

Working Paper

Bulgaria, Germany, Mexico, Netherlands, Romania, Spain, Sweden and Turkey

Fissile Material Cut-Off Treaty (FMCT)

I. Introduction

1. Appropriately addressing the issue of fissile material for nuclear weapons purposes could make an important contribution in enhancing international and regional security. A Fissile Material Cut-off Treaty (FMCT) is widely considered to be the next multilateral instrument to be negotiated in the nuclear disarmament field. An FMCT would complement and strengthen the existing disarmament and non-proliferation framework, in particular the Nuclear Non-Proliferation Treaty (NPT) and the Comprehensive Nuclear Test-Ban-Treaty (CTBT), yet to enter into force. An FMCT would inaugurate a new momentum in the overall process of disarmament by creating a single norm applicable to all.

2. The early commencement of negotiations on a treaty banning the production of fissile material for nuclear weapons and other nuclear explosive devices in accordance with the so-called “Shannon-Mandate” from 1995, constitutes a clear priority as a means to strengthen the disarmament and non-proliferation regime. Such negotiations are long overdue and their successful conclusion would constitute a significant achievement to nuclear disarmament efforts in accordance with article VI of the NPT. They would also be an important contribution to global nuclear security and a relevant step towards the prevention of the potential use by “Non-State actors” of fissile material in terrorist activities. An FMCT could also contribute as an important transparency and confidence building measure.

3. This document aims to contribute to the discussion on the objectives and definitions of an FMCT with regard to inter alia the scope of such a Treaty and its verification provisions.

II. Fissile material for nuclear weapons and other nuclear explosive devices.

4. The definition of fissile material included in a future FMCT is key to the treaty as this is directly related to the scope of the Treaty. The definition should therefore reflect a common understanding on what we mean by fissile material in the context of an FMCT.

5. It should be noted that when more materials are included in the definition of fissile material for an FMCT – thus expanding the scope of the treaty – the complication and costs for verification increases. The definition must harmonize with the treaty objectives. In order

to account for the technical development of the nuclear fuel cycle, possible procedures within the treaty to adjust the definition of fissile material for weapons purposes in the future, as might be required by technological changes, should be considered.

6. An FMCT should encompass, as minimum requirements, the following provisions:
 - (a) a ban on the production of “direct use” fissile material for nuclear weapons (following the IAEA definition)
 - (b) a ban on the transfer to nuclear weapons-related purposes of fissile material produced for civil use before or after entry into force of the FMCT
 - (c) a ban on the re-use for military purposes of material derived from disarmament measures and converted to/assigned for civil purposes (abiding by the principle of “irreversibility”)
7. The term “fissile material” is not used nor defined in the IAEA safeguards system, nonetheless, deliberations must to a large extent benefit from the experience of the IAEA in its safeguards system. The IAEA definition of “direct use material” is also suitable for an FMCT.
8. Nuclear materials that are subject to International Atomic Energy Agency (IAEA) Safeguards comprise two categories: “special fissionable materials” and “source materials”. Special fissionable material is mainly comprised of plutonium Pu-239, and uranium enriched in the isotopes 235 and 233.
9. Two transuranic elements, Neptunium and Americium, have fissionable capabilities. Although Americium can also in principle be used in a nuclear weapon, the manufacturing process would be complicated due to internal heating and radiation. The IAEA Board of Governors has indicated that some controlling measures might have to be applied to these two materials.
10. Thus, the production of the following fissile materials should be banned by the Treaty:
 - (a) **Uranium (235 and 233).** Highly-enriched HEU is defined as containing 20% or more than of U-235. It is also known that U-233 is usable for weapons, and this isotope should also be included in the treaty. A U-233 enrichment of 12% is equivalent to HEU, i.e. 20% enrichment of U-235.
 - (b) **Plutonium.** All plutonium containing less than 80% Pu-238 (IAEA definition of direct use material) should be included in the treaty.
 - (c) Material that contains **a combination of the above.**
11. Other materials which may theoretically be used to produced nuclear explosive devices:
 12. **It might also be advisable to include Neptunium 237.** The critical mass is low, and it has no heat or radiation properties that complicate its use in a nuclear device. Future nuclear fuel cycle concepts could include separation of Neptunium.
 13. In principle, **Americium** (241, 242 and 243) could also be used to manufacture a nuclear explosive device. However, the difficulties associated with internal heating should be further investigated before a final decision is taken whether on not to include Americium in the definition. In this context more information is also needed on the practical and financial implications of including Neptunium and Americium.

III. Stockpiles of fissile material for nuclear weapons and other nuclear explosive devices

14. The Shannon-mandate provides a good starting point for negotiations on the issue of whether or not to include stockpiles. We acknowledge that some relevant actors may presently be adverse to including stockpiles into the scope of an initial treaty. However, any FMCT arrangement should include stocks at least within its broader framework, since the existing large stocks of fissile material constitute a proliferation risk.

15. Theoretically, there are several options to address this issue. Although mandatory declarations (with a view to reductions) of all stocks of fissile materials by all States Parties to the treaty is desirable, there could be a transitory process (i.e. based on a “Fissile Material Control Initiative” (FMCI), or equivalent arrangements) as a complementary, voluntary, multilateral security and transparency arrangement. Another possibility could be additional protocols to the treaty on the gradual reduction of stockpiles, concluded at an appropriate time.

16. At the entry into force of the treaty, all states ought to declare all fissile material not used for military purposes in deployed or stored weapons as “excess material”, and place it under safeguards. This process should be irreversible, in line with Action 17 on nuclear disarmament under Conclusions and recommendations for follow-on actions in the Final Document of the 2010 NPT Review Conference.

17. Furthermore, an FMCT should include provisions for increased transparency in military stockpiles. States Parties to the FMCT ought to declare all stockpiles of fissile material defined as object of the Treaty, and participate in a fissile material control initiative, as appropriate. All such stocks of fissile material should be declared and placed under safeguards, with a view of a future disposal or elimination by procedures to be determined.

18. Aspects relating to disposition and/or conversion of fissile material to weapons non-usable material could also be considered for inclusion in an FMCT.

IV. Production of fissile materials for other applications, including for military and peaceful purposes.

19. An FMCT should not ban the production of fissile materials for other applications, including other military and civilian purposes, as long as they are not used in nuclear explosive devices.

20. However, we would support any initiative to promote the use of LEU for these purposes, especially for naval military purposes, and would be in favor of a progressive elimination of fissile material produced for naval reactors.

21. Fissile material for peaceful purposes may continue to be produced but research reactors still using HEU should be converted to LEU within existing programs, where technically and economically feasible.

V. Ban of acquisition and transfers of fissile material for nuclear weapons and other nuclear explosive devices from other countries non Parties to the Treaty

22. An FMCT should contain provisions immediately banning all transfers of fissile materials for nuclear weapons both between parties to the treaty, and between parties and non-parties to the treaty, as well as any kind of assistance to third countries for production of fissile material for nuclear weapons and other nuclear explosive devices after the entry into force of an FMCT.

VI. Facilities related to the production and storage of fissile material for nuclear weapons and other nuclear explosive devices

23. An FMCT should include the mechanisms and procedures that allow a controlled and safe storage and disposal of fissile material for nuclear weapons and other nuclear explosive devices and the dismantling or conversion of facilities related to the production, storage and disposal of such fissile material in a transparent and verifiable manner.

24. “Production of fissile material” within the framework of an FMCT would mainly refer to the enrichment of uranium and reprocessing of spent nuclear fuel for use in nuclear weapons and other nuclear explosive devices. Verification should be performed at the facilities used to perform such production.

25. Old production facilities that are closed down should be declared and placed under safeguards. For verification purposes, clandestine reactor operation should also be considered as part of the production process.

VII. Transparency and verification

26. Transparency and confidence-building measures are the necessary complement to an effective control of fissile material stocks and to the successful implementation of a verification system. Any measure designed to facilitate transparency in the management of those stocks of fissile material, both its storage and ultimate disposal, in the production of fissile material and monitoring and decommissioning of associated facilities would prove meaningful.

27. As for the verification system of the FMCT, generally speaking, two approaches, comprehensive and focused, have been proposed.

28. The comprehensive approach is a verification system covering all nuclear fuel cycle facilities and not only fissile material, but also other nuclear materials.

29. The focused approach concentrates on enrichment and reprocessing facilities and fissile material in downstream facilities. This latter approach may also cover R&D laboratories, including hot cells with a capability for the separation of fissile materials.

30. We would support to open a debate about the verification system considering factors such as security benefits, confidentiality, effectiveness of verification and cost-efficiency. We support a non-discriminatory, multilateral, and effective system of verification. The same rules and regulations on verification shall apply to all States Parties.

31. Civil production facilities in all States Parties to an FMCT should be placed under the current IAEA verification standard (INFCIRC/153 and also, preferably, INFCIRC/540) or equivalent regulations, using the advantages of “managed access” procedures. This could, at the same time, serve to detect any possible undeclared production of fissile material.

32. With regard to the implementation of the verification system, there are different alternatives:

(a) Increase technological capabilities, as well as human and financial resources of the Department of Safeguards of the IAEA;

(b) Create a new “FMCT safeguards department” in the IAEA;

(c) Development of a new international agency to verify the ban on production and disposal of fissile material, and decommissioning of associated facilities.

33. However, it should be acknowledged that states with comprehensive safeguards agreements (INFCIRC 153) and additional protocols (INFCIRC 540) in force would not

need to implement any additional FMCT measures, since they are already covered by such instruments. Other states producing fissile material would have to implement additional safeguards measures covering the stocks and production facilities of fissile material as defined by the Treaty, and declare production facilities. Additional procedures have to be developed in order to safeguard declared facilities, since facilities that are converted from military to civil production will impose particular verification challenges. Effective technical means of verification would also have to be found regarding HEU used for naval military purposes.

34. An FMCT verification regime would also demand verification of the absence of clandestine facilities. This implies that some verification tools might have to be further developed. Part of this work is already now performed by the IAEA. For these reasons, a “FMCT safeguards department” in the IAEA might be a cost-effective option for verification. Provided any necessary and appropriate adjustments to its mandate and resources are made, the IAEA appears well-suited to implement any verification mechanisms pertaining to an FMCT. It already offers a solid pool of highly specialized technical expertise with regard to safeguards and verification. At the same time, the FMCT's verification mechanism may also help to update the existing IAEA safeguards system.

35. Any specific additional verification system under FMCT should be funded by those states which require additional safeguards measures not included in existing agreements based on INFCIRC 153 and INFCIRC 540.
