8. Controlling Fissile Materials Worldwide

A Fissile Material Cutoff Treaty and Beyond

Robert J. Einhorn

Over the last decade of futile efforts to get negotiations underway on a Fissile Material Cutoff Treaty (FMCT), the United States has viewed an FMCT as a modest arms control measure of limited scope that could codify the existing de facto moratorium on fissile material production for nuclear weapons by the five NPT nuclear weapon states and cap the fissile material weapons stocks of the three nuclear powers that never joined the NPT. Those goals remain valid, especially now that India and Pakistan appear poised to ramp up their bomb-making capabilities.

But current circumstances—including the fear that terrorists could get their hands on the wherewithal to build nuclear bombs and the growing quantities of excess fissile materials now being created as a by-product of reductions in U.S. and Russian nuclear arsenals—provide grounds for taking a more ambitious approach toward controlling fissile materials. Instead of only banning the production of fissile materials for use in nuclear weapons, an FMCT should also prohibit the production of highly enriched uranium (HEU) for civil purposes and either phase out or adopt a long-term moratorium on the production of HEU for naval propulsion.

Moreover, while the scope of an FMCT itself should focus only on the production of fissile material *after entry into force*, the treaty

should be accompanied by parallel steps initially of a voluntary character—under a multilateral framework that might be called a Fissile Material Control Initiative (FMCI)—that would also address the challenges posed by *pre-existing* fissile materials and, over time, help monitor, manage, and reduce existing stocks of fissile materials around the world.

Taken together, the FMCT and FMCI would not only address critical problems posed by vast and growing stocks of fissile materials; they would also establish an essential foundation for moving toward a world with few or no nuclear weapons. But building the necessary international support will not be easy. Some key states may not be prepared to forgo future production of fissile materials for nuclear weapons as required by an FMCT, and some may resist the transparency, verification, and disposition measures called for under an FMCI. Strong leadership by the U.S. will be needed to get the growing problem of fissile material stocks under control.

A frustrating record

The record of international efforts to achieve an FMCT is a long and frustrating one. Fifty years ago, a 1957 United Nations General Assembly (UNGA) resolution calling for an FMCT first put the issue on the international agenda. But Cold War nuclear buildups and mistrust among the major powers made an FMCT impractical for over 30 years. In the post-Cold War era—with the collapse of the USSR and the focus on reducing the Cold War's nuclear legacy—the idea of an FMCT was resurrected. A 1993 UNGA resolution, co-sponsored by the United States, India, and others, supported the conclusion of "a non-discriminatory, multilateral, and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons and other nuclear explosive devices." Thereafter, resolutions calling for an FMCT became hearty perennials in annual UNGA disarmament debates.

The FMCT, or "cutoff," has also figured prominently in the Non-

proliferation Treaty (NPT) context. At the 1995 NPT Review and Extension Conference, agreement to pursue an FMCT was an integral part of the consensus that enabled the NPT to be extended indefinitely. At the 2000 Review Conference, as one of 13 "practical steps for the systematic and progressive effort" toward nuclear disarmament, NPT parties agreed to call on the Conference on Disarmament (CD) to commence immediately negotiations on a cutoff treaty with a view to concluding the treaty within five years.

So far, the CD—the Geneva-based, 65-nation body charged with negotiating an FMCT—has hardly been up to the task. In March 1995, after more than a year of consultations, Canadian Ambassador Gerald Shannon announced agreement on a mandate for an Ad Hoc Committee of the CD to negotiate an FMCT. However, notwithstanding the adoption of the "Shannon mandate," the CD, which operates on the basis of consensus, soon bogged down over disagreements on the priority to be assigned to the various items on its agenda. With the exception of a few weeks in the summer of 1998—when alarm over the May 1998 nuclear tests by India and Pakistan temporarily motivated CD members to set aside their differences—the CD has been unable to proceed with negotiations on an FMCT. Non-aligned countries have resisted giving FMCT priority over their preferred agenda items—nuclear disarmament and legally-binding negative security assurances—while Russia and China have linked negotiations on an FMCT to their desire to pursue an agreement that would prevent an arms race in outer space. With no consensus on a program of work, the CD has been paralyzed.

In July 2004, the Bush administration abandoned the longstanding U.S. requirement that an FMCT be effectively verified. Contrary to the Shannon mandate's call for an "internationally and effectively verifiable treaty," the U.S. stated that, after a lengthy internal review, it had concluded that an effectively verified FMCT could not be achieved. Several CD members, including close allies of the U.S., took

issue with this assessment, and basic differences on the question of verifiability became another impediment to moving ahead on FMCT.

In May 2006, the United States tabled a draft cutoff treaty in the CD. One of the motivations for the U.S. initiative was to undercut opposition to the July 2005 U.S.-India deal on civil nuclear cooperation, which reversed the decades-old American policy of engaging in nuclear commerce only with NPT parties. A major criticism of the deal was that, by allowing India to import uranium for its civil nuclear program, it would free up India's limited indigenous uranium supplies for use in its nuclear weapons program and would therefore facilitate a significant increase in India's production of fissile material for nuclear weapons. In anticipation of such criticism, the U.S. and India had pledged in their July 2005 joint statement that they would work together for the conclusion of a multilateral FMCT. The tabling of the U.S. draft treaty in 2006 was an effort to show Congressional critics that the administration was serious about that pledge and that concerns about an Indian fissile material buildup were unwarranted in light of the prospect of a cutoff treaty. Consistent with its 2004 decision on verification, the Bush administration omitted provisions for international verification from its very short treaty text and called instead for reliance on the parties' own national means of verification and on consultations among parties to resolve questions of compliance.

Despite the tabling of the U.S. draft treaty, negotiations did not get underway. In an effort to break the impasse in the CD, a compromise work program was floated in March 2007 which called for "negotiations" on an FMCT and "substantive discussions" on the three agenda items that some delegations had long sought to link to the cutoff: nuclear disarmament, prevention of an arms race in outer space, and negative security assurances. U.S. Ambassador Christina Rocca supported the draft work program, noting ominously that, "if the CD cannot agree to this compromise, we do not believe it will ever be able to break out of its stalemate, and member states will have to reconsider their commitment to this body." But so far, a consensus

has still not been reached—with China, Iran, and Pakistan the main holdouts—and prospects are uncertain.

Although the stalemate in Geneva is often described in procedural terms, it actually reflects significant substantive differences—both on priorities in the area of arms control and nonproliferation and on the desirability of stopping the production of fissile materials for nuclear weapons. Some states whose positions on a cutoff treaty are crucial may be determined to continue fissile material production in the near term (India, Pakistan), may wish to keep open their option to resume production in an uncertain strategic environment (China), or may see the FMCT as a challenge to their overall strategic posture (Israel, Iran). And other states whose strong support for an FMCT would be essential to its success (e.g., U.S., Russia) have not yet assigned it the necessary high priority.

Scope of an FMCT

In terms of the nuclear activities and materials that would be covered by an FMCT, the United States and the other nuclear weapon states party to the NPT have traditionally favored a relatively modest approach. They have taken the view that the scope of an FMCT should be confined to prohibiting the production of additional fissile material—mainly highly enriched uranium[1] and separated plutonium—for use in nuclear weapons. The idea that the treaty would "cut off" new production—production after entry into force—is what put the "C" in FMCT. Under this approach, the following would *not* be covered:

- highly enriched uranium (HEU) or separated plutonium already produced before entry into force, including for nuclear weapons or any other purpose;
- any production of low-enriched uranium (LEU);
- new production of HEU or separated plutonium for civil purposes

1. Uranium enriched to more than 20% U-235 or U-233.

(e.g., plutonium for use as fuel in nuclear power reactors, HEU for use in reactors to produce medical isotopes);

- new production of HEU for military, non-explosive purposes (mainly for use in reactors for naval propulsion).

An FMCT with this scope would not have much practical effect on non-nuclear weapon states (NNWS) party to the NPT that decided to join. Under the NPT, those states are *already* prohibited from producing fissile materials for nuclear weapons and are obliged to accept comprehensive IAEA safeguards to verify that they are abiding by that prohibition. The FMCT, therefore, would not add to their existing obligations (other than to require them to adhere to the Additional Protocol to their existing comprehensive safeguards agreements).

The impact of an FMCT with this scope would fall mainly on the states with nuclear weapons that decided to join—both states that are not party to the NPT (India, Israel, and Pakistan and North Korea if it does not re-join the Treaty) and the five NPT nuclear weapon states (China, France, Russia, U.K., and U.S.). None of these states now has any legal restriction on its ability to enrich uranium or reprocess plutonium for nuclear weapons.

An FMCT would codify the de facto moratorium on the production of fissile materials for nuclear weapons that is now in place for the five NPT nuclear weapon states. France, Russia, the U.K., and the U.S. have declared that, as a matter of policy, they have stopped such production and have no plans to resume. (The United States has not produced HEU for use in nuclear weapons since 1964 and not produced plutonium for use in weapons since 1988.[2]) China is believed not to be producing fissile material for nuclear weapons at present but has been reluctant to join a declared moratorium and apparently wishes to retain the option to resume production if warranted by future

2. Statement by Christopher A. Ford, U.S. Special Representative for Nuclear Nonproliferation, to the Conference on "Preparing for 2010: Getting the Process Right," Annecy, France, March 17, 2007.

strategic circumstances (e.g., a perceived need to expand Chinese strategic capabilities to penetrate U.S. missile defenses). Adherence by all five to an FMCT would give legal force to the current de facto moratorium and lock in Chinese restraint.

The impact would be more significant for the nuclear powers *not* party to the NPT that elected to join the FMCT because all of them are continuing to produce fissile materials for nuclear weapons (with the exception of North Korea if it maintains the current shutdown of its Yongbyon facilities and if it is not now covertly producing HEU). Indeed, a major benefit of an FMCT is that it could head off a potential nuclear arms race in South Asia. In its civil nuclear cooperation deal with the U.S., India insisted on keeping outside of IAEA safeguards—and therefore eligible for producing fissile material for nuclear weapons—its existing reprocessing and enrichment facilities, eight current or planned nuclear reactors, and any future reactors that it chooses to keep outside safeguards, including fast breeder reactors capable of producing large quantities of weapons-grade plutonium. Together with its newly-acquired ability to import uranium for civil uses and dedicate indigenous uranium to its weapons program, this will enable India to vastly expand its stocks of fissile material for nuclear weapons.

Meanwhile, Pakistan is not sitting on its hands. It is now constructing two plutonium production reactors which, added to its first production reactor at Khushab and its existing enrichment and reprocessing facilities, will give Islamabad the ability to accelerate its own accumulation of fissile material for nuclear weapons. A stepped-up competition in fissile material production between India and Pakistan could eventually persuade China that it needs to resume its own production.

Fissile material issues not covered

An FMCT with the scope described above—limited to banning new production of fissile materials for use in nuclear weapons—would not

address a range of issues associated with the accumulation of fissile material stockpiles around the world.

- *Civil plutonium*. The amount of plutonium that is currently being created by reprocessing spent fuel from civil reactors far exceeds the amount of plutonium that is being recycled as reactor fuel. As a result, global stocks of civil plutonium are growing at a rate of roughly 10 tons per year.[3] At present, France, India, Japan, Russia, and the U.K. are all engaged in large-scale reprocessing of civilian spent fuel. The U.K. and Russia—owning 75 and 40 tons of separated civilian plutonium, respectively—have no plutonium recycle program currently in place and therefore will continue to build up their stocks (until the U.K. stops reprocessing in 2012).[4] With the 2006 startup of Japan's Rokkasho reprocessing facility and no plutonium reprocessed there scheduled to be recycled before 2012, Japan's plutonium stocks are expected to grow from today's 40 tons to more than 70 tons by 2020.[5] Before long, the world's stocks of civil plutonium are likely to exceed global stocks of plutonium produced for nuclear weapons.[6] While "reactor-grade" plutonium is not as advantageous as "weapons-grade" plutonium in nuclear bomb-making, it can still be used to fabricate workable, effective nuclear weapons.
- *Excess weapons material.* As the United States and Russia have reduced their nuclear arsenals, various amounts of HEU and plutonium have been declared by both countries as excess to their nuclear weapons needs, and a portion of that surplus has been converted into material unusable in nuclear weapons. In 1993,

3. *Global Fissile Material Report, 2007*, International Panel on Fissile Materials, p. 7.

4. *Strategy Options for the UK's Separated Plutonium*, The Royal Society, September 2007, p. 9.

5. *Japan's Spent Fuel and Plutonium Management Problems*, Tadahiro Katsuta and Tatsujiro Suzuki, International Panel on Fissile Materials, 2006.

6. *Global Fissile Material Report 2007*, op.cit.

Russia declared 500 metric tons of HEU from dismantled nuclear weapons as excess and agreed, in the U.S.-Russia HEU Purchase Agreement, to blend the material down to LEU and sell it to the U.S. as reactor fuel. Well over half that material has already been down-blended. In 1994, the U.S. declared 174 tons of HEU as excess, roughly 87 tons of which has been down-blended. In 2005, the U.S. declared an additional 200 tons of HEU as excess and said it planned to down-blend 52 tons, reserve 128 tons for naval-reactor fuel, and allocate 20 tons for space and research reactors.[7] In 2000, the U.S. and Russia each agreed to dispose of 34 tons of excess, former weapons plutonium, but their plans to burn the excess plutonium in reactors ran into legal, financial, and other obstacles. With the U.S.-Russian "mutual understanding" of November 19, 2007, on funding and on disposition paths for Russian plutonium (burning in the BN-600 and BN-800 fast-neutron reactors), that agreement seems to be back on track, but the disposal of the material is still decades away.[8] At the 2007 IAEA General Conference, Secretary of Energy Samuel Bodman announced that an additional nine tons of plutonium from nuclear weapon "pits" had been declared excess to weapons needs and eventually would be converted to reactor fuel. However, despite these initial steps by Russia and the United States, both countries still have large quantities of weapons materials that they have been reluctant to declare as excess. Moreover, the conversion of excess HEU and plutonium to materials no longer usable in nuclear weapons has proceeded much too slowly, especially in the case of plutonium for both countries and HEU for the U.S. This problem of large stocks of surplus material—no longer needed for weapons but still readily usable for weapons—will be magnified as the two sides

7. Ibid, p. 20.

8. Joint Statement on Mutual Understanding Concerning Cooperation on the Program for the Disposition of Excess Weapon-Grade Plutonium, November 19, 2007.

implement the nuclear weapons reductions called for in the 2002 Moscow Treaty and pursue even deeper reductions.

- *Naval reactor fuel.* A significant military, non-explosive use of HEU is to fuel nuclear reactors on naval vessels, both submarines and surface ships. With HEU, it is easier than with LEU to design reactor cores that are highly compact (a critical requirement for submarines) and yet do not need re-fueling for long periods of time. Indeed, all U.S. submarines have HEU cores designed to last for the entire design life of the submarine. In addition to submarines, all U.S. aircraft carriers are HEU-powered. Most Russian submarines and nine civilian icebreakers operate with HEU, as do British submarines whose nuclear propulsion systems rely heavily on the United States. France has both HEU- and LEU-powered submarines but is planning to fuel future naval reactors with LEU. China is believed to rely on LEU or near-LEU fuel for naval propulsion, and India is also pursuing nuclear-powered submarines, probably HEU-fueled. The U.S. hasn't produced HEU for naval reactors since 1991. To meet its naval propulsion needs, the U.S. has set aside a reserve of 128 tons of HEU from excess weapons stocks. In announcing the allocation of HEU to naval propulsion, Secretary of Energy Samuel Bodman said that it would have the effect "of postponing the need for construction of a new uranium high-enriched facility for at least 50 years."[9] On the basis of estimates that the U.S nuclear fleet consumes roughly two tons of HEU annually, independent experts calculate that the naval propulsion reserve would be sufficient to power U.S. ships for 40–60 years.[10] In addition to those 128 tons and an undisclosed amount of HEU held by the Navy before the 2005 allocation, the

9. Statement by Secretary of Energy Samuel Bodman at the Carnegie Endowment for International Peace, November 7, 2005. Bodman's November 2005 announcement called for allocating 160 metric tons to the nuclear Navy but that was later changed to 128 tons.

10. *Global Fissile Materials Report*, 2007, p. 11.

naval propulsion program will presumably be able to draw upon HEU released from future nuclear weapons reductions. Despite the abundance of HEU the Navy has at its disposal, the U.S. draft FMCT would still permit new production of HEU for military, non-explosive uses.

- *Civil HEU.* Civil HEU—highly enriched uranium used to fuel civilian research reactors and produce isotopes for a range of peaceful applications—constitutes a small percentage of global HEU stocks. But civil HEU is widely dispersed at over 100 research centers in over 28 countries around the world, and many of those sites and their nuclear materials are inadequately protected against theft or seizure. Given the relative ease of making first-generation nuclear bombs out of HEU (as compared to plutonium), the security of HEU stocks worldwide has become a priority in U.S. efforts to prevent nuclear terrorism. In part due to its concerns about terrorists getting access to HEU, the U.S. has long sought to end the use of HEU in civil nuclear programs worldwide. Since 2004, it has actively pursued the Global Threat Reduction Initiative (GTRI), which is aimed at removing HEU fuel from potentially vulnerable research reactor sites around the world, sending HEU fuel back to its countries of origin (mostly the U.S. and Russia), and converting research reactors to operate on non-weapons-usable LEU fuel. After a slow start, GTRI is now making progress. But much remains to be done and the pace of the "global cleanout" of civil HEU needs to be accelerated. Moreover, at least so far, the initiative does not cover a substantial number of facilities that contain large quantities of HEU, including over 50 HEU-fueled research reactors and 15 icebreaker reactors in Russia. Under the U.S.-Russia Material Consolidation and Conversion Program, however, 17 tons of excess civil HEU from Russian research institutes will be blended down to LEU by the end of 2015.[11]

11. Ibid, p. 28.

A broader scope?

While the U.S. and the other NPT nuclear powers have favored an FMCT prohibiting only new production of fissile materials for use in nuclear weapons—and not addressing the four categories of fissile materials discussed above—some governments and non-governmental experts have suggested a more ambitious approach, broadening the scope of an FMCT in a number of possible ways.

For example, instead of prohibiting new production of fissile material only for use in nuclear weapons, an FMCT might also ban new production for other uses. An FMCT, at least theoretically, could prohibit further reprocessing of plutonium for use in civil reactors, further production of highly enriched uranium for civil uses, and/or further production of HEU for military, non-explosive uses. Each of these possible expansions of the scope of the prohibition would have strong opponents.

Another way to broaden the scope of an FMCT would be to address not just the production of fissile material after entry into force (the traditional "cutoff") but also material produced *before* entry into force. An approach addressing existing fissile material stocks:

- could cover one or more categories of such stocks (e.g., civil HEU, HEU for naval propulsion, civil plutonium);
- could call for one or more kinds of measures to be applied to such categories of materials (e.g., declarations, safeguards, conversion to non-weapons-usable forms);
- could be voluntary or legally binding; and
- could be an integral part of an FMCT or adopted separately and in parallel with it.

The question of whether an FMCT should deal with existing stocks of fissile material has been a contentious one. While the five NPT nuclear powers and India have opposed addressing existing stocks, Pakistan, Egypt, other non-aligned countries, and even some

Western countries have pressed for covering them in some fashion. Their motives and proposed methods for dealing with existing stocks have varied widely.

Pakistan said it sees the FMCT as an opportunity to "seek a solution to the problem of unequal stockpiles"[12]—presumably between Pakistan and India—but has not been clear on how an FMCT would deal with such asymmetries. Similarly, Egypt has suggested that an FMCT could provide a way to get at Israel's existing nuclear capability. South Africa proposed that material declared excess to military needs be placed under a special verification arrangement until it can be converted to a less sensitive form. Canada suggested a "separate but parallel process" to deal with existing stocks. Still others expressed the view that an FMCT that simply capped existing weapons stocks at very high levels and didn't require reductions would not meet the requirements of NPT Article VI. Given the differences of approach, the 1995 Shannon mandate left the issue open, specifying that agreement to begin negotiations on a treaty banning the production of fissile materials for nuclear weapons "does not preclude raising for consideration past production or management of such material."[13]

Pursuing an FMCT in today's strategic environment

During the 1990s, when the CD first began struggling with a mandate for FMCT negotiations, the United States viewed a cutoff treaty as a modest arms control measure that could codify the de facto moratorium on the production of fissile material for nuclear weapons by the five NPT nuclear powers, cap fissile material production for weapons by the nuclear powers outside the NPT, and demonstrate progress in fulfilling NPT Article VI. In today's circumstances, there are several reasons for considering a more ambitious approach that would regard

12. Statement by Ambassador Munir Akram to the Conference on Disarmament, July 30, 1998.

13. The Shannon Report and Mandate, March 1995, http://www.acronym.org.uk/fissban/Shannon.htm

the FMCT not just as a modest arms control measure but also as an opportunity to give greater impetus to international efforts to control, monitor, manage, and dispose of fissile materials worldwide.

- Since 9/11 and the realization that al-Qaeda and other terrorist groups are seeking to acquire nuclear weapons, preventing non-state actors from getting their hands on nuclear weapons and fissile materials has become a top national security priority. Denying them access means adopting strong physical protection measures for nuclear installations and fissile material stocks. But because larger stocks will be more difficult and costly to protect, it also means minimizing the growth of fissile material stocks worldwide and accelerating their conversion to non-weapons-usable forms.
- During the Cold War, most fissile materials were contained in nuclear weapons which, for the most part, are subject to rigorous accountability and protection measures. In the post-Cold War period, with the reduction and dismantling of nuclear weapons, there are much greater quantities of fissile material outside of weapons and those materials may wait many years before being disposed of in a manner that renders them non-weapons-usable.
- If reliance on nuclear power grows in coming decades as many expect, we may see an increase of sensitive fuel-cycle facilities in various parts of the world which, in turn, may mean a growth in the production of fissile materials, both for peaceful and military uses.
- Finally, if the international community is serious about moving toward a world without nuclear weapons, it will have to get a handle not just on the number of nuclear weapons and the fissile material contained in weapons but also on the vast stocks of fissile material outside of weapons that could be used to re-generate a nuclear weapons capability. Of course, the risks of re-generation are most acute when the numbers of nuclear weapons reach very low levels. But trying to get a handle on fissile material stocks

> only when those low levels are reached would be too late. If the international community is eventually to have confidence that substantial fissile material breakout capabilities do not exist, it will have to start soon to try to gain a better understanding of worldwide fissile material stocks and how they might be brought under greater control.

For these reasons, the U.S. should take another look at the scope and objectives of a fissile material cutoff treaty, and particularly at whether the treaty itself—or separate measures adopted in parallel with it—should seek to address some of the problems associated with fissile material stocks outside of weapons.

The remainder of this paper will address the challenge of controlling fissile materials worldwide. It will first look at some of the questions that arise in negotiating an FMCT and then will discuss how issues associated with existing fissile material stocks might be approached.

Key issues in pursuing an FMCT

Scope of the prohibition. Summarizing informal discussions on FMCT issues by CD members in February and March 2007, Italian CD Ambassador Carlo Trezza noted that it was "generally accepted" that only fissile materials for use in nuclear weapons—and not materials for naval and space propulsion or civil research reactors—should fall within the scope of the Treaty.[14] Notwithstanding this broad support for covering only materials for use in nuclear weapons, however, the possibility of expanding the scope to cover the production of fissile materials for *non*-weapons purposes should be considered.

Banning the production of plutonium for civil purposes would be a bridge too far. Countries currently reprocessing civil reactor spent

14. Report on informal meetings in the Conference on Disarmament on item 2 of the CD agenda, contained in CD/1827, 16 August 2007.

fuel and planning to recycle plutonium as fuel—including France, Japan, Russia, and India—would strongly oppose a prohibition on production of civil plutonium. And because these are countries whose support for an FMCT would be critical, it makes little sense to seek such a ban. Instead, concerns about the worldwide buildup of civilian separated plutonium stocks should be addressed outside an FMCT (see below).

A broader ban on producing HEU—that is, broader than the ban on producing HEU for use in nuclear weapons—may be more feasible. As a result of the widely-supported U.S. policy to eliminate the worldwide use of HEU for civil purposes—including by converting HEU-fueled research reactors to operate on LEU—we can expect demand for civil HEU to fall over time. For those few civilian and research applications that cannot readily make the transition to LEU, existing HEU stocks (including excess from weapons programs) can keep them supplied for a substantial period pending conversion. Indeed, the U.S. has already set aside more than 20 tons of excess weapons HEU for this purpose. Consideration should therefore be given to banning new production of HEU for civil purposes.

As noted above, the U.S. naval propulsion program already has a dedicated stockpile of HEU that can last at least 50 years and probably more. Moreover, additional weapons-grade uranium made excess to U.S. weapons needs by nuclear force reductions could be allocated to the naval program if necessary. Therefore, there will be no need, at least for a considerable period of time, for the U.S. to produce more HEU for military, non-explosive uses. The Russians, drawing on their own excess weapons HEU, and the British, relying on their own resources as well as ours, should also have no near-term requirement for producing additional HEU for naval reactors. The French, whose future naval propulsion programs are likely to use LEU, may see no need for HEU production. The future direction of Chinese and Indian propulsion programs are less well known. One approach would be for the FMCT to allow HEU production for naval propulsion for a grace

period of 20–25 years, after which production would be banned. The 20–25-year period would provide an opportunity for current users of HEU for naval propulsion to make the transition to LEU if they so desired. An alternative would be to ban production for naval fuel for 20–25 years, after which the ban would automatically end unless all FMCT parties that have naval reactors agree to extend the ban.

So, depending on which HEU option is chosen, it might be possible to have an FMCT that permitted civil plutonium production but prohibited HEU production for civilian use and phased it out for naval propulsion. This would somewhat simplify the verification task and end production of the material most useful to terrorists in fabricating a nuclear bomb.

Should the FMCT contain international verification provisions? As noted above, the Bush administration has reversed long-standing U.S. policy and proposed an FMCT without international verification. A U.S. White Paper states that "the United States has concluded that, even with extensive verification mechanisms and provisions—so extensive that they could compromise the core national security interests of key signatories, and so costly that many countries would be hesitant to implement them—we still would not have high confidence in our ability to monitor compliance with an FMCT."[15] Instead of relying on international measures, the U.S. approach calls on all parties to use their own national means to reach judgments about compliance, with the U.N. Security Council serving as the ultimate arbiter on compliance questions.

Among the insurmountable verification challenges claimed by the administration is the small likelihood of discovering covert centrifuge enrichment facilities, the difficulty of determining whether detected fissile material was produced legally (before entry into force) or illegally (after entry into force and for a proscribed purpose), and the

15. United States of America: White Paper on a Fissile Material Cutoff Treaty, http://geneva.usmission.gov/Press2006/0518WhitePaper.html

complications involved in verifying the non-diversion to weapons of HEU produced for naval propulsion (because naval propulsion facilities and processes are too sensitive to monitor). In addition, the administration argues that developing a consensus on verification arrangements in the 65-nation CD would take several years—during which countries would continue to build up their fissile material stocks—whereas the "normative treaty" proposed by the U.S. could be finished quickly.

Although the U.S. is not completely isolated in its opposition to international verification, it is in a small minority. Proponents of verification measures note that the IAEA has plenty of experience confirming the shutdown of facilities and verifying that only legal production is taking place at declared reprocessing and enrichment facilities. They point out that familiar "managed access" procedures can be used to deny inspectors sensitive information at nuclear weapon states' facilities. Moreover, while they recognize the difficulty of finding clandestine production facilities, they believe that "special inspection" and "complementary access" procedures, available to the IAEA under NPT safeguards agreements and the Additional Protocol, can take advantage of such techniques as environmental sampling and wide-area environmental monitoring of Krypton-85 (for detection of reprocessing) to significantly reduce the likelihood of undetected cheating. (While the Bush administration cites the difficulty of detecting clandestine enrichment facilities as a key reason why an FMCT is unverifiable, the same verification challenge exists for monitoring NNWS' compliance with the NPT—and the administration has not claimed that it is not worthwhile for the IAEA to attempt to verify the NPT.)

While no verification system is perfect, it should be possible to construct an FMCT verification system that is capable of protecting U.S. security interests better than having no international verification arrangement. The U.S. official responsible for FMCT in the late 1990s came to that conclusion: "We think that a strong regime of routine

monitoring of all [fissile] production facilities and all newly produced material and a regime for non-routine or so-called challenge inspections would give us enough building blocks to build an effective verification regime."[16]

If an FMCT is seen not as an isolated arms control measure but as a step toward a world without nuclear weapons, then the debate on whether to include international verification measures in an FMCT is won decisively by the proponents of verification. Moving to a world of few or no nuclear weapons will require that we have high confidence in a verification system. But such confidence will have to be built in stages and over an extended period of time. Clearly, the security stakes of non-compliance with an FMCT (which might involve an existing nuclear power producing additional fissile material rather than capping its capability) would be far lower than the stakes of cheating in the endgame of total nuclear disarmament (where the covert production or retention of a few nuclear weapons would have major security consequences). And so the FMCT provides an opportunity, at relatively low risk, to test the effectiveness of international verification and to gain experience that can be used to evaluate whether, and with what kind of verification, to proceed further down the path toward a nuclear-free world.

Should verification measures be an integral part of the FMCT or negotiated separately and subsequently? One of the arguments the Bush administration makes for excluding international verification provisions from an FMCT is that it would avoid years of negotiation on a verification regime and allow the prohibition to take effect before much more fissile material is produced. A better way to avoid such a lengthy delay in halting production would be to negotiate and bring into force quickly something like the Bush administration's short "normative" treaty (i.e., without verification) but to include a provision

16. Michael Guhin, Statement at the Carnegie International Nonproliferation Conference, Washington D.C., January 11-12, 1999.

obligating the parties and the IAEA, within a realistic period of time (e.g., two years), to work out a verification regime. Unlike the approach adopted in the Chemical Weapons Convention, which contained detailed verification measures in the Convention itself, this approach would follow the precedent of the NPT, which called for verification in Article III but left the verification system to be elaborated separately (which later took the form of bilateral "safeguards" agreements between each party and the IAEA based on a model agreement contained in IAEA document INFCIRC/153). A two-step FMCT approach along these lines was suggested by Australia.[17]

Separating the political obligations and verification measures in this way involves some drawbacks. In particular, it would require parties to begin implementing a cutoff without knowing what verification measures will eventually be agreed—indeed, without knowing whether agreement on a verification system will be reached at all. Some states may be reluctant to halt their own production without knowing whether the verification regime to be worked out will be adequate to detect possible noncompliance by other states. Such a two-step approach, however, would also have benefits—not just the advantage of not having to defer a production halt until detailed verification measures can be negotiated but also greater flexibility to strengthen the verification system in the future without having to amend the treaty itself.

Assuming the negotiating parties decide, contrary to the current U.S. position, that international measures should be adopted to verify an FMCT, the choice between integral and separate verification provisions will be an important issue for the negotiations. If it appears that agreement can be reached relatively soon on detailed verification measures, then the best approach would probably be to make them an integral party of the treaty text. But if it becomes clear that negotiating

17. Australian Working Paper, "Suggestions for Progressing the Fissile Material Cutoff Treaty," CD/1775, 17 May 2006.

verification provisions would significantly delay a production halt, then one of the following two alternatives should be pursued. The first would be the approach discussed above—bring the treaty into force soon and negotiate the verification system later. The second would be for key countries—perhaps the five NPT-nuclear-weapon states or the seven countries that have declared themselves nuclear powers and tested nuclear weapons (the five plus India and Pakistan)[18]—to adopt a moratorium on producing fissile materials for nuclear weapons pending completion and entry into force of an FMCT containing integral verification provisions. Because the moratorium would not be legally binding and therefore be more easily reversible, it might have greater appeal to countries reluctant to accept a legal obligation to stop production without knowing what the FMCT's verification measures will be.

Comprehensive vs. focused verification. Assuming that an FMCT will contain international verification measures, compliance by non-nuclear weapon states would be monitored by their existing NPT safeguards agreements and Additional Protocols (which should be mandatory for FMCT parties). To monitor compliance by the nuclear weapon states that join the FMCT, whether or not they are party to the NPT, a choice would have to be made between two differing approaches:

- A *focused* approach would monitor all enrichment and reprocessing facilities to confirm either that the facility had been shut down or that any continued production of HEU or separated plutonium was for non-proscribed purposes (e.g., plutonium fuel for civil reactors). Any plutonium or HEU produced for non-proscribed purposes would continue to be monitored at "downstream" facil-

18. North Korea and Israel would not be included in this group. North Korea has tested a nuclear weapon and occasionally declared itself a nuclear weapon state, but is now claiming that it is willing to give up its nuclear capability. Israel is universally believed to have nuclear weapons, but it has not declared itself a nuclear weapon state and there is no proof that it ever carried out a nuclear test.

ities (e.g., fuel fabrication plants) until they are no longer weapons-usable—until, for example, the plutonium in MOX fuel is loaded in a reactor or HEU is down-blended to LEU. In addition to monitoring at these declared locations, there would be agreed inspection and monitoring procedures (e.g., environmental sampling) to enable the IAEA to search for undeclared fissile material production.

- A *comprehensive* approach would include everything in the focused approach but would also include the entire civilian fuel cycles of the nuclear weapon states, including all civilian nuclear reactors, fuel fabrication, and storage facilities and exempting only military facilities and existing fissile material stocks.

Since separated plutonium and HEU can only be produced in reprocessing or enrichment facilities, it is sufficient, for the purpose of verifying new production of fissile material, to monitor reprocessing and enrichment facilities (and to try to detect any undeclared enrichment and reprocessing plants). Monitoring a wide range of other civil nuclear facilities in nuclear weapon states could add marginally to confidence in compliance, but that increment of confidence is more than offset by the additional cost of applying safeguards to a much larger number of facilities and the possibility that the more extensive verification arrangements would drive some countries away from the treaty.

The principal argument for the comprehensive option is a political one—that it would reduce the discriminatory nature of the nonproliferation regime by narrowing the gap between safeguards coverage in the nuclear and non-nuclear states and therefore make the safeguards burden more equitable. Minimizing discrimination is a worthy goal, but it would be better to ask the nuclear powers to shoulder a greater burden in areas that produce real payoffs (e.g., converting fissile materials to materials not usable in nuclear weapons, see below) than to ask them to make what are little more than symbolic gestures. For

these reasons, the focused approach to FMCT verification is preferable.

Entry into force requirement. The legal-sounding issue of entry into force has huge consequences for the value of an FMCT. To get the maximum benefit from an FMCT, we would want all nuclear weapon states, whether NPT parties or not, to join the treaty. But given the current reservations of some of those states toward an FMCT, requiring them all to get on board from the start, could delay entry into force indefinitely.

One option would be to require, as a condition for entry into force, the adherence of all states that have tested nuclear weapons and declared themselves to be nuclear weapon states—the NPT five plus India and Pakistan.[19] But there are several problems with this approach, not the least of which is that both India and Pakistan may be determined to continue building up their fissile material stocks, in which case they will refuse to adhere and entry into force will be blocked. Moreover, Indians (and perhaps Pakistanis too) would regard this option as an attempt to pressure them on a vital national security matter and could produce a nationalistic backlash against the FMCT (as happened in the case of the CTBT, whose entry into force provision included India among the states required for entry into force). In addition, many states, especially from the Arab world, would question why Israel was not on the list.

Another option would be to require adherence by all states with unsafeguarded nuclear facilities—which would add Israel to the seven in the first option. While this has the virtue of including all states whose participation would make the FMCT a success, it has most of

19. As indicated in the preceding footnote, the DPRK has tested a nuclear weapon and declared itself a nuclear weapon state, but is now claiming that it is willing to give up its nuclear capability. Moreover, to put North Korea in the category of states whose adherence is necessary for entry into force would tend to give it recognition as a nuclear weapon state at a time when the Six Party Talks are attempting to achieve its de-nuclearization.

the problems of the first option plus some of its own, the most critical of which is that Israel has made clear that, at least under current conditions in the Middle East, it wants nothing to do with an FMCT. Its opposition to an FMCT probably has little to do with a desire to produce more fissile material (it probably has enough plutonium for any reasonable deterrence requirements) and more to do with concerns about intrusive inspections at Dimona and possible transparency provisions that could compromise its longstanding policy of strategic ambiguity.

The preferred option—and the one included in the U.S. draft treaty—is to condition entry into force on adherence by the five NPT nuclear weapon states. Given their responsibilities as NPT parties, especially under Article VI, this is fitting. Moreover, since none of the five is currently producing fissile material for nuclear weapons, there is a reasonable possibility that the five will be prepared to adhere at an early date. (The one question mark is China.) By not requiring the non-NPT nuclear powers to join from the beginning, this option would avoid putting undue pressure on them and risking a backlash. Indeed, the initiative and leadership of the five would provide strong encouragement for the others to follow suit and, before long, if not from the outset, it would, one hopes, be possible to bring some or all of them on board. This option also avoids the perception—which might accompany the first two—that the non-NPT nuclear powers were being given *de jure* status as nuclear weapon states.

Addressing existing stocks of fissile materials

As suggested above, there are several reasons why existing fissile material stocks should not be ignored while pursuing an FMCT, including the risks of terrorist access to bomb-making materials, the possibility that existing non-weapons stocks could be diverted to weapons uses in circumvention of the FMCT, and the need to begin laying the foundation for going to very low levels of nuclear forces.

A number of countries want the issue of existing fissile materials

to be handled in the CD as part of an FMCT. However, there are strong reasons for not doing so:

- Several unilateral, bilateral, and multilateral efforts are already underway to address problems associated with fissile materials outside weapons (e.g., HEU Purchase Agreement, GTRI) and nothing done in the context of FMCT negotiations should be allowed to interfere with those efforts.
- Dealing with existing stocks could import bilateral disputes into the FMCT negotiations (e.g., India-Pakistan, Egypt-Israel) which could politicize deliberations and lead to paralysis.
- Not all nuclear weapon state stakeholders on the fissile material issue are ready or willing to accept new responsibilities with respect to their existing stocks, which could lead to gridlock in the negotiations.
- Some NNWS would be tempted to try to deal with the issue of existing stocks as a nuclear disarmament measure (i.e., seek reductions in fissile materials contained in weapons) and this would soon bog down the process.

In view of these factors, it would be better to handle the FMCT and the issue of existing stocks separately. However, given the number of states that insist on dealing with existing stocks in the FMCT, this may not be easy to do without stirring up major controversy. Consideration should therefore be given to how the two processes might be linked. Perhaps the most promising approach would be to include in the FMCT text a general provision or provisions that would obligate those parties possessing fissile materials to develop arrangements separately that would serve particular goals—for example, increasing quantities of fissile material declared excess to weapons needs, placing additional excess material under IAEA safeguards, and converting former weapons material as soon as possible to forms not usable in weapons. Such a legally binding commitment regarding existing stocks—albeit of a non-specific character and designed to be further

developed separately—might be sufficient to satisfy the desire to address existing stocks in some fashion while avoiding the gridlock certain to result from trying to negotiate detailed provisions on existing stocks in the Treaty itself.

Fissile Material Control Initiative (FMCI). Assuming there is support for loosely linking an FMCT with existing stocks but for addressing the latter in detail only on a separate basis, what should be done separately on existing stocks? In principle, it might be desirable to have a formal regime covering existing stocks with clear legal obligations binding all states possessing fissile materials. But in practice, it would not be possible at the present time to get such a diverse group of states—with very different fissile material holdings and security perspectives—to agree on a common set of obligations.

Instead of seeking such a formal regime, it would be more promising to create a voluntary multilateral arrangement that would establish common goals and guidelines with respect to fissile material stocks, but would allow each participant to proceed at its own pace. The arrangement—perhaps called the Fissile Material Control Initiative—would be open to any country that possessed fissile material (whether safeguarded or not) and was willing to sign on to a set of agreed principles. It could include NPT nuclear weapons states, nuclear powers not party to the NPT, and NPT NNWS such as Japan and Germany that have safeguarded civil plutonium or HEU. The IAEA would be invited to participate as an observer. FMCI would serve as an umbrella under which individual states or groups of states could act unilaterally or work out agreements, legally binding or not, with other states. It would not affect existing arrangements such as the U.S.-Russia Plutonium Management and Disposition Agreement or GTRI. Participants would meet periodically to share information and discuss new steps that members might wish to take.

The overall goals of FMCI would be to reduce the risks associated with existing stocks of fissile materials (e.g., seizure by terrorists), to move fissile materials verifiably and irreversibly out of nuclear weap-

ons and into forms unusable for nuclear weapons, and in general to help prepare for a world with far fewer or no nuclear weapons. A set of guidelines would be established that partners would be encouraged to follow—if not immediately, then as soon as they can. Not all guidelines would be relevant to all of the partners. For example, a guideline on declaring material excess to nuclear weapons requirements would obviously not be relevant to NNWS partners, and a guideline on managing civil plutonium would not be relevant to partners without civil plutonium programs. The guidelines would cover a wide range of measures:

- *Declarations.* Partners would be requested to make regular declarations on fissile material stocks. They would be asked to provide total HEU and separated plutonium inventories, together with production histories, as well as data broken down by categories—for example, material in weapons and weapon components; material declared excess to weapons requirements but still in classified forms; material declared excess already in unclassified forms; material in naval and other non-explosive military programs (broken down into reserve stocks in unclassified forms, material in fuel assemblies and reactors, and material in spent fuel storage); civil HEU and separated plutonium (with their planned uses and locations), and so on. Some of this information is already publicly available. For example, the U.S. and U.K. have already provided extensive data on their HEU and plutonium holdings, both aggregated and disaggregated. And participants in the "Guidelines for the Management of Plutonium" initiative[20] (Belgium, China, France, Germany, Japan, Russia, Switzerland, the U.K., and U.S.) provide annual data on civil plutonium and, to a lesser extent, civil HEU. But so far, information on military stocks other than for the U.S. and U.K. has rarely been available. Partners may wish

20. *Guidelines for the Management of Plutonium*, International Atomic Energy Agency, INFCIRC/549, 16 March 1998.

to proceed incrementally with their declarations, starting with aggregate holdings and proceeding to more detailed reporting over time. Declarations would be a key part of FMCI. They not only demonstrate transparency internationally, but can assist domestic authorities in planning their own material-management programs. And accurate declarations provide an indispensable baseline for moving to nuclear disarmament.

- Physical protection. FMCI partners would be asked to apply the highest standards of physical protection and accountancy to all their fissile materials, whether military or civilian. They would be encouraged, if they have not already done so, to adhere to the Convention on the Physical Protection of Nuclear Material, as recently amended. Although they are unlikely to interact on questions specifically related to their military fissile materials or nuclear weapons, they should be encouraged to engage one another on "best practices" in the generic area of nuclear security, and perhaps establish peer review procedures or use IAEA assessment teams to confirm that physical protection measures at their civilian facilities are up to the highest standards.
- *Excess material and safeguards.* As reductions in nuclear weapons proceed, large additional quantities of fissile material will become excess to nuclear weapons needs. Under the FMCI, the nuclear powers should be requested to declare regularly as much excess material as possible and, as soon as practicable, to make such material available for international safeguards under their so-called "voluntary offer" safeguards arrangements with the IAEA. Making excess material available for safeguards would provide assurance that it will not be returned to weapons use. A commitment to this effect was made at the 1996 G-8 summit in Moscow. The Moscow Nuclear Safety and Security Summit Declaration stated: "We pledge our support for efforts to ensure that all sensitive nuclear material (separated plutonium and highly enriched uranium) designated as not intended for use for meeting defense

requirements is safely stored, protected and placed under IAEA safeguards (in the Nuclear Weapon States, under the relevant voluntary offer IAEA safeguards agreements) as soon as it is practicable to do so."[21] So far, only the U.S., Russia, and the U.K. have declared any former weapons material as excess, but substantially more of their material could be. Moreover, of the material already declared excess, only a small portion has been made available for IAEA safeguards. An impediment to putting excess materials quickly under safeguards is that much of the declared material is often in sensitive, classified forms (e.g., weapons components). In the late 1990s, the U.S., Russia, and the IAEA participated in a Trilateral Initiative aimed at developing techniques that could ensure inspectors that materials made available for safeguards came from weapons without revealing sensitive weapons characteristics. Although the Trilateral Initiative was abandoned before it could be put into effect, it should now be resurrected (perhaps with additional participants) and, if proven to be effective, should be used to place classified excess material under international safeguards. If the effort to develop "information barriers" capable of concealing sensitive characteristics proves unsuccessful, states should be encouraged to convert the sensitive materials as quickly as possible to unclassified forms so they could be made available for regular IAEA safeguards.

- With respect to *civil* plutonium and HEU, that material is already under safeguards in NNWS, and is already under Euratom/IAEA safeguards in the U.K. and France. FMCI should request that civilian materials in the other nuclear weapon states, including non-NPT states, also be placed under IAEA safeguards. With respect to HEU for *naval* reactors, national security sensitivities preclude the normal application of safeguards. Under FMCI, however,

21. Text of the Moscow Nuclear Safety and Security Summit Declaration, IAEA Information Circular, 4 June 1996. http://www.iaea.org/Publications/Documents/Infcircs/1996/inf509.shtml

approaches should be developed that provide assurance about aggregate quantities of material assigned to naval programs and confidence that material assigned to the program is not being diverted to nuclear weapons. For example, monitoring naval reserve stocks of HEU and the amounts of material periodically withdrawn from those reserves and sent to naval fuel fabrication facilities might, without divulging sensitive information, provide confidence that the material withdrawn was roughly consistent with requirements for naval reactor operations.

- *Disposition.* Converting fissile materials to forms that cannot be used for nuclear weapons is the best way to provide confidence in the irreversibility of the disarmament process. Various conversion programs are already underway, including the HEU Purchase Agreement, the Plutonium Management and Disposition Agreement, the Material Consolidation and Conversion Program, and the Global Threat Reduction Initiative. FMCI should encourage the acceleration of these programs, especially the program for weapons plutonium disposition, which has not yet disposed of a single gram of plutonium. Moreover, even once these programs discharge their current mandates, there will remain huge stocks of HEU and separated plutonium—a substantial share of which has already been declared excess to weapons needs—that have yet to be moved to the queue for disposition. For example, the 34 tons of plutonium Russia is now committed to dispose of is estimated to be only one-quarter of Russia's total stock of weapons plutonium, while for the U.S. the 34 tons is only one-third of its plutonium inventory.[22] For civil plutonium, the main path for dis-

22. Matthew Bunn of Harvard's Managing the Atom Project writes that Russia is thought to have about 145 tons of separated weapons-grade plutonium (with an uncertainty of 25 tons) and about 40 tons of civilian separated plutonium, while the U.S. has about 92 metric tons of plutonium separated from spent fuel. "Troubled Disposition: Next Steps in Dealing with Excess Plutonium," in *Arms Control Today*, April 2007.

position is burning the material in reactors, but much more plutonium is being produced today than consumed. The Guidelines for the Management of Plutonium that were developed a decade ago noted "the importance of balancing supply and demand," so as to keep on hand only "reasonable working stocks" of plutonium rather than the glut we are now accumulating.[23] FMCI should take a new look at those guidelines with a view to reducing existing stocks of civil plutonium.

While ideally we would want all states with fissile materials to join FMCI from the outset and subscribe to all of its guidelines, in practice it would be a voluntary, evolutionary process in which participants, at least initially, choose "a la carte" which elements they are prepared to implement. As FMCI partners become more receptive to addressing their fissile material stocks internationally, FMCI's agenda would become more ambitious—and could include establishing benchmarks and a road map that would provide target dates for when benchmarks should be met. The goal, over time, would be to make FMCI an increasingly rigorous, comprehensive (in terms of materials covered), inclusive (in terms of participants), and perhaps even legally-binding regime for the accounting, management, and disposition of fissile material stocks worldwide.

Outlook for negotiations

As noted earlier, the longstanding impasse on getting FMCT negotiations underway has less to do with procedural difficulties than with substantive reservations about the treaty itself. Some countries, like India and Pakistan, seem reluctant to stop producing fissile materials for nuclear weapons. Others, like China, may wish to keep their future options open. Still others, like Egypt and some other non-aligned countries, may have unrealistic expectations that an FMCT can be

23. *Guidelines for the Management of Plutonium*, International Atomic Energy Agency, INFCIRC/549, 16 March 1998.

used to promote nuclear disarmament (including by Israel). And the Bush administration's approach toward verification has become another divisive and impeding factor.

The United States will have to play a leading role in ending the stalemate. A good first step would be to return to its traditional support for a treaty with verification provisions. It should also use its recently improved relationship with India to encourage a more forthcoming posture by New Delhi. During the last two years of negotiations with the U.S. on the U.S.-India nuclear deal, India has felt compelled, in the face of domestic criticism, to oppose all constraints on its strategic programs. One hopes that in due course the Indian government will show greater willingness to end its production of fissile materials for nuclear weapons. If India becomes more receptive to FMCT negotiations, Pakistan will come under strong international pressure to follow.

Even if the key countries are prepared to begin the process, the CD may prove to be unwieldy as a negotiating forum. If we see that various countries are inclined to abuse the consensus rule to push their own hobby horses, we should consider assembling an ad hoc group of countries with a strong stake in fissile material issues (the NPT nuclear powers, the non-NPT states, and NNWS with fissile material production capabilities) and seek to begin the process there. If agreement on the central elements of an overall FMCT-FMCI package could be worked out in that ad hoc group, the group could decide whether to bring the FMCT portion of the package to the CD for completion of the negotiations, send it to a different body (perhaps a committee convened by the IAEA Board of Governors), or simply complete it in the ad hoc group and send it to the UNGA for endorsement.

Toward a world without nuclear weapons

Among the practical steps to be taken on the way to a world with few or no nuclear weapons, controlling fissile materials may deserve a

somewhat lower priority than reducing operationally deployed nuclear weapons, non-deployed nuclear weapons, or even nuclear-capable delivery vehicles. But stopping the production of more fissile material for nuclear weapons is a necessary step toward capping and reducing worldwide nuclear capabilities, which is why an FMCT has long been considered an indispensable part of the nuclear disarmament process.

Stopping additional production of fissile material for nuclear weapons, however, is not enough—not for preventing nuclear terrorism and not even for preventing a further buildup of nuclear weapons capabilities, because of the risk that large stocks of fissile materials produced for civilian or non-explosive military purposes could be diverted to use in nuclear weapons. Indeed, as nuclear weapons are reduced to lower and lower levels, the potential risks associated with materials in civilian programs or materials no longer needed for nuclear weapons become more acute. And that is why the agenda for controlling fissile materials should go beyond the FMCT to a broad international effort to account for, secure, manage, and reduce stocks of fissile materials on a worldwide basis.