched uranium as a civilian reactor fuel, and rapid reduction of current civilian plutonium stockpiles through the recycling of mixed-oxide fuel (MOX) in nuclear power plants.

In essence, the above model shows a compromise that would reconcile those who want to limit the scope of a FMCT to the future production of fissile materials and those who want to see stocks incorporated into a first FMCT agreement. Subsidiary objective A registers the steps already made by the US, UK and Russia towards a better transparency of their stockpiles. Subsidiary objectives B and C would substantially enhance the FMCT and the NPT without curtailing the essential rights of NPT parties under Art. IV to engage in relevant fuel cycle activities. Altogether, these steps would be significant, would be powerful signals towards a realistic and verifiable first-stage FMCT.

A gradual approach to verification

Past attempts to reach an agreement on a fissile-material production cut-off treaty have failed because they tried to achieve too much, too quickly. Many negotiators wanted to make the treaty from the very beginning as stringent as the NPT itself in terms of technical definitions and verification objectives, an unachievable convergence of NPT and FMCT prior to further

progress in nuclear disarmament. Others wanted the treaty to include at once exhaustive information on existing stocks of fissile materials and the consideration of both declared and clandestine activities. And, of course, everybody wanted the resulting verification system to provide the highest degree of effectiveness and efficiency...

The present working paper suggests a more pragmatic step-by-step approach for the most salient verification parameters, an approach that focus on the specificity of the FMCT.

The definition of fissile material

The first question to be resolved is the definition of fissile materials. The FMCT is designed to proscribe production of fissile material for nuclear weapons or other nuclear explosive devices by States that already have nuclear weapons: thus, not all nuclear material need be subject to safeguards in such States.

Nonetheless, proponents of a strong FMCT recommend a verification system that uses the same definitions of fissile material as those chosen for the IAEA in the application of safeguards under the NPT, namely:

- plutonium with an isotopic concentration of Pu-238 of less than 80%;
- highly enriched uranium (HEU), i.e. containing 20% or more of the isotope U-235, as well as U-233.

Already under the NPT, this approach seems obsolete and excessive, leading to a waste of IAEA financial resources.

At the other extreme, the Russian Federation has proposed to limit the "fissile definition" to only the best weapon grade materials, namely plutonium with more than 90% of Pu-239 and uranium with more than 90% of U-235, with in addition the verification of only facilities capable of producing such materials and with no verification of former military and dual use facilities and fuel fabrication facilities for naval propulsion³.

On the one hand, the use of the IAEA definitions is claimed to be necessary to maintain a conceptual commonality between FMCT and NPT, allegedly to avoid a weakening of the NPT verification system. Yet, a different definition of fissile materials would only be one of the many differences needed to create a credible and affordable FMCT. This would be no rejection of the ultimate objective of bringing together FMCT and NPT at a more advanced stage of nuclear disarmament. But, the IAEA definitions have no place in the first stage of a FMCT. On the other hand, the Russian proposal goes too far in excluding from the treaty good fissile materials that can easily be used for weapons without much technological difficulties.

An appropriate FMCT compromise would be a fissile material definition characterised by the following parameters:

- plutonium with an isotopic concentration of Pu-239 of more than 70%;
- highly enriched uranium containing more than 40% of the isotope U-235; as well as U-233 and neptunium-237.

As to plutonium, the technological difficulties (heat, radiation and spontaneous fissions) associated with isotopic mixtures containing more than 30% of Pu-238 and Pu-240 make them unsuitable for weapon applications, as the French scientist and engineer Robert Dautray - former High-Commissioner of the French Atomic Energy Authority and a key figure of the French nuclear weapon programme - has written in a book dedicated to nuclear energy⁴. Under a FMCT regrouping serious NWS of all shades, possessing acknowledged stocks of good quality weapon-grade plutonium, no weapon designer will ever envisage to fiddle with the "fizzle yields" associated with "filthy plutonium mixtures".

The case of highly enriched uranium is somewhat different. Several observers have in the past drawn attention to the excessive enrichment span of the current definition that goes from 20 to 100%: they suggested the introduction of a "very highly enriched" category above 40% (VHEU). In the context of the FMCT, such an intermediate level would make sense in order to clearly recognise the greater weapon suitability of higher enrichment levels.

A word about the naval applications that make use of 90% enriched uranium. France has shown that submarines can run with 20% enrichment, albeit at the price of compactness and weight⁵. The proposed cut-off enrichment of 40 % is likely to facilitate and possibly allow the continuous use of current reactor designs. At any rate, verification methods have been developed by the IAEA to determine certain attributes of fissile material inside containers (an agreed isotopic range) without the inspectors seeing the material itself. For naval fuel, it should therefore be possible to devise verification approaches that do not reveal classified information.

Neptunium is added here to the list of fissile materials for the FMCT, since neptunium is the best weapon nuclear material of all in terms of nuclear and mechanical properties.

Rather than isotopic characteristics, many observers prefer to define "fissile material" according to its radiation status, that is containing or not radioactive fission products. In this approach, the FMCT would verify only "unirradiated direct use material", that is plutonium and uranium free of fission products. This approach would create a serious loophole. Irradiated spent fuel would not be subject to FMCT verification, thus leaving outside the verification scope valuable and sensitive fissile materials that weapon designers are keenly attracted to, namely low-burnup spent fuel resulting from short reactor exposures in military or civilian facilities, as well as blanket materials used in nuclear fast breeder reactors. In both cases, the plutonium produced can exceed 90% of Pu-239: such plutonium can be easily reprocessed and chemically separated in small facilities, when so decided. The current political controversy in India about the application of IAEA safeguards to fast breeders in the frame of the US-India nuclear agreement betrays the sensitivity of this issue for the Indian weapons programme.

For these reasons, this working paper gives preference to an "*isotopic discrimination*" rather than to "*radiation discrimination*" to constrain the verification scope of an FMCT to a manageable level, both in terms of effectiveness and efficiency. The FMCT fissile materials would thus be genuine "direct-use materials", that is plutonium with more than 70% Pu-239 and uranium with more than 40% U-235. The Pu definition would include all unirradiated Pu mixture - whether irradiated or not - containing such high-quality plutonium. In comparison with radiation discrimination, the approach of isotopic discrimination would be more expensive in terms of volume of spent fuel to be monitored, but more effective in plugging the loophole of low-burnup and blanket fuels. Most efficient and most effective would be a combination of both approaches, one in which verification would ignore all irradiated materials (according to a proper definition of an "irradiated" threshold), except those containing "direct use materials" as defined here above for the FMCT.

Declared facilities

Like Non-NWS under IAEA safeguards, the FMCT parties would declare all relevant facilities, such as enrichment and reprocessing facilities and downstream facilities producing and using the defined fissile nuclear materials. Declared facilities would be monitored through verification mechanisms of graded intensity, such as containment and surveillance, and inspections as discussed below, to verify that declared fissile material is not diverted to nuclear weapons (or purposes unknown). All enrichment plants would still be verified, including those producing low-enriched uranium (LEU), to ensure that there is no undeclared VHEU production. In principle, verification would not need to be applied to lower enrichment levels, but in view of the advantages of LEU as a feed for VHEU production, some verification measures for lower enriched uranium may need to be considered, particularly in the case of States with smaller fissile stocks. As to plutonium inventories of declared spent fuel, verification would be applied in direct proportion to the contained Pu-239 above 70% and up to 100%. The same graduated intensity would apply to such separated plutonium product leaving a reprocessing plant for any other facility. Verification would not apply anymore to high-burnup plutonium from power plants that has been returned to a plant as mixed-oxide fuel and therein irradiated, because the Pu-239 would thereby fall under the 70% threshold. As to stocks of weapon-grade material, the process of degradation in connection with their use in nuclear power plants would also remove them from the FMCT scope.

Undeclared activities

The discovery in 1991 of an extensive clandestine nuclear weapons programme in Iraq provided evidence to the fact that a verification system focused on declared activities was inadequate. Since then, the IAEA Board of Governors has strengthened the safeguards system and addressed the possibility of clandestine, undeclared activities, by prescribing access rights to a wide range of locations anywhere in the territory of a participating State. Similar arrangements were included in the verification provisions of the Chemical Weapons Convention and the Comprehensive Nuclear-Test-Ban Treaty.

Should the FMCT deal with the undeclared production of fissile material outside declared facilities? The short answer is - ultimately yes. Nevertheless, the present working paper takes the view that the inclusion of undeclared activities beyond declared facilities would prohibit the conclusion of FMCT negotiations by making verification very cumbersome, expensive and unmanageable. After all, under the model assumed above, the Nuclear-Weapon States would keep military stocks outside the FMCT; they should presumably have little incentive to risk treaty violation by hiding facilities that should have been declared or by engaging in clandestine undeclared activities.

Verification intensity

Decisions on verification intensity - how much and how soon - need to take into account the true risks of vertical proliferation. This is especially true for those NWS with large stocks. In these circumstances, rigorous verification may not be required, at least in an initial time frame. However, for States with small arsenals, verification intensity will need to reflect the fact that small-scale violations could have a serious effect on strategic relativities⁶.

Rather than immediate, rigorous verification, this paper proposes gradual, incremental or sequential levels of verification intensity, from nothing to an exhaustive verification system:

1. Declaration of non-production (no verification)

At the very minimum, the States submit to the FMCT Secretariat the list of facilities subject to declaration under the treaty, with information about the amounts of relevant fissile materials, as well as the movements in and out since the previous declaration. The report contains a formal declaration of compliance by the State. The Secretariat carries out general plausibility checks - only an indirect follow-up - on the basis of information provided by the State or gathered from other sources.

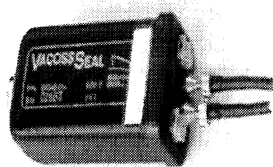
Estimated annual cost: 5 million euros.

The US Government has indicated that it would only support negotiations on a treaty without verification provisions, pointing out the difficulties associated with topics like clandestine production, naval fuel and stocks. Another reason advanced for going with a treaty that contained no-verification provisions was that it would ostensibly be quicker to negotiate.⁷ While apparently insufficient, the value of State's declarations of compliance should not be dismissed out of hand with such an arrangement covering a small number of States subject to great visibility and involved in a dense network of international commitments.

2. *Instrumented verification*

The declared nuclear production facilities are under the surveillance of a remotely controlled instrumentation network encompassing:

- Numerous electronic seals
- Tamper-proof digital cameras
- Flow meters at strategic points of a facility
- Chemical analysers
- Automatic sample taking



The locally acquired information is supplemented by satellite imagery of significant production facilities. The verification agency carries out inspections only in conjunction with the installation and maintenance of the surveillance system.

Estimated annual cost: 20 millions euros.

This approach would provide credible assurances of treaty compliance, without the need for an administratively heavy inspection organisation.

3. *Inspection limited to significant production facilities*

In addition to an instrumented verification, the agency carries out periodic on-site inspections of significant production facilities, that is only in declared facilities capable of producing significant quantities of high quality materials, such as enrichment plants, plutonium producing reactors and chemical reprocessing facilities.

Estimated annual cost: 50 millions euros.

4. *Random verification (challenge inspection)*

In addition to instrumented verification and to periodic on-site inspections of significant production facilities, the agency inspects further potential production facilities in the form of occasional random, unannounced or challenge inspections, such as power plants, research facilities, as well as other processing installations (e.g. uranium conversion). The "Organisation for the Prohibition of Chemical Weapons" and the IAEA have experience in the planning and implementation of these types of verification. The verification agency can also do special *managed-access* inspections at its most sensitive sites, a type of inspection that does not reveal sensitive information.

Estimated annual cost: 70 millions euros.

5. *Full verification of all nuclear facilities*

In this maximum option, all declared facilities of a State are verified through containment and surveillance and periodic on-site inspections to ascertain - in analogy with a standard IAEA Comprehensive Safeguards Agreement - that "*all nuclear materials produced have been adequately accounted for*". This would entail the verification of all potential production facilities of a State (in particular all research facilities and nuclear power plants) and of all civilian stocks.

Estimated annual cost: 150 millions euros.

The gradual adoption of various verification parameters, in particular in terms of intensity, can also be implemented time wise, that is, starting with a less onerous scheme such as instrumented verification. In this way, the verification agency could gain the necessary experience along the way to ensure an optimum use of financial resources.

Getting started on verification

To make progress in the negotiation of an FMCT, it would seem appropriate to resume detailed work in the CD framework and do so simultaneously on various issues, without the need to have agreed on all fundamental aspects.

As far as verification is concerned, the CD should establish an "**Ad hoc Committee on FMCT Verification**" with 16 members- the 8 States with nuclear explosive capability and the 8 NNWS with the largest civilian stake in the nuclear fuel cycle, as measured by the volume of uranium use and plutonium production (*that is* Belgium, Canada, Germany, Japan, Sweden, Spain, South Korea, and Ukraine). This formal committee could oversee several informal workgroups in which would be assessed issues under consideration (fissile material definition, facilities to be considered, intensity of verification) and this from various points of view (consistency with objectives, costs, added degree of assurance per unit cost, etc.

¹ Global Fissile Material Report 2006 - First report of the International Panel on Fissile Materials - Princeton University's Program on Science and Global Security.

² "Multilateral approaches to the nuclear fuel cycle": Expert Group Report submitted to the Director General of the International Atomic Energy Agency, February 2005: infcirc 640, at <http://www.iaea.org/Publications/Documents/Infcirc/2005/infcirc640.pdf>.

³ Statement by Ambassador Leonid Skotnikov at the Plenary meeting of the Conference on Disarmament, June 28, 2005.

⁴ Dautray R., "L'énergie nucléaire civile dans le cadre temporel des changements climatiques (Nuclear energy in the context of climatic upheavals)", Report to the French Academy of Sciences, 127, Editions Tec&Doc (2001)

⁵ Tariq Rauf, "The Canadian Nuclear Submarine Acquisition Programme of 1987-1990": Informal meeting of the Netherlands-Exercise, September 2003, Geneva.

⁶ John Carlson, "Can a Fissile Material Cutoff Treaty Be Effectively Verified?": Arms Controls Today, January-February 2005

⁷ Global Fissile Material Report 2006: *ibid*

ITALY

WORKING PAPER

BANNING THE PRODUCTION OF FISSILE MATERIAL TO PREVENT CATASTROPHIC NUCLEAR TERRORISM

1. Fissile materials – essentially plutonium (Pu) and/or highly enriched uranium (HEU) enriched to over 20 percent U^{235} – are the physical core of any nuclear weapons (NWs) or other nuclear explosive devices (NEDs). Thus, controlling fissile material, as well as the systems for its production (namely uranium enrichment and spent fuel reprocessing), is vital in preventing catastrophic nuclear terrorism and in providing the basis for any comprehensive nuclear disarmament and non-proliferation regime. The early achievement of such a “Fissile Material Cut-off Treaty (FMCT)” was firmly demanded among the commitments made by the nuclear-weapons States (NWSs) at the 1995 Non-Proliferation Treaty (NPT) extension conference and the 2000 NPT Review Conference.
2. This paper concerns the nexus between the FMCT and any serious comprehensive effort to prevent nuclear proliferation and hence to reduce the possibility of catastrophic nuclear terrorist attacks. In particular, the paper will argue that the evolution of nuclear proliferation networks represents the potential start of a new era, in which the same global fissile material might be vulnerable to diversion, theft or sale. It is estimated that existing quantities of HEU and Plutonium globally stockpiled could produce more than 50,000 nuclear devices.
3. The issue of nuclear terrorism is addressed by UNSC Resolution 1540 and by the International Convention for the Suppression of Acts of Nuclear Terrorism. Both these documents request all States, inter alia, to adopt and enforce appropriate effective domestic legislation to prohibit any non-State actor to manufacture, acquire, possess, develop, transport, transfer or use nuclear weapons and their means of delivery. The efforts to dispose of fissile material through arrangements such as the Trilateral Initiative (IAEA, Russia, USA), the G8 Global Partnership and other “blending down” activities of excess HEU are also relevant to nuclear terrorism prevention.

4. Nuclear terrorism is probably the least understood of all contemporary nuclear threats, and the countermeasures implemented so far may be less than optimal. It is hardly reassuring that possession of nuclear weapons by terrorist groups has not been established. Terrorist groups however have not hesitated to use the most lethal means they could get hold of; it is difficult to believe that they would hesitate in doing so in the future. The present security enforcements and nuclear threat responses are often driven by worst-case scenarios and perceptions of vulnerability. Furthermore, these efforts tend to emphasize demand-driven proliferation, namely the possible quest for NEDs or NWs or weapon-usable nuclear materials, by state and non-state actors, such as terrorists.

5. To launch a nuclear attack, terrorists must first obtain a nuclear weapon. They could do this in two ways: by stealing it or buying it. A third possibility also exists, however: to build a crude NED. All three pathways pose significant constraints to terrorists: the barriers against the stealing or the buying of intact NWs, and hence their successful detonation (specialized security codes and arming-firing devices on most NWs may prevent non-state actors from detonating), appear extremely difficult to surmount. Therefore, the last usable option for non-state elements is to build at least a crude NED. No terrorist organization currently has the ability to produce fissile materials, and hence terrorists would have to acquire already made HEU or Pu. It should be noted that, if non-state actors have sufficient quantities of un-irradiated, or "fresh", HEU, the production of a crude gun-type NED could be within their reach, since terrorists have far less stringent requirements than nations do in terms of safety, security reliability, yield or delivery constraints.

6. Furthermore, it is worth underlining that it is an extremely challenging task to detect illicit fissile materials at borders, or in a busy urban environment, especially in the case of fresh HEU (which also involves limited health hazards in its handling). Therefore, the production of a crude NED might go undetected. It is, therefore, evident that, if the international community wants to effectively prevent nuclear terrorism, it must emphasize and act on the supply side of the problem. To terrorists and non-state actors in general, as we have mentioned above, difficulty in access to HEU or Pu is likely to constitute the single most important obstacle to their plans. Denying terrorists the fissile material by increasing supply-side security measures on the declared facilities in NWSs, where weapons-usable material is being or could be produced, by banning the current (if any) and future production of these materials, by reducing the global stocks of fissile material and securing those which remain, could be the best and most effective of all nuclear terrorism countermeasures.

7. Yet, there exists another compelling counter-terrorism argument for a worldwide ban on the production of fissile material by speedily pursuing an FMCT and hence calling for the Conference of Disarmament (CD) in Geneva to commence negotiations on an FMCT immediately: one can expect that nuclear proliferation networks, that are either state-based or are the product of non-state actors, will eventually intersect and/or adopt some of the characteristics and behaviour generally associated with the "dark underside" of globalisation,

like the existing global networks of organized crime, drugs procurement, illicit arms-trafficking, etc.

8. If this turns out to be actually true, one could expect that, in such an environment, nuclear proliferation networks might produce the greatly feared “nexus” between global fissile material stockpiles and terrorist organizations with nuclear ambitions. Indeed, in an ideal “organized crime paradigm” everything may be potentially stolen or smuggled by threatening or buying human beings, and hence the nuclear establishments of the NWSs may also be vulnerable to insider threats.

9. It is not likely that terrorist groups could reach HEU or Plutonium production capabilities. However all measures should be taken to prevent that such groups get hold of weapons-grade fissile materials or credibly declare their possession. In addition to reduction and safe storage, a ban on production of weapons-grade fissile material would prevent terrorist groups from acquiring nuclear capabilities. **Appropriate language indicating that an FMCT would reduce the risk of nuclear terrorism by curbing the possibilities of an illegal diversion of fissile material should be included in the text of a treaty.**

ITALY

WORKING PAPER

FMCT'S ENTRY INTO FORCE: POSSIBLE OPTIONS

1. According to Article 24 of the Vienna Convention on the Law of Treaties, "a treaty enters into force in such manner and upon such date as it may provide or as the negotiating States may agree. Failing any such provision or agreement, a treaty enters into force as soon as consent to be bound by the treaty has been established for all negotiating States". As a rule, multilateral treaties provide the entry into force after a certain number of deposits of ratifications to depositary States, the Secretariat of an International Organization, or of notifications of the ratifications to the other States party.
2. Therefore, a treaty does not enter into force as soon as it is adopted and signed. Provisions on the entry into force are necessary in order to establish the way in which States parties will be bound by the treaty itself. They usually establish the number of countries and/or the names of countries the ratification of which is necessary for the treaty to enter into force. A minimum list and/or number of ratifications for the entry into force is in many cases foreseen in order to ensure the comprehensive character of a multilateral treaty.
3. The conditions for the entry into force of an FMCT will have to be decided upon taking into account the possible options available and on the basis of past experience for other treaties on disarmament and non-proliferation. The available options for the entry into force of a treaty are:
 - (i) To list specific names of countries the ratification of which is necessary for the entry into force.
 - (ii) To establish a minimum number of countries the ratification of which is necessary for the treaty to enter into force, without specifying names.
 - (iii) A mixed solution, i.e. to establish a limited list of specific countries plus a certain

number of countries the ratification of which is necessary for a treaty to enter into force.

4. The criteria adopted by previous disarmament treaties can be a useful term of reference. Among the WMD treaties:

- (i) The IAEA Statute entered into force after the deposit of instruments of ratification by 18 States (including at least three States among a list of 5, namely Canada, France, URSS, United Kingdom and United States: option c);
- (ii) The Non Proliferation Treaty entered into force two years after its conclusion, after the ratification by the depository States (USA, UK and Soviet Union) plus 40 other States (names of the latter were not specified: option c, mixed solution);
- (iii) The Biological Weapons Convention entered into force three years after its conclusion, after the deposit of instruments of ratification by 22 States, including the Depository Governments (USA, UK, USSR) (option c, mixed solution);
- (iv) The Chemical Weapons Convention entered into force after the deposit of the 65th instrument of ratification (option b);
- (v) The Comprehensive Test Ban Treaty (which has not entered into force 10 years after its conclusion) would enter into force after deposit of instrument of ratification by 44 States, identified by names (option a).

5. Also some treaties on Conventional weapons are relevant:

- (i) The Convention on Certain Conventional Weapons entered into force six months after the date of deposit of the 20th instrument of ratification (option b).
- (ii) The Ottawa Convention entered into force six months after the deposit of the 40th instrument of ratification (option b).

6. Scholars and NGOs have submitted for the FMCT the following options:

- (i) "the Treaty shall enter into force in two steps. Upon ratification by 35 States, except for Articles II para 9-11, (excess materials released from military use: declaration and verification), IV (undeclared production) and V (non explosive military use), the Treaty shall enter into force. Articles II para 9-11, IV and V shall enter into force when a minimum of five States, which possess material subject to the Treaty that is not subject to IAEA safeguards, deposit their instruments of ratification. Any State possessing such material may wave this provision and bring the remaining Articles into force before the minimum condition is met" (T. Shea, "The fissile material cut-off Treaty: a venue for future progress in arms control, non proliferation and prevention of nuclear terrorism", 2003).
- (ii) "this Treaty shall enter into force thirty days after the date of the deposit of the 30th instrument of ratification" (Greenpeace, "Draft treaty: banning the production of fissile materials for nuclear weapons and other nuclear explosive devices", 2004).

7. The first suggests a gradual entry into force, giving priority to the core provisions; the second provides for its entry into force as a whole after 30 ratifications.
8. The rationale for subordinating entry into force to ratification by a minimum number of countries (option b) is to allow entry into force after reaching a "critical mass" of parties, which would make the treaty credible. The rationale for establishing a list of significant countries the ratification of which is necessary for the entry into force is to make the treaty meaningful (option a). A mixed solution (option c) would combine credibility with meaningfulness and seems therefore preferable.
9. Two alternatives could be considered under option c. Entry into force would be subject to ratification by:
- (i) either the five Nuclear Weapons States according to the NPT plus the first 35 countries which will have deposited the instruments of ratification;
 - (ii) or the countries which possess either nuclear power or research reactors but are not subject to full-scope nuclear safeguards, plus the first 35 countries which will have deposited the instruments of ratification.
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JAPAN

WORKING PAPER

FMCT: A CONTRIBUTION TO CONSTRUCTIVE DISCUSSIONS

Introduction: The Purpose of this Paper

1. This paper sets out several major issues of discussion on a Fissile Material Cut-off Treaty (FMCT) from the perspective of strengthening the disarmament and non-proliferation regime. It analyzes the existing international framework for nuclear material, as well as the current international security environment.
2. This paper aims to contribute to the promotion of more detailed and precise discussions on an FMCT, when the CD conducts further work on it. It does not, therefore, prejudge in any way Japan's position in future discussions or negotiations.

I. The Significance and Relevance of an FMCT

Significance and Relevance in Nuclear Disarmament and Non-Proliferation

3. Article 6 of the NPT stipulates the obligations of each of the Parties to the Treaty 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. In the preamble paragraph 12 of the NPT, it is desired to further the easing of international tension and the strengthening of trust between States "in order to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons and the means of their delivery." These provisions show the aim of the NPT as the elimination of nuclear weapons, which requires measures such as the cessation of the manufacture of

nuclear weapons or the cessation of nuclear arms race. To this end, quality capping by comprehensively banning nuclear testing and quantity capping by banning the production of fissile material for nuclear weapons or nuclear explosive devices are both necessary and important.

4. As for the former quality capping, the CTBT has already been adopted, and the further promotion of its early entry into force is essential in this regard. For the latter, quantity capping should be achieved through the early commencement and conclusion of negotiations on an FMCT to ban the production of fissile material for nuclear weapons or nuclear explosive devices, as well as to ensure the non-reversion or non-diversion of fissile material for non-nuclear-weapon use to nuclear-weapon use. Like the two back wheels that propel a car forward, the early entry into force of the quality capping CTBT, and the early commencement and conclusion of negotiations on a quantity capping FMCT will realize "the cessation of the manufacture of nuclear weapons" and "the cessation of the nuclear arms race", leading to an environment conducive to the future elimination of nuclear weapons.

5. This way of thinking was also recognized in the adopted "Principles and Objectives for nuclear non-proliferation and disarmament" of the 1995 NPT Review and Extension Conference. More specifically, the decision adopted the programme of action with three important nuclear disarmament measures for "the full realization and effective implementation of Article VI": 1. the completion of the negotiations on a CTBT; 2. the immediate commencement and early conclusion of negotiations on an FMCT; and, 3. "pursuit by the nuclear-weapon States of systematic and progressive efforts to reduce nuclear weapons globally". At the 2000 NPT Review Conference, the immediate commencement of negotiations on an FMCT with a view to their conclusion within five years was also listed as one of the 13 practical steps for nuclear disarmament. The nuclear disarmament resolution entitled "Renewed determination towards the total elimination of nuclear weapons" put forward by Japan at the 60th General Assembly of the United Nations last year also emphasizes the importance of the immediate commencement of negotiations on an FMCT and its early conclusion, and calls upon all nuclear-weapon States and States not parties to the NPT to declare moratoriums on the production of fissile material for any nuclear weapons pending the entry into force of the Treaty. The fact that the resolution was adopted by an overwhelming majority clearly demonstrates that the international community attaches great importance to an FMCT as a nuclear disarmament and non-proliferation measure.

6. The significance and relevance of an FMCT to the enhancement of national security should also be emphasized. In the current framework, there are no international legal regulations imposed whatsoever on fissile material for nuclear weapons. The fact that only four of the five NPT nuclear-weapon states presently observe moratoriums on the production of fissile material for nuclear weapons means that not all states possessing fissile material for nuclear weapons declare a moratorium. Moreover, the moratorium is nothing more than a unilateral political declaration. Making the moratorium a legal obligation through an FMCT, therefore, will have significant bearing on the improvement of the security environment for the non-nuclear-weapon states. Likewise, imposing restrictions on an arms race and ensuring the stability of the security environment also provides long term security benefits for the nuclear-weapon states and other states possessing fissile material for nuclear weapons. Accordingly, preventing greater increases in the amounts of fissile

material for nuclear weapons, as well as ensuring the irreversibility of nuclear disarmament measures by states possessing such fissile material through an FMCT production ban will be of enormous value.

7. Additionally, if the three States not parties to the NPT, which are currently not under international nuclear disarmament obligations, conclude an FMCT, it will be a major step forward for nuclear disarmament and non-proliferation. It will also be beneficial for those States not parties to the NPT, as they will be seen, if not full fledged, as acting as responsible members of the international community in regards to their disarmament and non-proliferation commitments.

8. Since an FMCT will be a non-discriminatory treaty, from the standpoint of a multilateral disarmament and non-proliferation regime, it will make easier the concerted efforts of the international community towards nuclear disarmament and non-proliferation for the improvement of international peace and security.

9. Lastly, the advancement of the negotiation on an FMCT will lead to the re-activation of the Conference on Disarmament (CD), the only multilateral disarmament negotiation forum.

The significance of an FMCT in relation to strengthening nuclear security

10. In addition to the fundamental significance inherent in an FMCT as outlined in the above paragraphs 3 to 9, under the current international security environment in which the possibility of nuclear material falling into hands of non-state actors is an emerging concern, the perspective of strengthening nuclear security can be added as a contemporary significance of an FMCT. In particular, under the current situation, against the backdrop of military confidentiality and national security reasons, basically there is no international regulatory framework for the military-use (nuclear-weapon use and conventional military use) nuclear material of the nuclear-weapon states and States not parties to the NPT (refer to the Matrix annexed to this paper). Although it will depend on the extensiveness of the possible verification measures (safeguards), if an FMCT obligates states parties to implement state accounting and control on nuclear-weapon-use nuclear material and to make voluntary declarations based on state accounting and control, the sections for the SSAC (State System of Accounting for and Control of nuclear material) and safeguards in the annexed Matrix related to the five nuclear-weapon states and three States not parties to the NPT will be strengthened. Furthermore, if physical protection and transfer ban obligations are newly realized under an FMCT, it would also contribute to meeting the current international needs for strengthening measures to prevent the diversion and proliferation of nuclear material. Likewise, from a nuclear security perspective, an examination of realizing in an FMCT new state accounting and control and physical protection obligations and voluntary declarations based on state accounting and control, as well as a ban or strict control on the transfer of materials for conventional-military use to a third country could also be beneficial. Such additional obligations will close more gaps in the Annex Matrix.

II. Major Issues

11. There are a number of pertinent issues that require discussion in relation to an FMCT, but this working paper will only focus on the 4 major issue areas: scope of core obligations, verification, stocks and definition.

Scope of core obligations

12. Various discussions conducted until now clearly show there is consensus that a ban on the production of fissile material for nuclear weapons or nuclear explosive devices would be the core obligation of an FMCT. Additionally, there is no doubt that fissile material for civil use should not be subject to a production ban under an FMCT.

13. Issues such as how to define "production" for a production ban of fissile material for nuclear weapons or nuclear explosive devices, or more specifically, whether to limit the scope of "production" to "future production" or to add "past production" which means to include "stockpiling" as a banned activity (in other words, imposing future reduction and elimination obligations) still remain open to debate. However, at a minimum, there is a broad consensus that "future production" is within the scope of an FMCT ban. As a logical consequence of a ban on "future production", the entry into force of an FMCT would obligate the States Parties possessing production facilities for nuclear-weapon-use fissile material to close down or decommission such facilities, or convert them to non-nuclear-weapon use.

14. The "reversion" of such closed-down or decommissioned facilities back to production of nuclear-weapon-use fissile material should be subject to a ban, as such "reversion" would mean nothing less than de facto "production". The "reversion" of fissile material that states possessing fissile material for nuclear weapons have voluntarily declared as excess for national security needs should similarly be subject to a ban.

15. Furthermore, the "diversion" of existing and future stocks for non-nuclear-weapon purposes to nuclear-weapon purposes after the entry into force of an FMCT should be subject to a ban, as such "diversion" would substantially be the same as "production". Although the nuclear-weapon states under their "voluntary safeguards" may currently "withdraw" their declared civil nuclear material from IAEA safeguards, the conclusion of negotiations on an FMCT could necessitate changes to such safeguards agreement provisions between a nuclear-weapon state and the IAEA to conform with the FMCT obligations.

16. Receiving fissile material for nuclear weapons from another state should be subject to a ban under an FMCT, as such transfers would be equivalent to "production".

17. An FMCT should also ban assisting another state in its production of fissile material for nuclear weapons.

18. Moreover, considering the contemporary significance of strengthening nuclear security, it might be worth looking at the possibility of realizing not only a production ban, but also obligations of state accounting and control and physical protection, as well as a ban on the transfer of stocks of fissile material for nuclear weapons.

Verification

19. There are many different approaches concerning the verification of the core obligation of a "ban on production of fissile material for nuclear weapons or nuclear explosive devices." Arguments range from the opinion that verification is "unnecessary" to the opinion that all nuclear facilities, including civil use facilities, should be comprehensively verified. For the purpose of considering possible ways of verification regarding an FMCT, a more detailed examination of what we call "verification" in an FMCT, specifically what actions could be performed on which objects, would be beneficial.

20. The following are some of the possible ways for "verification" of the core production-ban obligation under an FMCT: (Note: As some view the below subparagraphs (iii) and (iv) different from the primary purposes of an FMCT, they need to be further studied in light of the expertise of the IAEA.)

- (i) Confirm that the amount of stock of fissile material for nuclear weapons or nuclear explosive devices has not increased from the date an FMCT enters into force.
- (ii) Confirm that the reactors and facilities for the production of fissile material for nuclear weapons or nuclear explosive devices that are closed down, decommissioned or converted to non-nuclear-weapon-use remain closed down, decommissioned or converted to non-nuclear-weapon-use.
- (iii) Confirm that fissile material that has voluntarily been declared as excess as a result of nuclear disarmament is not reverted back to nuclear weapons purposes.
- (iv) Confirm that fissile material for non-nuclear-weapon purposes has not been diverted to nuclear-weapon purposes.
(To be exact, non-nuclear-weapon purposes can be divided into civil purposes and conventional military purposes.)

21. Firstly, in order to confirm the above paragraph 20 (i), it would be necessary to declare all information regarding the types and amounts of such stocks that are the products of "past production". Nevertheless, from various perspectives, for instance proliferation-sensitive information, it has been pointed out that it would be unrealistic to make such declarations mandatory, and this needs to be carefully examined. However, it would be worth examining the possibility of some kind of transparency-enhancing measure such as voluntary declarations. It should be noted here that even if such stocks are declared, as it is often pointed out, the "identification of production time" or the "identification of production purpose" would be difficult. In this manner, these extremely difficult technical issues, which can only be answered by states possessing nuclear-weapon-purpose fissile material, seem to obstruct paragraph 20 (i).

22. In relation to the above paragraph 20 (ii), after concluding an FMCT, fissile material production facilities for nuclear weapons in States Parties will inevitably be closed down, decommissioned or converted to non-nuclear-weapon use. Confirmation that those facilities, at least the facilities closed down, decommissioned or converted to civil use, will never again "operate" as production facilities for nuclear-weapon purposes is necessary and significant from the perspective of ensuring the core obligation of an FMCT. Moreover, the verification of this category would have the effect of substantially verifying a large part of paragraph 20 (i) and will be extremely important for improving the confidence in an FMCT.

23. In regard to the above paragraph 20 (iii), discussions are underway in the Trilateral Initiative between the United States, the Russian Federation and the IAEA. Examining the integration of paragraph 20 (iii) into an FMCT with reference to this initiative would also be significant from the perspective of legally ensuring "irreversibility".

24. Taking some measures to confirm the above paragraph 20 (iv) in countries other than NPT non-nuclear-weapon States Parties is important. In this regard, based on the current situation in which "voluntary safeguards" are already applied in the NPT nuclear-weapon states and the facility-specific 66-type safeguards are applied to some of the non-NPT States Parties' facilities, this issue should be left to the discussions in the IAEA. Since the NPT non-nuclear-weapon States Parties shall be covered by the conclusion of the NPT/IAEA comprehensive safeguards agreement and the Additional Protocol, they should not bear additional measures/obligations under an FMCT.

25. As for the non-diversion of fissile material for conventional military purposes to nuclear weapon purposes, even for the NPT non-nuclear-weapon states nuclear material can be the subject of exemption under Article XIV of the model Comprehensive Safeguards Agreement (153-type). It has been pointed out that including this concept in verification under an FMCT would be difficult for military confidentiality and national security.

26. As noted above, rather than general discussions on the necessity of "verification" in an FMCT, conducting more detailed examinations of each concrete category is important. In so doing, it is important to bear in mind the two primary goals of verification (namely, confirmation of each above category): the confirmation of non-diversion or non-reversion of declared activities; and, the confirmation of the non-existence of undeclared activities (i.e., the detection of undeclared activities). Therefore, for example, for a certain category, there may be difficulties in introducing verification measures, including the fact that detecting undeclared activities would be difficult. Irrespective of this, for other categories, the introduction of verification measures could be examined from the perspective of the significance and necessity taking into consideration the aims and objectives of an FMCT.

Existing stocks

27. Concerning the issue of whether to include “existing stocks” in the scope of an FMCT, it would be beneficial to discuss it based on what “existing stock” and “include in the scope” respectively mean under an FMCT. In addition to this, the perspective of strengthening of nuclear security could also be integrated into the discussions. The discussions on “existing stocks” could be examined according to the following categories:

- (i) First, as mentioned in paragraphs 12 to 18, the transfer of stocks for nuclear weapons to a third country should be banned. Although we have to wait until discussions converge on whether to include “a ban on stockpiling” (in other words, imposing future reduction/elimination obligations), it would be worth examining the addition of transparency-enhancing measures such as voluntary declarations based on state accounting and control, as well as the realization of physical protection obligations.
- (ii) Next, the diversion to nuclear-weapon purposes of stocks from conventional military use must be banned. It has been indicated that the verification of non-diversion is difficult from the perspective of military confidentiality. However, it would be possible to examine obligations not to transfer (or to strictly control) to a third country, voluntary declarations based on state accounting and control, as well as physical protection obligations from the perspective of strengthening nuclear security.
- (iii) As mentioned above, the “reversion” back to nuclear-weapon purposes of stocks declared as excess (nuclear-weapon use and conventional military use) should be banned. In addition, for stocks once declared as excess, it would be possible to examine realizing obligations to place under verification and to reduce and eliminate such stocks in the future.

Definition of “fissile material for nuclear weapons” (“fissile material” for civil purposes be excluded)

28. Before examining the definition of fissile materials for inclusion in an FMCT production ban, as mentioned in paragraph 12, it should be emphasized that fissile materials for nuclear weapons or nuclear explosive devices will be banned, while materials for civil purposes will be outside the scope of such a ban.

29. Based on such a premise, it can be said there is consensus that “special fissionable material” stipulated in Article 20 of the IAEA Statute— plutonium 239, uranium 233 and uranium enriched in the isotopes 235 or 233— are within the scope of “fissile material for nuclear weapons” under an FMCT. Inclusion of other material – transuranic elements (neptunium, americium), tritium and thorium – should be studied in detail by experts based on possible discussions in the IAEA.

III. Conclusion

30. An FMCT, as the next logical step to nuclear disarmament and non-proliferation, is significant in terms of prohibiting the "production" of fissile material for nuclear weapons or nuclear explosive devices. In order to achieve this aforementioned significance, an FMCT should include: a ban on the "reversion" of closed-down/decommissioned or converted (to non-nuclear-weapon use) production facilities that were once for nuclear-weapon purposes; a ban on the "reversion" of fissile material that was once for nuclear weapons but declared as excess for security needs; and a ban on the "diversion" from non-nuclear-weapon use to nuclear-weapon use. Prohibiting these activities will strengthen the irreversibility effect of an FMCT, which strives to firmly cap the quantity of fissile material.

31. In addition to nuclear disarmament, the relevance of an FMCT from the perspective of addressing the current pressing international security issue of strengthening nuclear security is becoming more and more significant. For this purpose, it might be constructive to examine the possibility of further obligations in addition to the production ban on fissile material for nuclear weapons (excluding "fissile material" for civil purposes), such as state accounting and control and physical protection, as well as a transfer ban on fissile material for nuclear weapon purposes.

32. While examining verification, in addition to the effectiveness of each category, the feasibility and achievability should also be taken into account.

Annex

Presence or Absence of an International Framework for Nuclear Material¹

| | | 5 NPT Nuclear Weapon States | Non-NPT States Parties | NPT Non-Nuclear Weapon States (NNWS) |
|--------------|---------------------------|--|--|---|
| Civil Use | SSAC | △ | △ | ? ² |
| | Safeguards | △ (Voluntary safeguards) | △ (66-type Safeguards) | ? (Comprehensive Safeguards) ³ |
| | Physical protection | ? (Amended PP Convention) ⁴ | ? (Amended PP Convention) ⁵ | ? (Amended PP Convention) ⁶ |
| | Transfer Controls | ? ⁷ | ? (NSG Adherence) | ? ⁸ |
| Military Use | Conventional Military Use | SSAC | × | × |
| | | Verification | × | × |
| | | Physical Protection | × | × |
| | | Transfer Controls | × | × |
| | Nuclear Weapon Use | SSAC | × | N/A |
| | | Verification | × | N/A |
| | | Physical Protection | × | N/A |
| | | Transfer Controls | × | N/A |

? : international framework present

? : international framework partially present

× : international framework not present

¹ This does not refer to the actual state of controls within each country, but the assessment of the presence or absence of an international framework for nuclear material.

² The implementation of national material accountancy (SSAC: State System of Accounting for and Control of nuclear material) is a prerequisite in applying comprehensive safeguards agreement.

³ This includes countries (such as Japan) for which the IAEA has drawn the broader conclusion and, as a result, has implemented the integrated safeguards.

⁴ The amended Convention on the Physical Protection of Nuclear Material, adopted in July 2005, stipulates new physical protection obligations for protecting nuclear facilities and material in peaceful domestic use, storage as well as transport, although it has still not entered into force. In the fourth revised document (1999) on The Physical Protection against the sabotage of Nuclear Material and Nuclear Facilities produced by the IAEA (INFCIRC/225), the physical protection of nuclear facilities was added. Furthermore, Article VIII of the Convention on Nuclear Terrorism (still not entered into force) adopted at the 59th Session of the UN General Assembly in April 2005, provides an obligation to make every effort to adopt appropriate measures to ensure the protection of radioactive material (including nuclear material).

⁵ Same as above.

⁶ Same as above.

⁷ Under UNSC Resolution 1540, UN Member States are obligated to enforce export controls. NPT States Parties are also obligated to enforce export controls based on Article III paragraph 2 (based on which the Zangger Committee has established the MOU). In addition to these, the NSG has established its guidelines.

⁸ Same as above.

⁹ Stipulated in Article XIV of the Comprehensive Safeguards Agreement (153-type). However, there has been no case for invoking this article so far.

¹⁰ Between the US and Russia, there is the Trilateral Initiative with the IAEA.

AUSTRALIA

WORKING PAPER

**SUGGESTIONS FOR PROGRESSING THE FISSILE MATERIAL
CUT-OFF TREATY**

Introduction

1. A Fissile Material Cut-off Treaty (FMCT) has the potential to deliver substantial international security benefits, furthering the twin goals of nuclear disarmament and nuclear non-proliferation. By capping the amount of fissile material available for weapons use an FMCT would be an essential step towards irreversible nuclear disarmament. A cut-off treaty would also further tighten controls on fissile material, reducing the risk of it being diverted to proliferators or to terrorists. An FMCT would complement the CTBT which impedes development of nuclear weapons by proscribing testing.
2. The first objective is to start, without preconditions, negotiation of an FMCT containing the commitment to end production of fissile material for nuclear weapons. In order for the FMCT to be credible and effective there should be appropriate measures to verify that FMCT parties are complying with their obligations – but the negotiation of such measures can be conducted separately from the acceptance of the basic political commitments of an FMCT.

Treaty Architecture

3. In the area of multilateral non-proliferation and arms control treaties, two basic precedents are relevant. One is for a single treaty containing both the basic treaty objectives and commitments and the details of the verification system – the approach taken with the Chemical Weapons Convention (CWC). The disadvantages of this approach include the time required to negotiate the treaty – a major concern in the case of the FMCT – and the degree of inflexibility with any future adjustments to verification arrangements.

4. The alternative approach – demonstrated very successfully by the NPT – is to have the basic political commitments in a principal treaty, and to set out the verification system in a secondary agreement (or series of agreements – in the NPT's case each party concludes a safeguards agreement with the IAEA based on the model in IAEA document INFCIRC/153).

5. Applying the NPT model for the FMCT could allow rapid negotiation of the treaty containing the political commitment to end production of fissile material for nuclear weapons, with verification measures to be the subject of a subsequent, largely technical, negotiation. This would allow early establishment of a norm against the production of fissile material for nuclear weapons.

Objectives and Scope of the FMCT

6. If, as discussed above, an FMCT were to follow the example of the NPT, the basic commitments and essential elements of such a treaty might be as follows:

- (i) A commitment by each party not to produce fissile material for nuclear weapons or other nuclear explosive devices;
- (ii) Definitions relevant to the scope of the treaty, including the fissile materials that are the subject of the FMCT commitments, and a definition of "production" – see discussion below). The definitions might also clarify non-proscribed activities;
- (iii) An entry-into-force formula that establishes the date from which the commitment not to produce fissile material for nuclear weapons or explosive devices applies;
- (iv) Provisions on the status of pre-existing stocks of fissile material – see discussion below;
- (v) A commitment to negotiation of appropriate verification arrangements;
- (vi) A mechanism for State Parties to review the operation of the FMCT at regular intervals;
- (vii) An amendment mechanism;
- (viii) A mechanism for State Parties to bring to the attention of all other State Parties issues of concern in relation to the operation of the treaty – either in general or in the case of suspected non-compliance with FMCT commitments.

Fissile material

7. The fissile materials to be covered by the treaty should be those relevant to the manufacture of nuclear weapons. Broadly speaking these are high enriched uranium (HEU) and plutonium. The materials regarded by the IAEA for safeguards purposes as “direct-use materials” – nuclear material that could be used for the manufacture of nuclear explosive devices without transmutation or further enrichment - are as follows:

- (i) HEU is uranium enriched to 20% or more in the isotope U-235;
- (ii) plutonium containing less than 80% of the isotope Pu-238;
- (iii) also included is U-233.

8. These would seem an appropriate basis for definitions in the FMCT, with the following qualification. Plutonium in irradiated fuel should not be included because it cannot be used for nuclear explosive devices without first being separated from uranium, fission products and other materials by reprocessing. Plutonium defined as fissile material for the purposes of the treaty would be separated plutonium.

Production

9. Production of fissile material, as defined above, requires three processes:

- (i) for HEU, uranium enrichment;
- (ii) for plutonium, uranium irradiation in a reactor and separation by reprocessing.

10. Plutonium “production” should not encompass irradiation, but only reprocessing. For the treaty to encompass irradiation would be to give it an extremely broad scope – essentially, applying to all reactor operations. As noted above, plutonium produced in reactor fuel is only available for weapons use if it is separated through reprocessing. This is relevant to the issue of “stocks”.

Stocks

11. There has been some debate about whether an FMCT should apply to pre-existing stocks. However, it seems clear that the only FMCT which might be achievable at this time is one that deals primarily with future production. As discussed above, such a treaty would be of real value to non-proliferation and disarmament. Cessation of the production of fissile material for nuclear weapons is an essential reinforcing step towards the achievement of a nuclear weapon free world. An FMCT banning the production of fissile material for new weapons would be a barrier to recommencement of the nuclear arms race, buttressing nuclear disarmament gains to date. For the nuclear weapon states and “nuclear capable” states outside the NPT, an FMCT would establish a norm against the production of fissile material for nuclear weapons.

12. On this basis – with one important qualification - the treaty would need to clarify that it does not apply to fissile material pre-dating entry-into-force. The qualification is as follows: if the definition of production of fissile material means, in the case of plutonium, reprocessing as discussed above, then the exemption from the treaty of pre-existing stocks could apply, in the case of plutonium, only to plutonium that has already been separated at entry into force. Any new reprocessing activity, even if using pre-existing irradiated material, would be subject to the treaty.

Non-proscribed activities

13. The treaty would not proscribe production of fissile material per se, only production for nuclear weapons or nuclear explosives. Reprocessing for civil use would not be proscribed. Nor would production of HEU for civil use (which it is expected would be limited) or for non-explosive military use (e.g. naval propulsion).

Verification aspects

14. As outlined above, an FMCT should include a commitment to negotiate appropriate verification arrangements, but the details of these could be left for subsequent technical negotiations.

15. NNWS party to the NPT have an existing commitment not to produce fissile material for weapons purposes and to accept IAEA safeguards to verify this commitment. This subsumes FMCT goals, and in principle no separate verification system should be needed to verify NNWS commitments under the FMCT, provided the states concerned have in force a comprehensive safeguards agreement (INFCIRC/153) and an Additional Protocol (INFCIRC/540).

16. The principal effect of the FMCT – and its verification task – therefore relates mainly to the NWS and the three nuclear capable states outside the NPT. While the verification negotiation could be left largely to these states, as the most affected, the international community as a whole has an interest in ensuring that what is established has the necessary degree of integrity and effectiveness. In addition to appropriate generic verification arrangements, an important part of the verification architecture may well be bilateral or regional transparency and confidence building arrangements between these and perhaps other states.

17. Whether a particular verification regime provides the degree of assurance required by the parties – hence can be considered “effective” – is a matter for judgment, based on many factors: the verification objectives; the verification methods and standards; related CBMs; other information (including intelligence) available to the parties; incentives/deterrents reinforcing compliance; and so on. Only when the objectives and main features of the FMCT have been defined will it be possible to design the verification system and to judge whether it will be sufficiently effective to achieve the goals of particular parties and the international community more generally.

Conclusions

18. It is imperative to start, without preconditions, negotiation of the FMCT, so the commitment to end production of fissile material for nuclear weapons can be achieved without further delay. Early commencement of negotiations is achievable if the various parties are realistic about what can and cannot be agreed. A fundamental issue is verification. Insistence on a detailed verification regime as part of the basic treaty would lead to further delays and is likely to result in failure to achieve any treaty. Further, the political forum in which the basic treaty will be negotiated is not the right place for development of a highly technical regime. To achieve progress we must be prepared to proceed in a stepwise fashion, securing the principal treaty first, then focusing on the verification arrangements that can give strength to the objectives of this treaty.

UNITED STATES OF AMERICA

WORKING PAPER

**DRAFT MANDATE FOR AN AD HOC COMMITTEE ON A
"BAN ON THE PRODUCTION OF FISSILE MATERIAL FOR NUCLEAR
WEAPONS OR OTHER NUCLEAR EXPLOSIVE DEVICES."**

1. The Conference decides to establish an Ad Hoc Committee on a "Ban on the Production of Fissile Material for Nuclear Weapons or Other Nuclear Explosive Devices."
 2. The Conference directs the Ad Hoc Committee to negotiate a non-discriminatory and multilateral treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices.
 3. The Ad Hoc Committee will report to the Conference on Disarmament on the progress of its work before (DATE).
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UNITED STATES OF AMERICA

WORKING PAPER

**DRAFT TREATY
ON THE CESSATION OF PRODUCTION OF FISSILE MATERIAL FOR USE IN
NUCLEAR WEAPONS OR OTHER NUCLEAR EXPLOSIVE DEVICES**

The States Parties to this Treaty (hereinafter referred to as the "Parties"), have agreed as follows:

Article I

No Party shall, after the entry into force of the Treaty for that Party, produce fissile material for use in nuclear weapons or other nuclear explosive devices, or use any fissile material produced thereafter in nuclear weapons or other nuclear explosive devices.

Article II

For the purposes of this Treaty:

1. "Fissile material" means
 - (a) Plutonium except plutonium whose isotopic composition includes 80 percent or greater plutonium-238.

- (b) Uranium containing a 20 percent or greater enrichment in the isotopes uranium-233 or uranium-235, separately or in combination; or
 - (c) Any material that contains the material defined in (a) or (b) above.
- 2. "Produce fissile material" means:
 - (a) To separate any fissile material from fission products in irradiated nuclear material;
 - (b) To enrich plutonium-239 in plutonium by any isotopic separation" process; or
 - (c) To enrich uranium-233 or uranium-235 in uranium to an enrichment of 20 percent or greater in those isotopes, separately or in combination, by any isotopic separation process.
- 3. The term "produce fissile material" does not include activities involving fissile material produced prior to entry into force of the Treaty, provided that such activities do not increase the total quantity of plutonium, uranium-233, or uranium-235 in such fissile material.

Article III

- 1. Each Party shall take the necessary measures to ensure that all persons and entities anywhere on its territory or in any other place under its jurisdiction or control do not produce fissile material for use in nuclear weapons or other nuclear explosive devices, and do not use fissile material produced after entry into force of this Treaty for that Party in nuclear weapons or other nuclear explosive devices.
- 2. For the purposes of this Treaty, no Party shall be precluded from using information obtained by national means and methods in a manner consistent with generally recognized principles of international law, including that of respect for the sovereignty of States.
- 3. Any questions that arise regarding the implementation by a Party of the provisions of this Treaty shall be addressed through consultations between that Party and the Party or Parties seeking clarification.
- 4. In addition, any Party may bring to the attention of the Parties to this Treaty concerns regarding compliance with the provisions of this Treaty by another Party or Parties and may request the depositary to convene the Parties to this Treaty to consider the matter.
- 5. If, in connection with the implementation of this Treaty, any Party believes that questions have arisen that are within the competence of the Security Council of the United Nations as the organ bearing the main responsibility for the maintenance of international peace and security, that Party

may request consideration of such questions by the Security Council. The requesting Party should provide evidence related to the matter.

Article IV

1. This Treaty shall be open to all States for signature until its entry into force in accordance with paragraph 1 of Article VI.
2. After its entry into force, this Treaty shall remain open for accession by States that have not signed it.
3. This Treaty shall be subject to ratification by States Signatories in accordance with their respective constitutional processes.

Article V

1. Instruments of ratification and accession shall be deposited with [_____].
2. The depositary shall inform all States Signatories and acceding States promptly of the date of each signature, the date of deposit of each instrument of ratification or accession, the date of the entry into force of this Treaty and of any amendments and changes thereto, and the receipt of other notices.
3. The depositary shall send duly certified copies of this Treaty to the Governments of the States Signatories and acceding States.

Article VI

1. This Treaty shall enter into force on the date on which an instrument of ratification has been deposited by all of the following States: the People's Republic of China, the French Republic, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.
2. For a State that deposits an instrument of ratification or accession after the conditions set out in paragraph 1 above for entry into force have been fulfilled, the Treaty shall enter into force on the date of the deposit by that State of its instrument of ratification or accession.

Article VII

1. 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 its supreme interests. A Party shall deliver notice of such withdrawal in writing to the depositary no less than three months in advance of the date of withdrawal from the Treaty. Such notice shall include a statement of the extraordinary events that the notifying Party regards as having jeopardized its supreme interests.

2. This Treaty shall remain in force for a period of 15 years from the date of its entry into force. No later than six months before the expiration of the Treaty, the Parties shall meet to consider whether it will be extended. By consensus of the Parties, this Treaty may be extended.

Article VIII

This Treaty, of which the Arabic, Chinese, English, French, Russian, and Spanish language texts are equally authentic, shall be registered by the depositary pursuant to Article 102 of the Charter of the United Nations.

IN WITNESS WHEREOF, the undersigned, being duly authorized thereto by their respective Governments, have signed this Treaty opened for signature at [] on [date].

UNITED STATES OF AMERICA

WORKING PAPER

WHITE PAPER ON A FISSILE MATERIAL CUTOFF TREATY

1. The United States believes strongly that achieving a legally binding ban on the production of fissile material for use in nuclear weapons is a desirable goal. One way to accomplish this goal would be through the negotiation at the Conference on Disarmament (CD) in Geneva of a treaty banning the production of fissile material for use in nuclear weapons or other nuclear explosive devices. We aim to conclude a Fissile Material Cutoff Treaty (FMCT) as soon as possible.
2. The United States has given considerable thought to what an FMCT should look like. The draft treaty that we have put forward sets forth the essentials needed for an FMCT that would meet the objective of ending expeditiously the production of fissile material for use in nuclear weapons. The basic obligation under such a treaty, effective at entry into force, would be a ban the production of fissile material for use in nuclear weapons or other nuclear explosive devices. Stocks of already existing fissile material would be unaffected by the FMCT. The production of fissile material for non-explosive purposes, such as fuel for naval propulsion, also would be unaffected by the treaty.
3. The definitions set forth in the U.S. draft treaty on "fissile material" and "production" represent the outgrowth of the decade-long international discussion regarding what an FMCT should encompass. We believe that the definitions set forth in that text are appropriate for the purposes of an FMCT without any provision for verification.

4. The U.S. draft treaty omits verification provisions, consistent with the U.S. position that so-called "effective verification" of an FMCT cannot be achieved. The ability to determine compliance with a high level of confidence is a requirement for effective verification. The United States has concluded that, even with extensive verification mechanisms and provisions -- so extensive that they could compromise the core national security interests of key signatories, and so costly that many countries would be hesitant to implement them --, we still would not have high confidence in our ability to monitor compliance with an FMCT.

5. Furthermore, mechanisms and provisions that provide the *appearance* of effective verification without supplying its *reality* could be more dangerous than having *no* explicit provisions for verification. Such mechanisms and provisions could provide a false sense of security, encouraging countries to assume that, because such mechanisms and provisions existed, there would be no need for governments themselves - individually or collectively - to be wary and vigilant against possible violations.

6. Negotiating an international ban on the future production of fissile material for nuclear weapons will be a difficult enough task, in and of itself. Avoiding time-consuming and, we believe, futile efforts to negotiate "effective" verification measures will expedite action by the CD to conclude a legally binding ban on the production of fissile materials for nuclear weapons and nuclear explosive devices.

7. The United States believes that only by focusing on realistic objectives can the CD create the conditions necessary for negotiating an FMCT. The successful negotiation of an FMCT in the CD will be both a significant contribution to the global non-proliferation regime and an example of truly effective multilateralism.

8. The United States hopes that negotiations in Geneva on an FMCT can begin and conclude in the very near future. We also reiterate our view that, pending the conclusion of a Cutoff Treaty and the Treaty's entry into force, all states should declare publicly and observe a moratorium on the production of fissile material for use in nuclear weapons, such as the United States has maintained since 1988.
