

## **Verification of a Fissile Material Cut-off Treaty (FMCT): The Potential Role of the IAEA**

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### **1. Introduction**

The Group of Governmental Experts (GGE) meeting on a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices, so-called the Fissile Material Cut-off Treaty (FMCT), produced the final report in 2015. Discussions on the FMCT at the Conference on Disarmament (CD) has been in stalemate since the adoption of the United Nations General Assembly Resolution 48/7L “Prohibition of the production of fissile material for nuclear weapons or other nuclear explosive devices” in 1993. Hence, it is believed that the final report of the GGE meeting could be a momentum to resuscitate a stalled negotiation of the FMCT.

The objective of a future verification of a FMCT is to deter and detect non-compliance with treaty obligations in a timely and non-discriminatory manner with regard to banning the production of fissile material for nuclear weapons or other nuclear devices. Since the International Atomic Energy Agency (IAEA) has already established the IAEA safeguards as a verification system mainly for Non-Nuclear Weapon States (NNWSs), it is expected that the IAEA’s experience and expertise in this field will make a significant contribution to setting up a future treaty’s verification regime. This paper is designed to explore the potential role of the IAEA in verifying the future treaty by analyzing verification abilities of the Agency in terms of treaty verification and expected challenges. Furthermore, the concept of multilateral verification that could be facilitated by the IAEA will be examined as a measure of providing a credible assurance of compliance with a future treaty.

### **2. FMCT Verification**

The main objectives of verification are to gather and analyze information for the purpose of determining a state’s compliance with the treaty aimed at drawing credible, independent, and technically based conclusions. When it comes to the FMCT, verification activities include verifying declared fissile materials outside nuclear weapons program, transfer of nuclear materials removed from nuclear weapons program, and fissile material production for the non-weapon use. These verification activities are mostly conducted in Nuclear Weapon States (NWSs), hence NNWSs with

the Additional Protocol (AP) in force does not anticipate any additional verification obligations.

#### *2.1 Main Issues*

With respect to the scope of verification, some states support the idea of a focused approach that applies only to enrichment and reprocessing facilities and their downstream facilities. This approach places a high value on efficient and cost-effective verification. Others insist that verification activities cover critical nuclear fuel cycle, including power reactors and spent fuel. The inclusion of stockpiles of existing fissile material has also been controversial. However, recently the opinion starts to generally prevail that the objective of verification should be limited to the future production of fissile material while still remaining open the discussion on the extant stockpiles so as to advance the negotiations at the CD. As for verification toolbox, it is noted that existing verification methods, tools, and techniques should be taken into account such as non-routine inspections, including the special inspection of the IAEA and the challenge inspection of the Chemical Weapons Convention (CWC).

### **3. Role of the IAEA**

Efforts to reduce or eliminate fissile materials can be conducted by a single state’s own willingness, or within a bilateral or multilateral framework. Although this multilateral framework has factors for potential conflicts of interests between the haves of nuclear weapons and have-nots, multilateral verifications are likely to guarantee a high level of confidence and credibility. Based on this understanding, the IAEA has already functioned as a multilateral forum with its 168 member states. In addition, there is no doubt among states that a verification system for a new treaty should be resource-efficient and cost-effective to avoid unnecessary duplication of the existing verification mechanism.

In this sense, it is expected that the IAEA could play a pivotal role in establishing a verification mechanism for a new treaty. For instance, the key concepts of the IAEA safeguards such as significant quantity, detection time, and detection probability could be a good reference for the FMCT verification. Moreover, the IAEA’s existing verification methods, including the

nuclear material accountancy and control system could contribute to verifying the correctness and completeness of state declarations of fissile material production and associated facilities. The IAEA tools for detecting undeclared nuclear activities, including satellite imagery, environmental sampling, and open source intelligence could also be useful to verify the compliance with the treaty. Based on these considerations, the 2010 Review Conference of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) called on NWSs to put fissile materials that are no longer required for military purposes under the IAEA verification. Furthermore, the 2014 General Conference of the IAEA noted that the IAEA needs to be ready to provide assistance in verification activities under nuclear disarmament if it may be requested to conduct.

#### **4. Challenges**

Notwithstanding IAEA's potential ability to carry out verification activities for the FMCT, some challenges have emerged as practical discussions go on. First of all, verification process and procedure must not lead to revealing sensitive information related to national security, nuclear proliferation, and commercial proprietary. In particular, proliferation of sensitive information in relation to the designing or manufacturing nuclear weapons will cause catastrophic consequences. Second, due to this information barrier, it is a challenging work to attribute an object containing fissile materials presented by a state for verification without revealing information with classified characteristics. Thirds, the international community has insufficient information in verifying military fuel cycle facilities. The information gap about military nuclear program between NWSs and NNWSs could generate a tendency to rely on NWSs in the course of verification. Also, today NWSs are not under international obligations to maintain an accurate nuclear material accounting system. Hence, it is unlikely to believe that these states have maintained an accurate, complete, and accessible records of fissile material. This aspect could not only cause difficulties in setting the initial records, but also give rise to a disjunction of understanding of verification obligations along with the different verification culture between NWSs and NNWSs.

#### **5. Case Study – The Trilateral Initiative**

Despite these difficulties, the IAEA demonstrated its potential to play an important role in FMCT verification activities. The Trilateral Initiative as a joint project of the United States, the Russian Federation, and the IAEA was carried out from 1996 to 2002 in order to examine the feasibility of the IAEA to verify weapon-origin fissile materials that exceeded

military requirements, including fissile materials with classified characteristics. The Agency developed an approach to verify plutonium with classified characteristics without accessing to sensitive and proliferative information. The methods of this initiative are to make it sure that a submitted object with fissile materials not only has the same isotopic composition that is identical to plutonium used in nuclear weapons. The mass of plutonium in the object could also be examined by verifying whether the amount of plutonium exceeds a minimum amount stipulated for a facility where verification is carried out. Through this initiative, the IAEA proved its ability to verify fissile materials so as to provide assurance that fissile materials under verification are not re-diverted to military purposes.

#### **6. Conclusion**

It is conceivable that the FMCT negotiation is unlikely to be concluded in the very near future. However, there has been a common global understanding that production of fissile materials for the military purposes should be controlled and ultimately be banned to achieve a world without nuclear weapons. In this circumstance, it is necessary for the IAEA to be prepared for playing a leading role in FMCT verifications as a form of multilateral verification by taking advantage of its existing verification concepts, methods, and tools. Also, several challenges that the Agency faces today need to be overcome, including dealing with sensitive and proliferative information, attribution of fissile materials, lack of verification experience in military fuel cycle facilities, and different attitude and culture towards verification between NWSs and NNWSs. Capacity building also should be taken into consideration in terms of developing effective and efficient technical means to fulfill its mandate of verification given proliferation and national security concerns. These concerted efforts could contribute not only to increasing the credibility of the implementation of the FMCT, but also to facilitating nuclear disarmament dialogue between NWSs and NNWSs through multilateral frameworks.

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