

## **The FM(C)T: When and how to realize it?**

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### **Abstract**

Nearly three decades have passed since the treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices (Fissile Material (Cut-off) Treaty: FM(C)T) was first proposed. Although numerous proposals and suggestions have been made by many governments, institutions and experts, there has been no sign of a convergence of opinions toward the realization of the treaty. Meanwhile, the international situation has gradually but drastically changed. In January 2021, the Treaty on the Prohibition of Nuclear Weapons (TPNW) came into force, which accentuates the gap between the global desire for the ultimate elimination of nuclear weapons and the hard reality. The realization of an FM(C)T is becoming more urgent to provide a practical step in narrowing the gap and stabilizing the international community. The leadership of leading states is required and eagerly awaited.

Although various proposals for the realization of an FM(C)T were well summarized in the report by the high-level fissile material cut-off treaty expert preparatory group in 2018, it indicates that further effort is required in formulating proposals to bridge the existing gaps between various proposals based on the analysis of diverse opinions. This paper proposes to draw attention to the polysemy of the key term of an FM(C)T, namely “production” and presents a more consistent, robust, and effective way to interpret the term for making a breakthrough in the impasse in the discussion on this important matter.

### **1. Introduction**

Since the proposal by the then United States (U.S.) president, Bill Clinton, in 1993, the materialization of the fissile material cut-off treaty (FM(C)T) (hereafter “the treaty”) has been eagerly awaited. A variety of opinions and ideas have been advocated and they were well-summarized in the report of the high-level fissile material cut-off treaty (FMCT) expert preparatory group of the United Nations General Assembly in 2018 (UNGA A/73/159, hereafter “the expert report”). It remains, however, to present “a menu of potential treaty elements.” This paper aims to discuss what is needed to make a

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<sup>1</sup> This paper presents the personal views of the author and not the view of the Japan Atomic Energy Agency.

breakthrough in the impasse.

What is primarily required is an awareness of the urgency of actualizing the treaty, as well as the willingness to take action based on this awareness. The fact that the international community has discussed the treaty for nearly three decades shows the importance of the treaty and, at the same time, a lack of awareness of its urgency in global terms. During this period, the world has gradually but greatly changed. Should we keep on with a back-and-forth discussion for another decade in an increasingly volatile world? Greater responsibility to answer this question rests with the leading states, especially the nuclear-weapon states (hereafter “NWSs”) as defined in the Non-Proliferation Treaty (NPT).

In dealing with this chronic problem, what we require next are a diagnosis of the root causes of the current situation of the treaty and prescribing appropriate methods to overcome the problems. Many options presented in the expert report often conflict with each other. Therefore, it is necessary to devise a measure for sorting out the conflicting options and for integrating them into a pragmatic optimal solution.

This paper aims at accelerating discussions toward the realization of the treaty with a focus on the abovementioned points.

## **2. When to realize an FM(C)T?**

After the Cold War, since President Clinton presented the treaty in 1993, the world order surrounding nuclear weapons has changed greatly.

Following the restart of India’s nuclear testing in 1998, Pakistan and the Democratic People's Republic of Korea (DPRK) have developed their nuclear weapons, and the DPRK is still developing its nuclear force without being subject to International Atomic Energy Agency (IAEA) inspections. The revelation of the A. Q. Khan network has shown that a new form of proliferation of nuclear technology was progressing behind the scenes involving non-state actors. New types of complicated risks, which did not exist in the Cold War era, have emerged with such a proliferation of nuclear technology involving non-state actors in possible association with the activities of transnational terrorist groups like al-Qaeda and ISIL. The development of the global computer network increases the risk of irreversible proliferation of sensitive technologies, and the worldwide development of manufacturing capability lowers the technological barriers against the possible utilization of the proliferated technologies.

Parallely, with the rise of China far beyond expectations in 1993, the world order has become multi-polarized and more complicated compared with the situation in the Cold War era, in which the Great Powers, the U.S. and the Soviets, promoted arms control and reduction. The current global situation is increasingly volatile with conflicts in many parts of the world, including the border conflicts in Kashmir in 2019 between two states with

nuclear weapons, i.e., India and Pakistan, The outbreak of COVID-19 has further accelerated the disintegration of the international community. The growing mutual mistrust associated with this disintegration can destabilize global society and worsen the security risks.

Therefore, from a global perspective, developing an international framework serving as a brake against the increase in security risks coupled with the growing uncertainty induced by the disintegration is urgently needed. Here we must recall the historical fact that the Partial Test Ban Treaty and the NPT were concluded in 1963 and 1968, respectively, soon after the Cuban Crisis in 1962.

The NPT has been widely supported by the international community and has functioned effectively so far. The NPT is not, however, the perfect panacea. India, Pakistan, and Israel are not parties to the NPT and the international community has not effectively responded to the unilateral declaration of withdrawal made by the DPRK. Further, the sound functioning of the NPT requires that the NWSs should fulfill the obligation regarding nuclear disarmament in good faith.

As a practical mechanism to address nuclear non-proliferation and disarmament issues, the treaty has been long-awaited by the international community. The change of the global situation mentioned above is stressing the need for urgent realization of the treaty. While there is still no prospect of the realization of the treaty, the TPNW came into force in January 2021. No state would oppose the goal of the TPNW, realizing the world without nuclear weapons, but the attitudes toward the goal are diverse among states, reflecting the difference in their national security environment. The entry into force of the TPNW legally established an ethical norm toward the goal on the one hand, but it necessitates the early establishment of the measures to prevent the further disintegration of the international community exacerbated by the perspective differences toward the TPNW.

The exacerbated security environment has already been reflected in the nuclear arms control, such as the reverse change from the trend of reducing the upper limit of nuclear weapon stockpiles in the United Kingdom (UK). There is the risk of a further negative trend in terms of nuclear disarmament, resulting from further disintegration, international tension, and the arms race in feedback amplification. There is an urgent need to establish a multilateral brake system before accelerating such a negative spiral. There is no more time left. “*When must we realize the FM(C)T?*”—our answer to this question must be, “*As soon as we can.*”

The realization of the treaty depends heavily on the leadership of the states with a huge responsibility in securing world peace and stability, especially the permanent members of the Security Council. Their leadership in the international community with prompt and earnest efforts toward the treaty is eagerly anticipated.

### **3. How to realize the FM(C)T?**

#### **3.1 “Production”—shedding light on the keyword as an auxiliary line for the solution**

What, then, is needed to realize the treaty? To answer the question, we must analyze what has hindered the realization of the treaty. This makes us realize the fundamental problem is that there is no consensus about what the realization of the treaty actually means. It is extremely inefficient, if not completely meaningless, to discuss the approaches working together toward the goal before we share it.

What is “a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices”? What will we achieve with the treaty? This paper focuses on these fundamental questions. To address these questions, the target to be prohibited under the treaty, i.e., “the production of fissile material for nuclear weapons or other nuclear explosive devices” must be scrutinized. This is the critical issue considering the purpose and the scope of the treaty and the treaty’s key term with prime importance, “production,” at the same time.

Here, we propose to examine “fissile material for nuclear weapons or other nuclear explosive devices” (hereafter “FM for NWs/NEDs”) before considering the meaning of the term, “production.” The examination is carried out based on the presumption that “fissile material” is a certain subset of “nuclear material” as defined in IAEA safeguards agreements. Nobody would deny the validity of the presumption, and, later in this paper, this seemingly rough presumption will prove to be robust and sufficient.

Further, if it is possible to objectively determine certain material as FM for NWs/NEDs based on its physical properties, it would be limited to plutonium or highly enriched uranium in metal form with a special shape prepared for the components to be used in nuclear weapons or other nuclear explosive devices (hereafter “NWs/NEDs”), such as a fissile core or spark plug. On the other hand, it would be impossible to claim other material as FM for NWs/NEDs based on any objective standard. Here, we must note that other nuclear material with similar physical properties is used for civil or military applications for non-explosive purposes and that the preparation process of such material has a lot in common with that of FM for NWs/NEDs. This is why nuclear material for peaceful purposes is subject to IAEA safeguards considering the possibility of diverting such material into weapons use.

In conclusion, unless we determine FM for NWs/NEDs as very limited nuclear material designed and prepared especially for NWs/NEDs, only the entity that can decide the use of a certain material can determine whether the material is FM for NWs/NEDs or not. In other words, the determination of FM for NWs/NEDs depends on the subjective judgement of the entity and not on any objective standard.

Based on the above consideration, we next examine “the production of FM for

NWs/NEDs.” The next focus is the meaning of the key term of the treaty, “production.” To establish a solid basis for actualizing the treaty, it is necessary to analyze the effect of the polysemy of this fundamental term in the title of the treaty.

In the expert report, “fissile material production” is defined as “any activity that produces fissile material,” and specific definitions are focused on enrichment and reprocessing activities. Furthermore, a “fissile material production facility” is defined as “any facility that is capable of producing fissile material.” These statements indicate that the term “production” means a certain processing with a resultant change in physical properties of target materials.

Here, it would be worthwhile to review the meaning of the term from a more general perspective, and it would be a valid approach to refer to dictionaries as the basis for multilateral discussion for that purpose. According to some dictionaries, the term “production” has meanings of “the process of making something” and “the process of growing something.”<sup>1</sup> The above definitions in the expert report and other expressions such as “future production” and “past production” are supposed to be based on the meaning of “the process of making something” with a focus on the change of physical properties of target materials.

If we use the term “production” following the meaning of “the process of making something” throughout the treaty, we will end up giving up either its effectiveness or its solid grounds. The reasons are as follows. First, let us assume the case that the term “FM for NWs/NEDs” is used exclusively to mean nuclear material that can be used in NWs/NEDs as their components or something like that. Under this condition, nuclear materials in prior process stages are not considered to be “FM for NWs/NEDs” (hereafter “non-FM for NWs/NEDs”). In this case, “the production of FM for NWs/NEDs” means the very last process in which “non-FM for NWs/NEDs” is converted into “NM for NWs/NEDs.” Then, “banning the production of fissile material for nuclear weapons or other nuclear explosive devices” means to prohibit only the last process stages of making FM for NWs/NEDs. Such a move would completely legitimize any conduct in the prior preparation process stages. This would seriously restrict the effectiveness of the treaty. Next, let us assume the alternative case that nuclear materials in prior preparation process stages can also be regarded as FM for NWs/NEDs. As discussed previously, the judgement whether such materials are FM for NWs/NEDs or not depends on the intention of the entity that can determine their usage. Moreover, it is impossible to define a boundary in a series of preparation process stages toward the components in NWs/NEDs based on any objective standard. Under this condition, it is impossible to determine what “the production of FM for NWs/NEDs” means based on any objective grounds.

Then, let us examine the case that the term “production” used in the context of “the production of FM for NWs/NEDs” is interpreted in line with the alternative meaning, “the

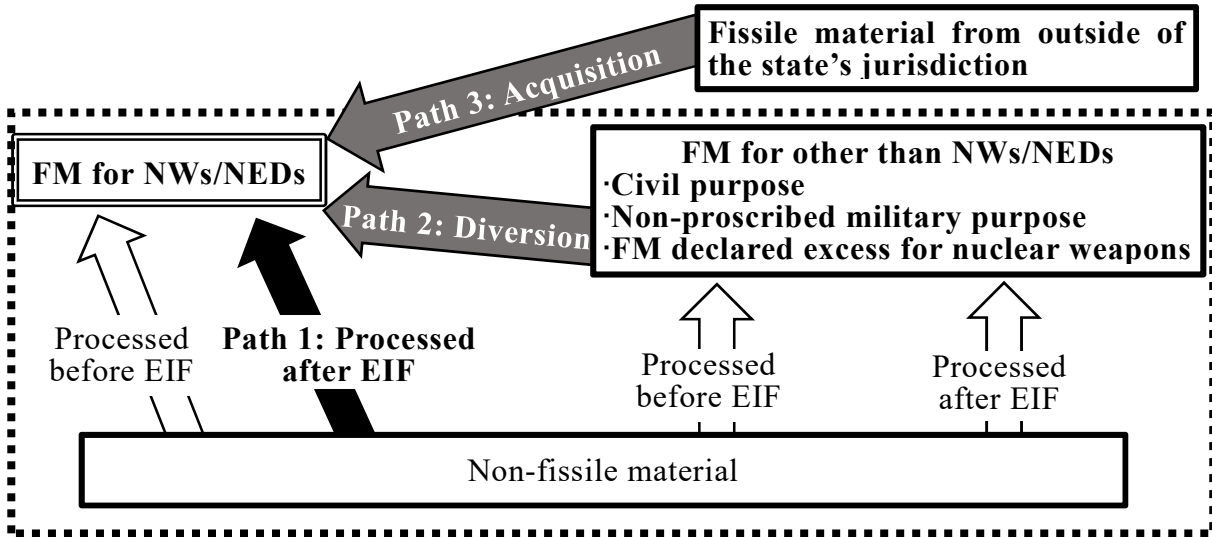
process of growing something. In this case, “the production of FM for NWs/NEDs” is equivalent to “the process of growing FM for NWs/NEDs.” For “growing FM for NWs/NEDs” in a state, the following three pathways can be considered. Here, attention must be paid to the fact that all of the conduct in these pathways occur only after the entry-into-force (hereafter “EIF”) of the treaty in the state, and any conduct before the EIF of the treaty in the State is not subject to the prohibition to the treaty.

**Path 1:** Process non-fissile material into fissile material to make “FM for NWs/NEDs” in the state

**Path 2:** Divert fissile material for purposes other than nuclear weapons or other nuclear explosive devices (hereafter “FM for other than NWs/NEDs”) to FM for NWs/NEDs in the state

**Path 3:** Designate fissile material acquired from another state as FM for NWs/NEDs in the state

These pathways can be illustrated as Figure 1 below.



**Figure 1. The Treaty's Scope: What are to be prohibited?**

If the term “production” is limited to “the process of making something, it does not cover Paths 2 and 3, whereas it does include Path 1. If the term means “the process of growing something,” it does include Paths 2 and 3 as well as Path 1. Because the diversion to and the designation as FM for NWs/NEDs depend on the intention of the state, the inclusion of Paths 2 and 3 in the meaning of “production” is compatible with the nature that FM for NWs/NEDs can be determined by the entity that can decide on the usage of the subject material. This broader approach to encompass all the three pathways is more consistent, robust, and free from the problems caused by adopting the narrower approach that include only Path 1. Therefore, the adoption of the broader approach is expected to

bring a breakthrough for the lasting problems of the treaty.

### **3.2 Validation**

The new, broader approach probably may look unfamiliar to many stakeholders and might be subject to criticism from the viewpoint of effectiveness. To address these points, it would be meaningful to validate the compatibility with previous discussions and the effectiveness of the new approach.

#### **(1) Compatibility with previous discussions**

The view to encompass Paths 2 and 3, as well as Path 1 within the meaning of the term “production” has existed since the very early stage of the discussion on the treaty. This is reflected in the statement made in the Shannon report (CD/1299), the foundation of the consensus on the treaty<sup>2</sup>. Such views have been expressed repeatedly by many non-nuclear weapon-state parties of the NPT (hereafter “NNWSs”)<sup>3</sup>. Further, among the states with nuclear weapons (hereafter “SNNWs”), Pakistan has a similar view<sup>4</sup>, and the U.S. and the UK have expressed their recognition that covering existing stocks of fissile material under the treaty is a legitimate issue for discussion<sup>5</sup>. This evidence clearly illustrates that the essence of the broader approach to include Paths 2 and 3 in the Treaty’s scope has been presented and recognized in the discussion on the treaty.

Although our proposal in this paper is to interpret the term “production” in “the production of FM for NWS/NEDs” in the meaning of “the process of growing something,” we are not insisting that the term “production” should be used in that meaning throughout the treaty. Rather, it may be better to use the term “production” in the meaning of “the process of making something” throughout the treaty consistently. In that case, however, the meaning that has been described by “the production of FM for NWS/NEDs” must be rephrased by supplementing the meaning with appropriate words, such as “diversion” and “acquisition” besides “production.”

#### **(2) Advantage of the Broader Approach**

To confirm the validity of the broader approach further, it would be meaningful to examine its advantage over the narrower approach. This examination starts with the narrower approach with the prohibition of only Path 1 in a strict sense. In this case, under the condition that it is legitimate to use nuclear material for civil purposes and non-proscribed military purposes, state parties to the treaty with nuclear weapons can increase NWS/NEDs by as many as they want by diverting nuclear material for civil or non-proscribed military purposes to FM for NWS/NEDs. As Path 2 is not prohibited, such conduct is completely legitimate. Adopting the narrower approach with the full awareness of its apparent defect results in the deliberate creation of legitimate loopholes in the treaty’s system.

The shortcomings of the above option may have been recognized already. A variant of the narrower approach to address the above problem to some extent is to prohibit Path

2 partially in addition to Path 1. In the discussions on the treaty's verification system, the U.S. and UK have mentioned the diversion of fissile material for nuclear weapons and other nuclear explosive devices as well as downstream use of fissile material<sup>6</sup>. These statements are clear evidence that these states are aware of the need to address Path 2 under the treaty in some way. At the same time, with the clear exception of Pakistan, most of the SNNWs are reluctant or have opposed including "existing stocks" under the treaty's coverage, while agreeing to place "future production" under its coverage<sup>7</sup>. This may be interpreted in such a way that the diversion of fissile material processed only after the EIF of the treaty in the state is to be prohibited. This means that it is completely legitimate to divert nuclear material to FM for NWs/NEDs as far as it was processed before the EIF of the treaty in the state. Under this condition, whether the diversion of nuclear material for civil or non-proscribed military purposes to FM for NWs/NEDs is legitimate or not depends on the history of the nuclear material whether it was processed before or after the EIF. Such a complicated legal setting requires a correspondingly complicated verification scheme and nuclear material control system. With the recognition that stocks of extant fissile material would be unaffected by the treaty, the U.S. once concluded that it would not be possible to achieve adequate confidence in the verification of the treaty with reference to technical uncertainties as the production date of fissile material cannot always be determined<sup>8</sup>. This variant approach would lead to another impasse.

With the above considerations, it can be pointed out that the narrower approach is likely to lead to various serious practical problems, although it may appear simple and easy and has been advocated as such. Furthermore, it is recognized that a large stock of fissile material declared excess for weapons use or designated as fuel for propulsion of military vessels exist in SNNWs, especially the U.S. and Russia. In any of the above cases, manufacturing nuclear weapons using such material through Paths 2 or 3 will not be prohibited under the treaty. Regarding the prohibition of Path 1, four NWSs except China have already voluntarily declared moratoria, and China is deemed to have substantially been in the same situation without such a de facto declaration. Under the circumstances, it is questionable whether establishing a system only with the prohibition of Path 1 and dedicated verification just to confirm the status quo is worth the entire efforts of the international community.

In contrast to the shortcomings associated with the narrower approach, the broader approach is expected to bring the following merits.

- The broader approach can plug the legal abovementioned loopholes and, thus, prevent the increase of nuclear weapons effectively and practicably.
- As the broader approach covers all plausible acquisition paths, the treaty's verification scheme would be similar to the scheme of IAEA comprehensive safeguards applied to NNWSs. This would ideally fulfill the requirement that the



treaty should be non-discriminatory and effectively verifiable. The SWNWs' positive support for the broader approach would surely alleviate the feeling of unfairness of NNWSs toward SWNWs and help strengthen the NPT scheme and the ethical positions of NWSs in the negotiations to address other global nuclear issues.

- The broader approach is basically consistent with the points asserted by Pakistan. If Pakistan accedes to the treaty, it would be a significant step forward to strengthen the international regime of nuclear non-proliferation and disarmament by complementing the NPT scheme substantially.
- The broader approach will be able to provide more credible assurance that the quantity of nuclear weapons is not increasing in SWNWs. Increased transparency will help build confidence among the SWNWs, facilitate nuclear arms control, and enable those states to allocate their precious resources to more constructive purposes.

### (3) Disadvantages of the Broader Approach

For balanced consideration, it would be fair to examine the demerits of the broader approach as well. In doing so, the SWNWs' opinions are crucially important because only the SWNWs strongly advocate that the treaty's scope should cover only "future production." However, very limited reasons have been provided to support their arguments. The SWNWs may have concerns over the verification scheme based on the broader approach from the viewpoints of the possible influence on their national security and verification costs. For the realization of the treaty, it is important to address their concerns, but these elements will be examined in another paper due to space constraints. Here, we would like to point out that the costs of verification under the broader approach can be reasonable if the scheme is properly designed considering its effectiveness and efficiency, while, as indicated above, the verification scheme using the narrower approach can be complex and costly. Moreover, it is extremely important to compare the verification costs from the overall viewpoint, not as the costs alone but as the combination of the costs with the benefits altogether.

## 4. Conclusion

This paper examined the urgency to actualize the treaty and the interpretation of the term "production" to make a breakthrough in the impasse of the discussion on the treaty.

First, it is a matter of urgency to actualize the treaty, considering the increasingly volatile international situation together with the signs of retrogression of nuclear disarmament. In particular, as the EIF of the TPNW has the potential to negatively impact the integration of the international community, it is of prime importance that the leading states, especially NWSs, make sincere efforts toward the early realization of the treaty.

Second, our proposal in this paper for making a breakthrough in the impasse of the

discussion is to interpret the meaning of “the production of FM for NWs/NEDs” as “the process of growing FM for NWs/NEDs” by encompassing the diversion of FM from other purposes and the acquisition of FM from other states as well. This broader approach surely has its roots in the previous consultations and will bear fruit for the international community as a whole.

The measures for actualizing the treaty discussed in this paper will be examined further in more detail and more comprehensively in another paper.

## 5. Acknowledgements

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<sup>1</sup> For example, the definitions of the term, “production” are provided as follows: “the process of making or growing goods to be sold, or the amount of goods made or grown”:(Cambridge Academic Content Dictionary: US), “the process of growing or making food, goods or materials, especially large quantities” (Oxford Learner’s Dictionary),

<sup>2</sup> CD/1299, “Other delegations were of the view that the mandate would permit consideration not only of future but also of past production.”

<sup>3</sup> For example, United Nations General Assembly Report of the Secretary-General A/68/154, A/68/154/Add.1, A/71/140/Rev.1, A/71/140/Rev.1/Add.1

<sup>4</sup> United Nations General Assembly Report of the Secretary-General A/68/154, A/71/140/Rev.1/Add.1

<sup>5</sup> Foreign & Commonwealth Office “Fissile Material Cut-off Treaty” 16 May 2013, “Fissile Material Cutoff Treaty: Views of the United States of America, pursuant to UNGAR 67/53 (2012)”

<sup>6</sup> *ibid*

<sup>7</sup> *Ibid*, United Nations General Assembly Report of the Secretary-General A/68/154, A/71/140/Rev.1

<sup>8</sup> US Department of State Archive “The United States and the Fissile Material Cutoff Treaty”, March 17, 2007 <https://2001-2009.state.gov/t/isn/rls/other/81950.htm>