



aspen strategy group

## **CTBT ratification issues and options**

Linton F. Brooks

September 21, 2009 (revised October 11, 2009)

Few national security issues are as divisive as whether or not to ratify the Comprehensive Test Ban Treaty (CTBT). It was the only issue on which the recent Congressional Commission on U.S. Strategic Posture could not reach consensus.<sup>1</sup> To the extent that ratification is a rational (rather than an emotional) decision, it depends on resolution of the following major issues:

1. Will the United States gain significant international benefits from ratification, despite the potential problems in bringing the CTBT in force?<sup>2</sup>
2. Can the U.S. nuclear stockpile remain safe, secure, reliable and effective for the indefinite future under a CTBT?
3. Can a CTBT be effectively verified?
4. Can whatever safeguards are devised to deal with the previous two issues endure over time?

In addition, two other issues may not matter in fact, but could have significant political implications: the alleged inconsistency in the understanding of what constitutes a nuclear test and the question of enforcement of the treaty's provisions. This paper describes all of these issues briefly and sets forth possible policy options where such options exist. The default option—reject the treaty—is not listed in each case but is the implicit choice for those who find the suggested options inadequate to deal with the issues.

In evaluating these issues, it is an error to compare the existing CTBT with some hypothetical “better” treaty. Renegotiation of the text is essentially impossible and, in any event, no country ever gets all it wants in a negotiation. Thus, the choice facing the United States is ratification or rejection of the treaty as it stands.

---

<sup>1</sup> For a summary of the positions of the two sides, see *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States*, Chapter 9.

<sup>2</sup> In principle, there is also an issue of whether or not a universally-adhered-to CTBT would enhance U.S. national security. This issue plays no part in the current debate and is not analyzed in this paper

## **International benefits**

The fundamental benefit of a universally-adhered-to CTBT would be to inhibit modernization and improvement of nuclear weapons (so-called “vertical proliferation”), especially by less sophisticated states. While testing is not required for developing an initial nuclear capability, it may be required for the creation of smaller warheads capable of delivery by ballistic missiles or for moving from single-stage fission weapons to thermonuclear devices.

Proponents of U.S. ratification also argue that ratification will bring international no-proliferation benefits even in advance of entry into force. Opponents counter that there is no demonstrated linkage between the absence of U.S. testing and non-proliferation. They cite South Africa giving up nuclear weapons when the United States was testing while India, Pakistan and North Korea tested during periods of U.S. restraint. Proponents agree, but argue that CTBT ratification will restore U.S. international leadership in nonproliferation, allowing more effective international mobilization to counter both proliferation and nuclear terrorism. They cite several states that assert they are unwilling to implement the IAEA Additional Protocol or to move forward on eliminating use of highly enriched uranium in research reactors because of a lack of progress on Article VI of the Nuclear Nonproliferation Treaty (NPT).<sup>3</sup> It is not clear whether these are genuine reasons or simply excuses.

Opponents also argue that U.S. ratification will not bring the treaty into force but will simply place constraints on the United States that other states will not face. Entry into force requires signature and ratification by 44 specific states. Of these, China, Egypt, Indonesia, Iran, Israel and the United States have signed but not ratified; India, Pakistan and North Korea have not signed. Many assume that China, Indonesia and Israel will ratify once the United States does. Egypt is a strong CTBT supporter but may condition ratification on broader Middle East issues. Iran will find it difficult to resist ratification if Israel and Egypt ratify, given its assertion that its nuclear program is for peaceful purposes only. Pakistan can probably be convinced to ratify if (and only if) India does and some believe that India will not wish to be the final holdout (despite recent press reports suggesting a technical need for additional nuclear tests). North Korea remains utterly unpredictable, but there is little reason to believe the current regime will adhere to a CTBT.

Policy options. The differing views of the international benefits of ratification do not appear to call for specific policy options. With respect to entry into force, the following alternatives are possible:

1. Stress the political benefits of U.S. ratification while accepting that entry into force is unlikely in the immediate future.

---

<sup>3</sup>Article VI obligates all NPT parties to “pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.” Many states claim that CTBT ratification is necessary (though not sufficient) to demonstrate a serious U.S. commitment to Article VI.

2. Prepare and publicize the outlines of a concerted diplomatic campaign to reach entry into force. The content of such a campaign is unclear and its prospects for success uncertain.
3. Once China and the United States have ratified, seek agreement on provisional application of CTBT among those states that have ratified. The Senate would need to be aware of this plan prior to giving advice and consent. As a practical matter, it will be politically impossible to accept provisional application until China ratifies the treaty.

### **The stockpile**

After the United States adopted a nuclear testing moratorium in the early 1990s, it established the Stockpile Stewardship program to ensure the continued reliability of the stockpile. Stockpile Stewardship uses non-nuclear experiments (many involving complex new tools), extensive reexamination of the historical test data, and newly-developed supercomputers in an attempt to understand the functioning of nuclear weapons from first principles with sufficient fidelity to verify reliability. All agree that Stockpile Stewardship has been a success. Understanding weapon performance, however, does not ensure weapon reliability, only that we will be aware of problems if they exist.

Because the United States is no longer designing new weapons, it has established life extension programs (LEP) to extend the life of each type of warhead. LEPs use refurbishment to restore the weapons close to an “as built” condition. In recent years, much of the weapons community has come to believe that this approach may, over the long term, prove to be inadequate. The concern is that the inherent increased uncertainties associated with aging will eventually affect reliability, in part because existing weapons were designed with relatively low performance margins in order to maximize yield to weight ratio and minimize the use of plutonium. Of particular concern is the W76 warhead deployed on Trident II missiles. The W76 is the most numerous warhead in the U.S. arsenal and the only one for which there is no backup.

To meet these concerns, the Bush administration proposed a Reliable Replacement Warhead (RRW) program to redesign existing warheads (starting with the W76) to increase performance margins and improve safety and security. Congress did not fund the program and the current administration terminated it, in part for fear that RRW would be perceived as a new weapon and hamper nonproliferation efforts. Some (including the Strategic Posture Commission) now argue that life extension should include a spectrum of options that includes traditional refurbishment, the reuse of existing components (including pits and secondaries) from other designs, or the design of replacement components, including new

pits and secondaries. The administration has not yet endorsed this “robust LEP” approach, which many believe is not needed<sup>4</sup> and is, in essence, RRW by another name.

In strictly technical terms, none of these issues has anything to do with CTBT ratification. The political bar against the United States resuming nuclear testing is extraordinarily high and will almost certainly remain so for years. Thus, the United States should take whatever actions are required to maintain confidence in the stockpile in the absence of testing regardless of whether or not the United States ratifies the CTBT. CTBT ratification is relevant only if one believes that testing might be required in the future to diagnose or correct a significant stockpile problem. But any stockpile problem significant enough to overcome the political inhibitions against testing is almost certainly significant enough to trigger provisions for withdrawing from the CTBT under the supreme national interest clause.<sup>5</sup>

Politically, however, CTBT skeptics will almost certainly link approval of the CTBT to improving the maintenance of the stockpile. They will argue for maintaining the ability to design modified warheads using replacement components and for the policy decision to permit life extension to use all three approaches—refurbishment, reuse, and replacement. They will also argue for increased funding for the weapons complex in order to proceed with complex modernization (widely considered to be vital for safety reasons) while still preserving a robust weapons science program at the national laboratories.

Policy options. Ratification will probably require agreement to a sufficiently robust life extension approach to satisfy those whose primary concern is maintaining the stockpile, while at the same time limiting the perception that such life extension actually involves the design of new weapons. The following alternatives are possible; the choice among them will depend on which of these two concerns any specific individual stresses:

1. Limit life extension to refurbishment, while fully funding Stockpile Stewardship and seeking to maintain sufficient design capability at the weapons laboratories to allow a different decision in the future. (Some will argue that such a design capability can not be maintained without being exercised.)
2. Limit life extension to refurbishment except for the development of a backup for the W76, either by allowing the second half of the ongoing life extension to use redesigned components (as the Strategic Posture Commission proposed) or in some other manner. This reduces the risk of an unexpected failure in the W76 and revitalizes weapons design capabilities.

---

<sup>4</sup> A forthcoming JASONS study will review the need for going beyond refurbishment and the ongoing National Academy of Sciences update of their 2002 CTBT study may review the issue as well.

<sup>5</sup> Developing a fundamentally new type of weapon that required nuclear testing would be precluded by the CTBT (indeed, that is one of its major purposes), but there are no significant voices in the current debate arguing for retaining such a capability.

3. Allow life extension to use all three approaches (refurbishment, reuse, and replacement), deciding which is most appropriate made on a case by case basis. To minimize the concern that this approach would lead to “new” weapons, mandate that life extension not introduce new military capabilities.

A separate policy issue is how much—if any—additional funding for the weapons complex should be provided and whether this funding should be explicitly tied to ratification. This appears to be a question of legislative and budgetary tactics not requiring additional analysis.

### **Effective verification**

The traditional U.S. standard of effective verification requires that the United States be able to detect a militarily significant violation in time to respond effectively and (in some formulations) to deny the violator the benefits of the violation.<sup>6</sup> In the case of nuclear testing, effective verification depends on how small an explosion the United States can reliably detect and on the military utility of tests below that threshold. Unfortunately, both detection and the utility of very low yield tests are complex subjects that cannot be fully analyzed without access to classified data. Thus there is an excellent chance that debate on these issues will be conducted by reference to “dueling experts,” with Senators and staff unable to discuss the issues in detail in an unclassified venue.

A 2002 National Academy of Sciences (NAS) study (now being updated) concluded that underground explosions can be “reliably detected down to a yield of 0.1 kt (100 tons) in hard rock if conducted anywhere in Europe, Asia, North Africa, and North America. In some locations of interest such as Novaya Zemlya, this capability extends down to 0.01 kt (10 tons) or less.” Differing media in which the explosion occurs could cause the actual yield to vary from the hard rock value by a factor of about ten. The study was skeptical of evasion scenarios, but accepted that under some circumstances tests up to 1-2 kt might be concealable under a CTBT.<sup>7</sup> While it is inappropriate to prejudge the results of the current NAS study, it is widely believed that the capability for detection has grown in recent years.

The same 2002 NAS study also assessed the utility of evasive testing (this assessment is also being updated). The NAS concluded that:

States with extensive prior test experience are the ones most likely to be able to get away with any substantial degree of clandestine testing, and ... the ones most able to benefit technically from clandestine testing.... But the only states in this category that are of possible security concern to the United States are Russia and China....the threats these countries can pose to U.S.

---

<sup>6</sup> See Lewis A. Dunn, *Effective Verification across U.S. Administrations – Concept, Approach, and Implications*, Executive Briefing, February 10, 2009.

<sup>7</sup> *Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty*, Committee on Technical Issues Related to Ratification of the Comprehensive Nuclear Test Ban Treaty, National Academy of Sciences, 2002. Executive Summary pp. 5-7.

interests with the types of nuclear weapons they have already tested are large. What they could achieve with the very limited nuclear testing they could plausibly conceal would not add much to this.<sup>8</sup>

Opponents of CTBT ratification argue that this conclusion is too benign. They assert that different design approaches taken by Russia and China might make very low yield tests of greater benefit to these states than comparable testing would be to the United States. The current updating of the 2002 NAS study will probably deal with this issue, although detailed results will be classified.

Policy options. The conditions for ratification will almost certainly include continued emphasis on research and development for nuclear test monitoring and the continued conduct of an extensive intelligence collection and analysis effort focused on foreign nuclear tests. One additional policy option would be to seek to negotiate a separate agreement for additional monitoring at Russian and Chinese test sites (the two states of greatest concern). It is unclear whether such an agreement would be negotiable.

### **Safeguards**

One way to deal with the risks of stockpile maintenance and effective verification is through the provision of safeguards. The Clinton Administration safeguards proposed in 1997 included maintaining a Stockpile Stewardship program and maintaining modern nuclear laboratory facilities and programs, sufficient to continue to attract high quality scientists. By including appropriate safeguards in the resolution giving advice and consent to ratification, the Senate makes its approval contingent on sustained implementation of specific actions over the life of the treaty. There are, however, at least three problems in relying on safeguards:

1. The U.S. record on adhering to them is not stellar.
2. Most require sustained funding and thus require support by the House of Representatives, which is not involved in ratification.
3. Safeguards are typically very general, allowing differing interpretations of whether they are being complied with.

As a result, safeguards may not fully assuage those who have concerns with CTBT ratification.

Policy options. Uncertainty over the future implementation of safeguards is inherent in the American political process. Thus, the goal should be to force the system to consider whether safeguards are effective. Possible options:

---

<sup>8</sup> *Ibid.*, pp 9-10

1. Require the Administration to submit an annual report, similar to the annual stockpile assessment letters prepared by the three weapons laboratory directors and the Commander of the U.S. Strategic Command, on how effectively safeguards are being implemented. This would, at a minimum, force an internal review of the status.
2. Consider devising specific metrics for safeguards to provide a degree of objectivity to these annual assessments.<sup>9</sup> Great caution would be required to devise metrics detailed enough to provide an objective standard without degenerating into a welter of data of limited value to senior leaders.

### **Other issues**

Enforcement. Except for the authority of the United Nations Security Council to act on issues of international peace and stability, there is no supranational ability to enforce arms control treaties. By design, the Security Council cannot act against the permanent members. The only true enforcement mechanism against Russian or Chinese cheating, therefore, is the U.S. ability to respond in kind in order to deny the violator any long-term net benefit from the violation. Enforcement, therefore, has played little role in past arms control ratification debates. Senator Lugar, however, cited enforcement as one of the reasons for his 1999 vote against ratification.<sup>10</sup> Because Senator Lugar may be crucial to ratification, treaty proponents will need to demonstrate that the overall benefits of ratification outweigh any doubts about the ability to enforce compliance.

Definition of a nuclear test. The CTBT does not define a nuclear test. Proponents assert that the public record is clear that all five NPT-sanctioned nuclear weapons states had a common understanding of what the treaty prohibits. Opponents note the absence of any clear document setting forth this agreement and cite statements made by Russian officials over the past several years that imply the Russians are using a different definition than that used by the United States (although some of these statements may refer to the existing moratorium, rather than to obligations under the CTBT). As a result, the Strategic Posture Commission recommended the Administration “secure P-5 agreement on a clear and precise definition of banned and permitted test activity.”<sup>11</sup> Proponents have been dismissive of this recommendation, asserting (probably correctly) that, as a matter of international law, there is no issue. The Administration has not yet chosen to pursue such an agreement. Because it is very difficult to see how using a slightly different definition of a nuclear test can result in a military advantage, this ambiguity (if it exists) is not a technical problem but may be a significant political problem.

---

<sup>9</sup> For additional details on metrics, as well as a discussion of the history of safeguards, see *Comprehensive Nuclear-Test-Ban Treaty: Updated “Safeguards” and Net Assessments*, Jonathan Medalia, Congressional Research Service (R40612), June 3, 2009

<sup>10</sup> “Statement by Senator Lugar (R-IN) in Opposition of the CTBT,” Lugar Press Release, October 7, 1999.

<sup>11</sup> *America’s Strategic Posture*, p. 87

Policy options. The question of enforcement can be partially addressed by a safeguard addressing willingness to withdraw from the treaty if the national security requires (such a safeguard was proposed in 1997) and by a requirement for a periodic formal certification that remaining within the treaty continues to serve U.S. interests. Options for dealing with the definition of a nuclear test include:

1. Ignore the issue, arguing that questions of definition are debating points that will not actually influence any votes.
2. Publish a forceful authoritative explanation of why the Administration believes there is no ambiguity in what is prohibited. Seek Russian acknowledgement that the U.S. statement is consistent with their understanding.
3. Implement the Strategic Posture Commission call for a formal P-5 agreement on definitions. To avoid extensive negotiations over wording, the document could cite the various 1990s statements that are the basis for the belief that there is no ambiguity and simply note that the statements remain the policy of each government.