

# CHINA AND A FISSILE MATERIAL CUTOFF TREATY\*

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## ABSTRACT

In this paper, I will explore China's possible position in upcoming FMCT negotiations, China's major security concerns, the kind of verification provisions that could be accepted by China, and the factors that might facilitate China's participation in the treaty.

## 1. INTRODUCTION

A universal fissile material cutoff treaty (FMCT) has long been seen as a key building block in nuclear disarmament and nonproliferation. Proposals to achieve a fissile material cut-off agreement can be dated to the mid-1950s. In 1993 the United Nations General Assembly adopted a resolution calling for the negotiation of a nondiscriminatory, multilateral, and internationally and effectively verifiable treaty banning the production of fissile materials for nuclear weapons or other nuclear explosive devices.<sup>1</sup> In March 1995, the CD decided to adopt Ambassador Shannon's report and to establish an ad hoc committee to begin negotiations on an FMCT. In May 1995 at the NPT extension conference, the Parties adopted a principles and objectives document that called for the "immediate commencement and early conclusion" of FMCT negotiations. After several years delay caused by debates over scope and linkage to nuclear disarmament measures, the CD agreed on 11 August 1998 to convene an *Ad Hoc* Committee to negotiate an FMCT. However, the negotiations quickly ended when the CD failed to agree on renewing the Committee's mandate. The 2000 review conference for the NPT called for FMCT negotiations to start immediately and to be completed in five years. However, until now, the CD remains deadlocked over the resumption of negotiations, due to the linkage between FMCT and Prevention of an Arms Race in Outer Space (PAROS).

A primary goal of an FMCT will be to attain the signatures of the five declared nuclear weapon states and three de facto nuclear weapon states (India, Pakistan, and Israel). In practice, the FMCT does not impact much on the US and Russian stockpiles. Because of their huge size, they do not need additional fissile material. One major incentive for the declared nuclear powers to join the treaty is to draw the participation of the three de-facto weapons states. China's participation in an FMCT will be critical to its success, however. Without China's participation in the FMCT, India will not sign it and Pakistan will not sign unless India does. Both South Asian countries and Israel are believed to be continuing to produce fissile materials for their stockpiles. China is believed to have stopped the production of both HEU and Plutonium for weapons since the early 1990s. China announced its support for the FMCT negotiation from the beginning. On October 4, 1994, Chinese Foreign Minister Qian and U.S. Secretary of State Christopher issued a joint statement in which they promoted the "earliest possible achievement" of a treaty prohibiting the production

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of fissile material for use in nuclear weapons. However, because of its concerns about U.S. missile defense and “space control” plans, which would lead to weaponization of outer space and stimulate a costly and destabilizing arms race, recently China clearly expressed that the PAROS is a realistic and urgent issue. China firmly holds that the CD should start concurrently negotiating both FMCT and PAROS. However, the US opposes negotiations on the outer space issue while pressing for the immediate negotiation of an FMCT. This disagreement between China and the US over FMCT and PAROS negotiations, has already prevented the CD from continuing any arms control negotiations. To advance these talks, it is therefore necessary to analyze the factors that may influence China’s position.

## **2. CHINA’S MAJOR SECURITY CONCERNS**

China’s interest in an FMCT will depend on whether it judges its existing fissile material stockpile to be adequate for its future weapon needs, which would depend on its future nuclear policy and others countries’ military and nuclear weapon programmes. It is reported that China stopped HEU production in 1987 and plutonium production in 1991. Some estimates suggest that China’s stockpile could contain about three tones of weapon-grade HEU and one tonne of separated plutonium.<sup>2</sup> China’s nuclear arsenal is thought to include approximately 300 strategic warheads and might have as many as 150 undeployed battlefield warheads.<sup>3</sup> Thus, the stock of fissile materials already produced are more than sufficient for China’s current nuclear arsenal and a very moderate further build-up. However, China’s need for additional fissile material and nuclear weapons would be affected by the future international security environment. China has developed a very limited nuclear force for self-defense and has kept a minimum deterrence nuclear policy. To this end, on the very first day when China exploded its nuclear device, it declared a no-first-use nuclear policy. Now China’s security concern is how to maintain an effective nuclear deterrence in the changing international security environment. Thus, the following major security concerns would affect China’s attitude toward the FMCT negotiation.

China is expressing a serious concern on US missile defense plans. China is concerned that it would be one target of US missile defense: even the limited system would neutralize the two dozen single-warhead ICBMs that are capable of reaching the United States and that China now possesses. Thus, China worries that a US missile defense system could politically or strategically subject China to nuclear blackmail. Such a system would give the United States much more freedom to intervene in China’s affairs including undermining China’s efforts at reunification with Taiwan. This concern is enhanced by US cooperative research and development of advanced TMD with Japan and potentially Taiwan, and agreements with Japan to cooperate in defending areas surrounding Japan, possibly including Taiwan. The recently released reports of the US “Nuclear Posture Review”, in which the Bush administration has reportedly directed the military to prepare contingency plans to use nuclear weapons against at least seven countries including China, further increases China’s concerns.

China’s other major security concern is the weaponization of outer space. China has concerns that US missile defense plans will inevitably intensify competition in outer space. To develop strategic missile defense systems, the US would have to develop and use its military assets in outer space and deploy space-based missile defense components which will function as a space weapon system. And the missile defense system itself could be used as anti-satellite weapons (ASAT). Meanwhile, such a missile defense system will encourage other countries to deploy ASAT weapons. Thus, it will initiate a new arms race in outer space. China has further concerns about any US program of "Space Control" and concerns that the US missile defense plans would be one part of the pursuit of space control. U.S. military planning documents issued in recent years explicitly reveal it wants to "control the space" and establish superiority over the world.<sup>4</sup>The “space control” plan would require the development, testing, and deployment of ASATS based in space or on earth. The arms race of ASAT weapons would make the peaceful use of outer space much more dangerous,

such as the vital communication, navigation, environmental monitoring satellites would be countered. The development of the space control program would raise the risk of turning outer space into a battlefield. China is further concerned that the US space dominance program will offer the US absolute military superiority and be used to intervene in China's affairs.

China is also concerned about that US missile defense and space weaponization plans would degrade China's security environment. The US missile defense plans and the US withdrawal from the ABM treaty will end further reductions in the nuclear arsenals of the United States and Russia than otherwise. Thus, the huge gap between China's nuclear arsenal and those of the United States and Russia will remain. China is not willing to see the huge "strategic missile gap" between its arsenal and those of both leading nuclear powers, which pose a major threat to China's small nuclear arsenal, continue to grow. Eventually, failure to proceed with the nuclear disarmament process that the nuclear weapon states have committed to under the NPT would damage the nuclear non-proliferation regime. China wishes to focus on its economic development. It needs a stable international security environment to do so.

The above security concerns affect China's willingness to participate in FMCT negotiations. Historically, the sole purpose for China to build and develop its nuclear weapons was to guard itself against a nuclear threat and blackmail. If its "legitimate security concerns" are ignored, China would develop responses to neutralize such threat. To retain its nuclear deterrent capability, China's direct response to the U.S. missile defense and space weaponization plans could be to build up more warheads and its missiles would be deployed with decoys and other effective countermeasures. China is already reportedly engaged in a nuclear modernization program to field less vulnerable mobile and solid-fueled missiles. But it has been expected that such a program will be at a slow pace and modest in size. The existing HEU and plutonium stockpile would be big enough for its modernization program under the case of non-deployment of missile defense. However, while facing a planned U.S missile defense system, China could be driven to expand its ICBM arsenal about tenfold. China would be used up its existing fissile material stockpile for the many more missiles needed to penetrate the U.S. missile defense system. Thus, China might find it necessary to produce more fissile material for its stockpile. China might then well restart production and refuse to join a global fissile material cutoff treaty. This might explain why China has linked the FMCT negotiation with talks on agreements to prevent an arms race in outer space - which would include limiting US missile defense plans.

### **3. FMCT VERIFICATION**

One focus in negotiating the FMCT will be verification. Under an FMCT verification, China's sensitive nuclear facilities and sites would be accessed by the first time for international inspections. The verification measures adopted could affect China's willingness to sign the convention. China's position on the FMCT is that the treaty should only ban the future production of fissile material for nuclear weapons or other nuclear explosive devices, and should not touch upon the existing stockpiles.<sup>5</sup> The treaty would ban the production of fissile material for nuclear weapons or other nuclear explosive devices. It would prohibit the diversion of fissile material produced for other purposes to nuclear weapons or other nuclear explosive devices. The verification regime of the treaty should comply with the above-mentioned basic obligations for just and effective verification. And the treaty should not undermine the legitimate security interest of the State Parties.

The scope of verification will depend on the facilities and activities subject to an FMCT. It is necessary define clearly the scope of verification. Such discussion has centered on the focused verification and wide verification approaches. Focused verification would concentrate on only sensitive fissile material production facilities, i.e., reprocessing and enrichment facilities, and fissile materials produced after an FMCT enters into force along with the facilities where these materials are present. A wide-scope approach would further

cover a variety of less sensitive civil facilities such as fuel fabrication plants and civilian power reactors. For China, the wide-scope approach could pose some problems. For example, China is believed to use LEU fuel for its submarine reactors. The naval LEU fuel is fabricated at Baotou Nuclear Fuel Component Complex.<sup>6</sup> Under the wide verification, those LEU fuels would be required a quantitative account, which could be sensitive for China. However, under the focused approach, such a facility would not be safeguarded. It is believed that a focused approach is technically adequate and cost-effective for the FMCT.<sup>7</sup> It is most likely to be acceptable by the nuclear states.

Under an FMCT, China's previous military nuclear facilities and some civilian facilities would require verification. The basic FMCT verification measures will include: safeguards at declared facilities similar to those administered by the IAEA; non-routine inspections involving managed access; environmental monitoring, and remote sensing involving satellite imagery. Appropriated techniques would be developed for each specific facility taking account of its status, such as whether it is under construction, closed-down, decommissioned, or operating. For facilities used only for civil purposes, such as the civilian reprocessing plants and gas centrifuge enrichment plants (CEPs), China would have no objections to IAEA-type safeguards. However, for past military facilities, China would have some concerns about the disclosure of sensitive information. As a nuclear state, China would expect that the FMCT verification system for those former military facilities in the eight target states would have to be different from the IAEA safeguards for NNWS. An FMCT is likely to permit the eight nuclear nations to hold of undeclared stockpiles (from past production) and to use or process already produced fissile material for sensitive military activities including the assembly of nuclear weapons. These allowed sensitive production facilities and activities could be collocated with facilities requiring verification. Thus, like other target states, China could worry about potential loss of sensitive information at those defense-related nuclear processing sites. Also some nuclear facilities could be not established following the requirement of IAEA safeguards, so their military classified levels and their political tolerability might be lower. Consequently, some IAEA safeguards measures, which can be accepted by the NNWS, might be seen as too intrusive and not be permitted by the eight target states. Thus, less intrusive verification would be preferable. In the followings, as case studies, I will demonstrate what verification measures might be applied and accepted to China's enrichment and reprocessing plants.

**Gaseous diffusion plants.** China began producing HEU in 1963 at a gaseous diffusion plant (GDP) located near Lanzhou and, in the mid-1970s, started production at a second GDP in Heping.<sup>8</sup> It has been reported that both GDPs stopped HEU production in 1987 and that the Chinese government is preparing to decommission a number of military nuclear material processing facilities, including the Lanzhou GDP.<sup>9</sup> The Heping GDP may also be shut down, as China is building enough CEP capacity to supply its LEU needs. This CEP capacity, which is being built for China by Russia, is to be under IAEA safeguards. Under the FMCT, it is required to verify the shutdown status of both GDPs. Here I will take Lanzhou GDP as a case study.

The Lanzhou GDP is located on the bank of the Yellow River near Lanzhou in Gansu Province. Published estimates put its initial capacity at 10-50,000 kg-SWU per year – these later increased to about 300,000.<sup>10</sup> A declassified Corona satellite image of the Lanzhou GDP taken on 31 March 1971 shows clearly the infrastructure of the site,<sup>11</sup> including the enrichment building; a mechanical cooling tower used to discharge waste heat from the enrichment processing; and coal-fired steam plant used to provide heat or electricity for the GDP. One telltale signature of the GDP operation should be the water-vapor plume coming from the cooling tower. This plume will be easy to detect with 1m-resolution satellite images. Another important signature of the GDP operating would be the hot roof of the enrichment buildings. The elevated temperature of the roofs would be detectable using commercial satellites (such as Landsat-7) thermal infrared images. In short, the shutdown status of Lanzhou GDP could be monitored effectively using satellite images at visible band and thermal infrared band.<sup>12</sup> This approach would be the least intrusive. It is expected this approach could be applied to the case of Heping GDP as well. Such remote sensing method should be easily accepted by China.

To further confirm the shutdown status of the GDP, some on-site inspections should be allowed. These include 1) site visual observation, such as no treatment of cooling water, no electrical service for the enrichments, not hot and not noisy inside the enrichment building. 2) continuous surveillance monitor and tamper-proof seal, such as, sealing the high-voltage disconnect switches; sealing the valves on the supply and return headers of the Recirculating Cooling Water system; sealing the inlet and outlet block valves for the cascade piping; putting vibration and or/temperature sensors on the process equipment. These verification measures would be effective for monitoring the shutdown status of the GDP and would pose less security concerns. One concern on such a site would be the diffusion barrier technology information that most countries consider an industrial secret. However, this would be easily protected by preventing measures.

Finally, China's non-weapon HEU requirements are likely to be very small, which means China is unlikely to resume its GDPs to production HEU. Its nuclear -power submarines are reported to be fueled with LEU which might be provided by its CEPs. Under a focused verification approach, the LEU for the naval reactors need not be quantitatively declared, and should provide less concerns on its naval reactor fuel. Furthermore, at Baotao's Tritium production reactor , some HEU might be used for the production of Tritium to offset the decay of Tritium in its current warheads. However, it is estimated that such a tritium production reactor only needs some tens of kilograms HEU annually,<sup>13</sup> which might be provided from its HEU stocks.

**Reprocessing plants.** China's first plutonium production complex, Jiuquan Atomic Energy Complex, began plutonium production since the late 1960s. This complex also houses facilities for manufacturing HEU and Plutonium and assembling weapons. Since the mid 1970s, China built a second plutonium production complex at Guangyuan as part of China's duplicate Third Line of nuclear weapon manufacturing facilities.<sup>14</sup> It is the site of a larger plutonium production reactor and reprocessing plant. Both plutonium production complexes could be shut down in 1991. It can be expected that under an FMCT, both complexes would be keep their shutdown status.

Under an FMCT, it is necessary to confirm the shut-down or decommission status of the reprocessing plant. With satellite monitoring, the most likely observable characteristics would be the activity level. When operating, there will be many shipments of various forms of nuclear material at the site. For these activities, transport vehicles, such as trucks, should be big enough to be detected by 1m resolution images from satellites.<sup>15</sup> Other preferred off-site verification could include: off-site monitoring of nuclear and chemical effluents such as krypton-85. However, some kinds of on-site inspections will be required to verify that the reprocessing plant is shutdown. While inspectors conduct on-site visits and inspect the site, China could have some concerns about the possible disclosure of its sensitive nuclear information. Thus, it is necessary to explore what on-site inspections China would accept for the sites. These would ensure effective on-site inspections and sampling measures without compromising the national security interest.

To monitor the status of a reprocessing plant, the most effective verification would be site environmental sampling.<sup>16</sup> The samples could be taken from gloveboxes in the plutonium product processing sectors, which could allow a determination of the burn-up of the spent fuel, plutonium isotopic composition, and the time since separation of the plutonium. Another effective approach to detect undeclared reprocessing activities would be for inspectors to take samples from HLW tanks or the areas contaminated by HLW, which would for recent plutonium production activities, determine the important quantities--the burn-up of spent fuel, plutonium isotopic composition ,the irradiation time and discharge time to reasonable accuracy through measurements of ratios of fission product and actinide isotopic ratios. This will help confirm the status of the plant.

At the same time, China may worry that on-site sampling analysis could disclose sensitive information about their past plutonium production activities, such as the power level at which production reactors had operated and how much plutonium they had produced, data that will probably not have to be declared under an FMCT. However, sampling at the reprocessing facilities would not reveal such sensitive information as long as inspectors are not able to measure total quantities of Cs-137 and Sr-90 from HLW produced at former military plutonium production facilities. Sampling methods can therefore serve as an effective and militarily non-intrusive measure for verification of an FMCT. It should be noted that it is not clear whether China, as Russia does, would take the plutonium isotopic composition as sensitive information (here we assume it should not be). If so, the sampling analysis would be restricted to appropriate level. Other on-site inspections at the reprocessing site would also be allowed, such as visual observation to show there are no activities at the spent fuel cask portal.

One major concern about the on-site verification of Jiuquan and Guangyuan complex could be the issue of collocated facilities. Under the FMCT, the nuclear-weapons-related activities at the complexes including the fabrication of weapons components and the final assembly of weapons should be permitted and continued. Some sensitive information, e.g., chemical composition information from these activities, might be divulged through sampling and analysis around the facilities. Therefore, it is necessary to explore whether conducting on-site sampling around reprocessing facilities could also get such sensitive information, which might depend on how far away such information is detectable from the sensitive manufacturing facilities and how close such facilities to the reprocessing plant. For such collocated sites, a managed access approach should be applied.

Finally, FMCT verification regime would have to be designed to detect undeclared nuclear facilities, such as reprocessing or enrichment facilities. Such verification measures could include non-routine inspections including challenge inspection. However, learning from the lesson of the event of Silver River Ship, China will be unwilling to see the abuse of such kind of inspections at its sensitive and non-proscribed military and nuclear activities. To protect its national security sensitivities, it is essential to have an appropriately managed access mechanism. For example, for most cases of managed access situations, sampling around the site, without access to the inner sectors of the buildings or the appropriated control security fences, would be sufficient. However, in some locations including the fissile material manufacturing facilities, measures would have to taken to prevent overt or covert sampling. In some cases where it will be essential for inspectors to have access areas with classified activities, appropriated measures would have to employed to protect sensitive information. For example, at the nuclear weapons assembly facility, the sensitive information -- weapons component, or process machinery that provided design information-- might be vulnerable to the visual access. Thus it had to take measures including shrouding and masking of sensitive equipments or other obvious method to prevent the visual access. In short, under the FMCT, appropriated verification measures would be able to verify China's reprocessing and enrichment facilities without compromising national sensitive information.

#### **4. CONCLUSIONS AND DISCUSSIONS**

China has serious concerns on US missile defense and "space control" plans. Such plans would not be in China's security interest. If its "legitimate security concerns" are ignored, China would develop responses to neutralize such threats. To retain its nuclear deterrent capability, as a direct response to these events, China would need more warheads than otherwise. Thus, China would need more fissile material to fuel those weapons, which would inevitably affect China's willingness to join a fissile material cutoff treaty. Also China would prefer to a just and effective FMCT verification without undermining its legitimate security interest. Appropriate verification techniques should be acceptable to China's nuclear facilities without compromising its national sensitive information. However, China would concern much on its international

security environment. China holds that the purposes and objectives of arms control and disarmament “ should serve to enhance the security of all countries; it should not become a tool for stronger nations to control weaker ones, still less should it be an instrument for a handful of countries to optimize their armament in order to seek unilateral security superiority.”<sup>17</sup> China is against any country seeking its own security at the cost of others. However, the ending of the ABM treaty, U.S. missile defense plans, along with other developments including the rejection of the CTBT, all run counter the purposes and objectives of arms control and disarmament. If Chinese security concerns are not considered by other countries, and its security status quo is worsened by other countries’ military and weapons programmes, China’s leaders would doubt the value of arms control and disarmament and would reconsider its participation in multilateral nuclear arms control treaties.

To facilitate China’s participation in the FMCT treaty, and to break the current standstill of the arms control and disarmament process, the major nuclear powers should take some measures (although they are not necessarily a precondition to the FMCT negotiation).

- Without the ABM Treaty and with the development of missile defense, outer space risks being weaponized. Although there is at present no arms race in space, it is necessary to take some measures to prevent the weaponization of outer space, before there is active conflict or even an approach to conflict in space. Since the prevention of the weaponization of and an arms race in outer space is becoming an urgent issue, the CD should start to negotiate a treaty on the prevention of an arms race in outer space [PAROS] early. The treaty should prohibit the testing, deployment and use of any weapon systems and their components in outer space. While US missile defense plans would not be stopped as the Chinese hope, the policy maker should take Chinese concerns seriously, such as taking measures to ensure China that the system will not target China, as some US official had promised. Also if the US-Japan joint TMD plan can exclude Taiwan, it would greatly reduce China’s concern on the regional security issue.
- The U.S. and Russia should reduce their huge nuclear arsenals in a verifiable and irreversible manner through legally-binding instruments. Even with the conclusion of their current reduction pledge to reduce the deployed strategic nuclear arsenal to around 2000 warheads over the next 10 years, the US and Russia would still keep a huge total inventory of nuclear weapons. Thus, the US and Russia should take a lead and commitment to make further substantial reductions of their respective nuclear arsenals. The reduced nuclear warheads and explosives should be dismantled and disposed in a verifiable way, and not be used again as weapons in any form. Also, the U.S. and Russia should make more significant commitments to irreversible reduction of their fissile material stockpiles including fissile material from warheads withdrawn under the deep cut agreements. In fact, without significant reduction of their stockpile, the FMCT would have little limitation to the U.S. and Russia’s nuclear arsenals.
- The nuclear-weapon states should, at an early date and in a legally binding format, unconditionally undertake a no-first-use nuclear policy. A no-first use policy would be an important measure to strengthen the non-proliferation regime and to promote further reduction of nuclear weapons. China has been taking seriously about the first use policy of other nuclear powers. Given the huge gap between China and the U.S. nuclear arsenals, if the U.S. makes a nuclear first strike on China’s nuclear targets, the number of surviving warheads of its smaller nuclear force would be very limited. Furthermore, the retaliation capacity of those survived warheads would be neutralized by the U.S. missile defense. Thus, China’s nuclear deterrence would be heavily threatened. Therefore, if the U.S., as Russia has done, commits to a no-first-use policy with China, it would be very attractive to China and increase China’s willingness to participate the FMCT.

## NOTES AND REFERENCES

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