

Keys to Unblocking Multilateral Nuclear Arms Control

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Given the current U.S. government's resistance to formalized, negotiated multilateral treaties, success in the area of multilateral nuclear arms control over the next decade will present a challenge. To make any progress in the first half of this decade so that substantial results may occur in the second half, creative alternatives to immediate treaty negotiations will be necessary. This article outlines in the context of one multilateral arms control effort, namely the Fissile Material Cutoff Treaty (FMCT), what activities must be undertaken and issues addressed if efforts to develop more effective multilateral nuclear arms control are to resume and eventually succeed.

We point out that an eventual universal halt to production of fissile materials for nuclear weapons programs is inevitable, but the timing of this is as yet very uncertain. We examine the impasse in the Geneva Conference on Disarmament (CD) over whether discussions or negotiations on prevention of an arms race in outer space (PAROS) will accompany FMCT negotiations and discussions of the overall future of nuclear disarmament.

The linkages between these three arms control efforts are central to our discussion concerning the future of multilateral arms control and ways to unblock the current impasse. Understanding the dynamic between PAROS, FMCT, and disarmament discussions at the CD requires examining each of these areas and their linkages to one another. For example, to better gauge the reasons behind China's insistence on simultaneous PAROS and FMCT negotiations, we analyze Chinese positions on PAROS and FMCT, including the implications of a recent joint Chinese and Russian proposal on PAROS. Because it is formally compatible with U.S. pursuit of missile defense programs as long as they do not explicitly threaten or attack other countries orbiting satellites or other space assets, this new proposal provides a potential starting point for a compromise between previously incompatible U.S. and Chinese positions in the CD. However, there is still a need to resolve a disagreement on whether it is clear a priori that a new treaty on military uses of outer space is needed. We conclude by discussing three options that may evolve to become the most viable for dealing with PAROS in the CD: 1) demilitarizing the international space station by treaty, 2) clarifying the scope of the Outer Space Treaty for the whole of outer space and 3) pursuing an agreement primarily aimed at further restricting military activities beyond geosynchronous orbit.

We also examine the question of discussions in the CD on the future of nuclear disarmament, and their relationship to the question of whether PAROS and the FMCT will proceed in a negotiation or discussion format. We do this because some states have linked the initiation of any movement on PAROS, FMCT, and nuclear disarmament at the CD to certain characteristics of these efforts, such as whether they all proceed in discussion or negotiation format.

We conclude by returning to the FMCT, and then looking beyond the CD context. The focus of this discussion is on the impact of the "war on terrorism," the most recent confrontation between India and Pakistan, and the continuing strife over Palestine on the timing of the establishment of a broader moratorium on the production of additional fissile materials for nuclear weapons programs. Recent events have opened up possible new opportunities for achieving such a broader moratorium within a decade. However, they also present new challenges that may prevent this outcome if the opportunity and challenge it presents is not artfully engaged.

The FMCT In Today's Context

Eventually each of the countries with nuclear weapons capabilities will accumulate as much unsafeguarded nuclear weapons plutonium and highly enriched uranium (HEU) as it is going to want for the foreseeable future. When all states reach this point, let's call it "Point B," there will be a de facto universal moratorium on the production of such material. The moratorium may last indefinitely, or until such time as some state starts making unsafeguarded weapons material. However, we are now at a "Point A" where negotiations on a fissile materials production cut-off treaty (FMCT) are stalled at the Geneva Conference on Disarmament.

Determining and pursuing the most expeditious path between this “A” and “B” could be important for two reasons. First, a production cut-off would signal and possibly help cement achievement of a certain degree of stability in relationships involving countries that had formerly been producing plutonium or separating uranium isotopes for weapons programs. Second, a transparent production moratorium is a necessary prerequisite for an effective comprehensive and global management system for nuclear materials and weapons. Here comprehensive global nuclear management is taken to mean that all nuclear weapons material is kept in a defined set of locations under the secure control of national command authorities in a well-defined set of states. For nuclear weapons materials in fixed locations, comprehensive management requires a secure set of protection, control, and accounting procedures.¹ For mobile launcher locations, comprehensive management implies precise nuclear inventory control for weapons in transit and tight security against possible efforts to commandeer or divert nuclear weapons to outside the control of the national command authority. At the minimum, the host country should be justified in having complete confidence in the adequacy of these management procedures. Ideally, there would be sufficient transparency on quality control and declarations of any nuclear material stocks declarations that other interested countries would also have a similar degree of confidence.

A traditional reason for increasing transparency and quality of comprehensive nuclear management is to assure other countries against the possibility of hidden threats that go beyond declared or readily apparent capabilities. A growing recent concern is to build confidence that nuclear weapons materials will not be diverted into the hands of non-state actors outside of the secure control of the national command authority, whatever country these actors might be from. It is highly unlikely that all of the relevant nations will be willing to accommodate the transparency needed for comprehensive and transparent global nuclear management if they have not previously agreed to the less intrusive and restrictive transparency needed for a global cutoff of the production of unsafeguarded fissile materials. For this reason, a cut-off in the production of additional fissile materials for nuclear weapons programs appears to be a prerequisite for attaining the broader goal of comprehensive global nuclear management in the sense used here.

FMCT negotiation was one of the steps agreed to in connection with the indefinite extension of the Nuclear Nonproliferation Treaty (NPT) in 1995. States not party to the NPT had also agreed to the start of FMCT negotiations in 1998, albeit with some reservations. In addition to detailed implementation procedures involving issues such as transparency and verification, outstanding issues deal with existing stocks of fissile materials and with the possible future production of naval reactor fuel highly enriched in the isotope uranium-235. The question of existing stocks may be resolved by inviting but not requiring states to declare additional fissile materials excess to nuclear weapons programs and developing appropriate procedures for safeguards and transparency.² For naval propulsion, a possible solution is for concerned states to make ratification of an FMCT contingent on adequate verification that new HEU production isn't being used for nuclear weapons.

However, the process of working out details concerning transparency, verification, existing stocks, and possible future uranium enrichment for naval propulsion has been stalled since 1998 due to disagreements on the overall agenda for the CD. In particular, negotiations on an FMCT in Geneva are currently coupled with prevention of an arms race in outer space (PAROS) and with discussions in an ad hoc working group on nuclear disarmament. China, for example, is resisting FMCT discussions until its concerns about PAROS are addressed. It is insisting on *negotiations* on PAROS, while the United States will consider only *discussions*. Previously this was with the understanding that discussions would lead to negotiations. However, at the CD on 27 June 2002, the U.S. ambassador supported the idea of an Ad Hoc Committee on PAROS but said that the United States cannot accept the idea that it should “start its work with the preconceived idea that it will later be necessary to negotiate a legally binding agreement.”³ What is the likelihood that issues relating to PAROS and nuclear disarmament may be addressed so that the FMCT negotiation can get under way?

PAROS

The deadlock in the CD from the halt of FMCT negotiations in 1998 through May of 2002 was not merely semantic or procedural. It reflected Chinese concerns about U.S. long term plans for space and ballistic missile defenses. China was unwilling to negotiate a cap on its own fissile materials production as long as it faced the prospect of an unlimited offensive/defensive strategic nuclear arms competition with the United States, which

would involve at least include space-based support systems. The current U.S. president had indirectly attempted to reassure China that U.S. ballistic missile defenses are not aimed at undermining the credibility of China's nuclear first strike capability. However, the Chinese appeared to be unconvinced.⁴ The Chinese seem to have complete confidence that China can and would readily maintain deterrent capability in the presence of any missile defenses that the United States deploys. As a result, from the Chinese perspective there remained the possibility of an open-ended offensive-defensive nuclear arms race that would preclude a negotiated agreement on a fissile materials production cut-off because of the United States' unwillingness to define its long term plans for its ballistic missile defenses. American opacity about the ultimate configuration of its ballistic missile defenses and the role of space-based assets therein did not bode well for creating confidence within China, which was suspicious of American intent being domination to the detriment of Chinese national security. That this dynamic between possible American missile defenses (including their use of space) and the possible Chinese need for additional fissile materials to address those capabilities was the formal logic of the impasse on FMCT negotiations is not widely understood.

China's stated preference implied that there be no active use of outer space for military purposes, such as positioning ground-strike and other weapons in outer space. This could even imply the banning of space-based reconnaissance and communications for battle management, such as guidance of precision munitions. The idea that Chinese soil and Chinese embassies should be inviolate from precision attack is deeply engrained, making the foreign use of space above China for military purposes an anathema despite this already being a reality. Some even concluded that incompatibility between Chinese and U.S. positions made the impasse on PAROS and, thus on the FMCT, impossible to resolve.

However, the Chinese position on PAROS and FMCT can be seen as having several layers. Specifically, in connection with PAROS, it is useful to distinguish between what is desired within China's overall policy goals and what is essential with respect to restarting FMCT negotiations. What is desired from a Chinese viewpoint is preventing U.S. military domination of space, and what is essential is avoiding unlimited buildup of U.S. ballistic missile defenses (or a significant influence on cross-straits relations from transfer of related theater missile defense technology to Taiwan). Given appropriate signals from the leadership and the absence of interfering factors (like last year's airplane incident in Hainan), it was possible for China's arms control experts to identify a distinction between what is needed to get discussions moving and what the Chinese will actually want to focus these discussion on once they begin. Given sufficient delay after complicating incidents like the U.S. bombing of the Chinese embassy in Serbia and the Hainan affair, it remained possible that China would evolve a more pragmatic approach to making progress in the CD. What was necessary in the meantime was that the United States continue to send adequate signals on Taiwan. A particularly sensitive issue is psychologically relevant arms transfers to Taiwan, such as a complete Aegis naval defense system. The Bush administration did indeed manage to "thread the needle" on this sensitive issue, setting the stage for a new Chinese initiative for the CD.

A somewhat more pragmatic approach was indeed forthcoming when China made public a draft of a joint working paper with Russia on PAROS on 10 June 2002.⁵ A presentation on this was made to the CD seventeen days later. Some basic obligations in this proposal were "not to place in orbit around the Earth any objects carrying any kind of weapons, not to install such weapons on celestial bodies, or not to station such weapons in outer space in any other manner." Additional proposed basic obligations were not to resort to the threat or use of force against space objects. Missing from this proposal were obligations in a previous Chinese proposal not to test in outer space "any weapons, weapons systems, or components," and "not to test, deploy, or use on land, in sea, or atmosphere any weapons, weapons systems, or their components that can be used for war-fighting in outer space..."⁶ Unlike this previous Chinese proposal, the new joint proposal on PAROS is formally compatible with the testing and deployment of exo-atmospheric missile interceptors with their inevitable anti-satellite capability. Under the new proposal such interceptors could in principle be deployed as long as this involved no threat or use of force against outer space objects. This assumes, of course, that the suborbital offensive missiles the interceptors are explicitly designed to threaten and destroy are not to be included in the definition of "space objects."

The joint proposal on PAROS from China and Russia removes a seemingly insuperable difficulty by no longer being formally incompatible with U.S. missile defense plans. However, the suggestion that such proposal

be discussed under a negotiating rather than discussion mandate is still incompatible with the above-mentioned U.S. response on the question of negotiations vs. discussions.

The question thus remains how progress on PAROS in the CD might realistically be envisioned. This question is examined here only in the context of placement of weapons systems in or beyond trajectories where they orbit the Earth more than once. Productive discussion of universal controls on military reconnaissance or communication or use of suborbital trajectories is assumed to be out of the question for the readily foreseeable future because the U. S. intelligence community and Air Force would resist any attempt to negotiate substantive limits on their ability to use or protect existing types of space assets. On such topics, it is unlikely that either the U.S. administration or Congress would move to overrule its security establishment. For approaches to avoid this pitfall and still permit meaningful PAROS discussions to occur, three options, each a confidence-building measure with significance, will be explored here.

One option is to discuss ways to protect the international space station. The station will eventually be a nearly \$100 billion asset that is extraordinarily vulnerable to complete destruction by vertical launch of a single low-cost precision sounding rocket. Should such an event occur it would provoke a profound crisis of an urgency ill suited to measured debate over international legal precedent. Would such an attack be an Act of War, and if so against whom? Would it constitute simple murder? If so, how would the responsibility be apportioned along the perpetrators' chain of command, and what would constitute broadly acceptable means for bringing them to justice? A prior agreement on such matters could be valuable in itself. It could also provide a broadly understandable precedent for extension to more subtle questions, such as the use and protection of commercial communications satellites. However, in an exchange of letters with space station partners in 1998 the United States left open the possibility of use of the space station for security purposes.⁷ There is thus serious doubt whether even a future U.S. administration would countenance the demilitarization of the space station by international treaty.

A second option for eventual PAROS discussions concerns the meaning and implementation of the agreement commonly known as the Outer Space Treaty. This treaty is somewhat ambiguous about just what it prohibits, and it also omits specifics on verification mechanisms. In particular, while the Outer Space Treaty prohibits the use of "celestial bodies" themselves for military purposes, it is mute on a question potentially more relevant for the twenty-first century, namely whether military use of materials obtained from such bodies is prohibited. Of particular potential interest is the use for rocket fuel of hydrogen obtained from earth-approaching asteroids, or conceivably from the polar regions of the moon. By placing a mass launcher on the moon or by throwing mass from one earth-approaching asteroid in the path of another, the energy cost of bringing extraterrestrial material to earth orbit can be made much less than the energy cost of lifting the same amount of mass from the earth. Given sufficient experience with manned and automated operations in space, it is reasonably likely that the dollar cost of such extraterrestrial materials transfers will also become less than the dollar cost of ground launch.⁸ As with the Antarctica treaty, it may be much easier to negotiate the demilitarization of such activities decades before they become economically practical than when such practicability is more imminent. While such issues may not seem pressing, they nevertheless have considerable long-range significance, are potentially negotiable, and could build confidence in this arena for eventual formal negotiations. However, promoting the peaceful uses of deep space is in the purview of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). The COPUOS member states might be reluctant either to have this committee left out of such a discussion or to have it tackle the complicated and distant issue of the possible military implications of such advanced space technology.

A third possibility for eventual PAROS discussions concerns the possibility of banning all military activities in outer space beyond geosynchronous orbit. While the Antarctica Treaty demilitarized a whole continent, such an action would more boldly demilitarize the rest of the universe. This would require an implementation mechanism, if only to deal with the question of misfires that might send military satellites much beyond 40,000 kilometers from earth. Again, any implementation mechanisms could provide a precedent in the unexpected event that a consensus developed on additional restrictions on military activities at lower altitude. Of course these issues deal with remote potential threats compared to the kind of international crisis that could be precipitated if a country withdrew from the Outer Space Treaty and put nuclear weapons in orbit. However, it is precisely the less emotive nature of discussions of longer term issues that makes them potentially more

manageable to address in the CD context, provided of course that there is a consensus on doing anything at all concerning PAROS as part of breaking the overall impasse in the CD.

Nuclear Disarmament

For many years, India and several other states have pushed for the CD to have nuclear disarmament negotiations or discussions. During that time, the United States, Russia, and other nuclear weapons states have opposed such efforts. Finally in 2000 when even Russia, the final holdout, agreed to the idea of an ad hoc group discussing nuclear disarmament at the CD, the possibility of such discussions became viable. It is important to realize that there is already agreement that this third portion of the proposed nuclear-related CD agenda has a very different function from that agreed upon for the FMCT and that proposed by China and Russia for PAROS. For it has been understood from the start that the ad hoc working group on disarmament would have a *discussion* rather than a *negotiation* mandate. Thus the immediate diplomatic problem is constructing an agenda for this working group that will not get in the way of negotiations on the FMCT. This will be, nevertheless, a delicate task. A discussion program that clearly has no chance of ever turning into a negotiating mandate may rattle nuclear disarmament proponents, while a more realistic program with any substance may provoke opposition from elements within nuclear weapons states that may want to avoid any possibility of discussions evolving into substantive negotiations.

A 13-Step program agreed upon at the year 2000 Nonproliferation Treaty (NPT) review conference⁹ has been envisioned as a possible basis for discussions on the future of nuclear arms control and disarmament. This program calls for early entry into force of the Comprehensive Test Ban Treaty (CTBT), a moratorium on nuclear explosions, negotiation of an FMCT, discussions on nuclear disarmament in the CD, irreversibility of nuclear disarmament, and an unequivocal undertaking by the nuclear weapons states for the elimination of their nuclear arsenals. It also recommends conclusion of a third strategic arms reduction treaty (START III) and strengthening the antiballistic missile (ABM) treaty, as well as implementation of the US/Russia/IAEA (International Atomic Energy Agency) Trilateral Initiative on surplus weapons program materials. In addition, it calls for nuclear disarmament steps including unilateral reductions of strategic and non-strategic nuclear weapons, increased transparency, de-alerting, and a diminishing role of nuclear weapons in security policies. Finally, it identifies the need for international cooperation on disposition of excess weapons materials, reaffirmation of the goal of general and complete disarmament, regular reporting on progress towards disarmament, and improved verification. However, making the 13-Step program the basis for discussions in the CD faces many difficulties, especially given the Bush Administration's current negative view of the CTBT, ABM Treaty, and most of the rest of that program's agenda. A similar program, but without references to the CTBT and ABM Treaty, might become acceptable to India, Pakistan, and Israel as a basis for discussions in the CD, in part because the program itself does not call for these countries to sign the NPT. However, in negotiating this maze, a particularly delicate issue may be finding a method acceptable to Japan and others to integrate the concerns about the nuclear weapons capabilities of India, Pakistan, and Israel without explicitly acknowledging them as "nuclear weapons states" as defined in the NPT.

One possible alternative approach to deal more broadly with the question of irreversible and universal commitments to nuclear disarmament is through discussion of a declaration with the following features:

I. Limits on Possession of Nuclear Explosive Devices

1. Beginning on (__) the number of nuclear explosive devices held by any country subscribing to this Declaration will be no more than (__).
2. Subject to the limitations under Article II of this Declaration, the limit on the number of nuclear explosive devices held by any country subscribing to this Declaration [hereinafter, Adherent] shall be reduced by a factor of (__) at the end of every subsequent (__) year period.

II. Exemptions from Lowered Limits

1. Any Adherent may exempt itself from a lowering of the limit on the number of nuclear explosive devices it may possess by giving notice (__) years in advance of the effective date of such lowered limit. This notice shall include a statement of the reasons for its refusal to accept a lower limit.
2. The limit on the number of nuclear explosive devices held by any active Adherent shall not be increased.

The idea here is to first agree on such an approach in principle. Discussion on the details of how the blanks might be filled in could then follow. Then commitment to such declarations could be pursued in a parallel unilateral fashion, presumably with provisions for orderly cancellation under extraordinary circumstances. Alternatively, a call could be issued for such declarations to be deposited to an appropriate repository such as the Secretary General of the United Nations.

In today's context, it is probably most practicable to avoid treaties or discussions of treaties that rely on the 13-Step program specifically. Instead, the goals of this effort—such as a moratorium on nuclear testing, lowering the numbers of nuclear weapons, and increasing transparencies—should be distilled and used as guideposts. Such an approach could include additional limits on qualitative upgrades of nuclear arsenals (e.g. through nuclear testing) and additional agreements on disposition of excess materials, on verification, and on limiting production, possession, or means of delivery of nuclear weapons.¹⁰

Such an approach would have the virtue from an Indian point of view of being fully non-discriminatory, in that its call for a universal upper limit on assembled nuclear explosives holdings applies equally to all states, regardless of whether they have adopted a minimum deterrence policy, are building down to lower levels, have opted for no nuclear weapons holdings, or are within the area of a nuclear weapons free zone. Such an approach is only likely to be acceptable in face of at least a tacit understanding that China will not build up its arsenal to the universal limit, with India possibly following suit. As noted above, however, such an understanding with China is likely in any case to be necessary to break the PAROS deadlock. In this context it is possible, albeit far from certain, that Japan and India could have a meeting of the minds on how to deal with NPT non-signatories where India is included in international discussions. Otherwise some similar sort of “don't ask; don't tell” approach to India's nuclear role will be needed, with all of the delicate problems that this tack inevitably entails.

In the readily foreseeable future the U.S. Administration is unlikely to actively endorse such a broad discussion of the overall future of nuclear weapons. The most that might be expected, and this probably only after 2004, is that a U.S. president of either party might demur to having this included as one possible approach to discussions, in the hope that more contentious and less fruitful arguments on details of some of the points in the 13-Step Program might thereby be avoided.

Negotiations or Discussions?

Despite the new joint proposal from Russia and China on PAROS, the central sticking point on getting the CD moving on issues related to nuclear arms control remains the disagreement on whether a new treaty is needed to deal with outer space. There are three ways to meet in the middle on this. One is to reduce the scope of a proposed PAROS treaty to make negotiations acceptable to the CD member states, while simultaneously negotiating on the FMCT. Restricting the scope of the above-mentioned joint proposal to the region beyond geosynchronous orbit for purposes of parallel PAROS and FMCT negotiations should avoid the principle objections of the U.S. security apparatus and might thus eventually become acceptable to the U.S. government, provided that this is sufficiently strongly supported by other CD members. A second approach is for China, Russia, and others to agree to discussions only on PAROS during initial FMCT negotiations, perhaps in exchange for some softening of U.S. insistence that it sees no need whatsoever for a new treaty dealing with outer space. A third approach is to scale back both PAROS and the FMCT to ad hoc discussion committees.

This third option may be the most realistic. It at least provides some mechanism for looking at technical aspects of above-mentioned issues connected with the FMCT. Moreover, it may evolve that actual entry into force of an FMCT for the foreseeable future is in any case unrealistic. In this case all that may be achievable is confidence building and transparency measures connected with broadening the scope of parallel declarations on production halts to additional states that have not yet legally abjured nuclear weapons. For example, the formation of a nuclear suppliers group restricting exchange of HEU naval reactor fuel and cores to as few as the three countries presently using them could be helpful.¹¹ If confidence building and transparency measures are all that can realistically be achieved in the foreseeable future, then there is a question in any case whether formal negotiations on a production cutoff treaty are really necessary.

The question of whether negotiations or discussions will occur in the CD on fissile materials production and outer space may also have some impact on viable options for discussion of nuclear issues in an ad hoc

committee on disarmament. If FMCT negotiations appear to be taken seriously, then many of the self-declared non-nuclear-weapons states may be content with a nuclear disarmament discussion menu that deals with individual issues without a serious head-on attack on the overall future of assembled nuclear explosives holdings. If discussions only are to occur on fissile materials production and outer space, then some of these states might be more prone to push for a broader based discussion on the retirement of what may become broadly viewed as nuclear explosives holdings excess to needs defined by relations between nuclear weapons states and others in the twenty-first century. In this case the declaration approach discussed above might yet be of some utility.

Timing

It should be emphasized that the above discussion is focused primarily on what is needed to move the CD beyond its present procedural impasse, rather than what is necessary to actually come to an agreement once this occurs. In particular, the Chinese may need several years of discussions, productive interactions, and close monitoring of U.S. ballistic missile defense activities and technology transfer before they will be comfortable enough with U.S. intentions to accept limits on their own fissile material production.

Most critically, Pakistan will need to come to the conclusion that additional unsafeguarded fissile materials production is not essential to its security before an agreement encompassing the poignant South Asian region can be made. In early 2002 there was a confrontation, leading to threats of possible nuclear war, over India's complaints about Pakistan's support for what India calls terrorism. What possible outcomes from this confrontation would allow inclusion of South Asia in an enduring moratorium on production of fissile materials for weapons programs? One is that India becomes convinced that the Pakistani political system is durably capable of exercising adequate restraint in this area, and that Pakistan becomes convinced that further nuclear weapons production is unnecessary. The second is that their recent confrontation with the possibility of nuclear war convinces both countries that it does not matter how many nuclear weapons Pakistan has, as long as that number does not decrease. A third is that Pakistan and India come to at least an implicit understanding of what level of additional "minimum nuclear deterrence" is necessary, and that both countries can be induced to cooperate on regional or global mechanisms to build confidence in a production halt once this occurs.

The approach taken by other states with nuclear weapons may also be critical with respect to Pakistan and India. The cooperation of the United States and International Monetary Fund are essential to maintenance of the shaky status quo in Pakistan. This provides considerable potential leverage, albeit with the potential of upsetting the status quo in case of a major confrontation over nuclear policy. China's relations with Pakistan and India are also critical. Even if India achieves what it considers to be minimum nuclear deterrence, it may not cooperate with confidence building or transparency measures if it feels China is a growing threat or is unduly supporting growth of Pakistan's nuclear potential even under safeguards. India also has a long-standing demand that the permanent members of the United Nations Security Council engage it in serious discussions on the future of nuclear disarmament. Thus India could possibly end up blocking action related to fissile materials production if it is not satisfied with the nature of discussions on the future of nuclear disarmament.

There is also the possibility that the Middle East could provide a stumbling block even if other issues can be worked out. In particular, even if Israel concludes it has adequate fissile material to halt its production for weapons use, it is likely to continue to want to produce tritium to make up for radioactive decay of a material needed to boost nuclear weapons yield. This could easily complicate the establishment of confidence building or transparency measures in the Middle East, thereby requiring the politically trickier outcome of a regionally tailored rather than globally uniform approach.

With these considerations in mind, what is a plausible minimal timing for traversing the path from Point A (the current deadlock on FMCT negotiations) to Point B (a global moratorium on production of fissile materials that are not safeguarded against use in nuclear weapons)? One answer is as follows:

- The Bush administration clarifies its immediate plans for missile defenses (e.g. during 2002–2004).
- A domestic U.S. political consensus (not unanimity) emerges that its missile defenses are not aimed at neutralizing China's modernizing strategic nuclear deterrent (e.g. from 2002–2005).

- The United States develops a tacit understanding with China that U.S. missile defenses and Chinese strategic nuclear delivery capabilities will be limited to prevent an open-ended arms race (e.g. during 2004 or 2005).
- The United States and China either agree to avoid a negotiating mandate for PAROS or limit it to mutually acceptable issues (e.g. in 2004, 2005, or 2006).
- Influential Russian observers continue to agree that U.S. missile defenses that do not threaten China's intercontinental nuclear first strike capability also will not threaten the credibility of Russia's second strike capability.
- The domestic political situation in Pakistan and its relations with India are stable enough (e.g. during a long enough period of time between 2005 and 2014) to allow eventual acceptance of asymmetric limits on fissile materials holdings in South Asia and to avoid conflict with India severe enough to undermine India's acceptance of the same limits.
- Japan and any other key creditor and donor countries remain open enough to providing substantive development aid to Pakistan in the context of a resolution of some key difficulties over nuclear weapons programs in South Asia, even though neither Pakistan nor India adopts non-nuclear-weapons policies.
- Israel remains cooperative or low profile enough that an otherwise global fissile materials production moratorium can evolve with Israel initially or subsequently joining it—with the level of transparency allowed by Israel's domestic and regional political circumstances.
- The fissile materials production programs of current non-nuclear-weapons NPT parties are constrained enough that they do not promote continued production by another state.

Three recent developments have provided more room on either end for the possible timescale for establishment of a broader moratorium on production of fissile materials for nuclear weapons programs. One is the fallout from the infamous attacks of 11 September 2001. On the one hand, the United States now appears more prepared to define China as a “strategic partner” rather than a “strategic competitor.” On the other hand the “war on terrorism” can also provide a distraction from concentrating on the nuclear programs of the handful of sovereign states that are currently producing fissile materials for weapons programs. The second development is the early 2002 confrontation between India and Pakistan. Combined with changes in other countries' policies towards the region after September of 2001, this could precipitate a change of policies leading to an earlier halt to production of fissile materials. Alternatively, the result could be a renewed determination on the part of Pakistan to build more nuclear weapons, perhaps combined with supply and funding difficulties that stretch out the time needed to accomplish this. The third development is intensified conflict over the fate of Palestine. Weariness with this conflict and changed approaches by Israel's neighbors could lessen the focus on the importance of nuclear weapons and facilitate progress on global approaches to fissile materials production. On the other hand, intense activity or simmering resentment over this conflict could spill over to poison any approach to fissile materials production that requires the cooperation of Israel or its neighbors.

How the United States and other influential countries view the likely implications of these developments will heavily influence the outcome at the CD. If there is seen to be a reasonable expectation that a broader fissile materials production cutoff may be forthcoming and contribute to security, then there will be more motivation to overcome the obstacles to progress in the CD. If prospects for establishing a production cutoff within the current decade seem very remote, then continued deadlock in the CD is likely.

The implications of such alternative futures for military and civilian nuclear programs, military nuclear strategy, and the spillover into other arms control negotiations are potentially profound. A more thorough understanding of the various factors influencing progress towards a global fissile weapons materials production cut-off may help facilitate the process of choosing between such alternative futures.

Notes

1. Comprehensive materials protection, control, and accounting (MPCA) in Russia is a critical component of comprehensive global nuclear management. Allowing for inclusion of an additional 33 metric tons per year of Russian fissile material in a comprehensive MPCA system starting from about 500 tons in 2005, completing a thorough MPCA program might be achieved by about 2020. The efforts needed in other countries are much less materially ambitious but may face a variety of political obstacles. For a discussion of progress on nuclear management in Russia, see Leonard Spector, "Missing the Forest for the Trees: U.S. Non-Proliferation Programs in Russia," *Arms Control Today* 31, no. 5 (June 2001): 6-11.
2. We use the usual definition of HEU as that containing more than 20 percent uranium-235. Weapons grade plutonium is generally defined as that containing more than 20 percent of isotopes other than non-fissile plutonium-238, but there seems little prospect that weapons grade plutonium will again be used as naval nuclear fuel. For related discussion, see Chunyan Ma and Frank von Hippel, "Ending the Production of Highly Enriched Uranium for Naval Reactors," *The Nonproliferation Review* 8 (spring 2001): 86-101.
3. See "Statement by Ambassador Eric M. Javits, United States Representative to the Conference on Disarmament," Geneva, 27 June 27 2002, at <<http://www.usmission.ch/press2002/javits0627.htm>>, accessed on 3 July 2002.
4. This paper draws heavily on results from public and private meetings in London, Paris, Beijing, Islamabad, New Delhi, Geneva, and Washington in the spring of 2001. For details see Clifford Singer, editor, *The New Nuclear Arms Control Environment: Trip Report and Project Conclusions*, University of Illinois at Urbana-Champaign Program in Arms Control, Disarmament, and International Security Occasional Paper, September 2001, at <http://www.acdis.uiuc.edu/homepage_docs/pubs_docs/PDF_Files/Singer%20Editor%20OP%20Folder/dreamweaver/cover.html>, accessed on 5 July 2002.
5. See "International Network of Engineers and Scientists Against Proliferation Press Release," Berlin, 11 June 2002, at <<http://www.mbmd.org/PressReleases/berlin0602.html>>, accessed on 3 July 2002.
6. See the "Statement by Ambassador Hu Xiaodi for Disarmament Affairs of China at the Plenary of the Conference on Disarmament," 7 June 2001, Geneva, at <<http://www.mbmd.org/SpaceWeaponsBan/HuXiaodi.html>>, accessed on 1 June 2002.
7. The existence of a letter on the uses of the space station for security purposes was pointed out by Wulf von Kries.
8. It has long been known that the energy cost of bringing extraterrestrial materials to earth orbit can be much lower than lifting them into earth orbit from the ground. For an early detailed set of reports on this see *Space Manufacturing III, Proceedings of the Fourth Princeton/AIAA Conference, May 14-17, 1979*, eds. Jerry Grey and Christine Krop, American Institute of Aeronautics and Astronautics: New York (31 October 1979), including a report on "Collisional Orbital Change of Asteroidal Materials" by C.E. Singer on pp. 556-559 of that volume. Given the copious and steady supply of solar energy in space for separating hydrogen from oxygen to make high energy density rocket fuel, a cheaper extraterrestrial source of water could eventually lead to a major expansion of military space operations dependent on resources obtained from well beyond geosynchronous orbit. Scoping studies on this topic will be of little practical import, however, until there is substantial additional experience with manned and unmanned operations in space of the type needed to execute such plans.
9. For a discussion of the 13-Step program, see Tariq Rauf, *Towards NPT 2005: An Action Plan for the "13-Steps" towards Nuclear Disarmament Agreed at NPT 2000*, Monterey Institute of International Studies Center for Nonproliferation Studies, <<http://cns.miis.edu/pubs/reports/pdfs/npt2005.pdf>>, accessed on 5 July 2002.
10. For a full draft of a "Declaration Concerning Nuclear Explosive Holdings," and a discussion of the rationale behind it, see Clifford Singer, "Look before You Leap: A Practicable Step towards Reduction and Possible Eventual Elimination of Assembled Nuclear Explosives Holdings," *The Washington Quarterly* 20 (summer 1998): 199-210; <http://www.acdis.uiuc.edu/homepage_docs/pubs_docs/PDF_Files/Look-Leap.pdf>, accessed on 5 July 2002.
11. For additional information on this topic, see James Clay Moltz, "Closing the Loophole on Exports of Naval Propulsion Reactors," *The Nonproliferation Review* 6 (fall 1998): 108-114.