

CRS Report for Congress

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Comprehensive Test Ban Treaty: Pro and Con

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Summary

The Comprehensive Test Ban Treaty (CTBT) would ban all nuclear explosions. President Clinton signed it in 1996 and transmitted it to the Senate in 1997. The Senate rejected it in 1999. To enter into force, 44 named nations, including the United States, must ratify the treaty. The Bush Administration opposes ratification but has maintained a moratorium on nuclear testing begun in 1992. This report presents pros and cons of key arguments: the treaty's implications for nuclear nonproliferation, for maintaining and developing nuclear weapons, for the value of nuclear weapons, and for maintaining U.S. nuclear advantage; monitoring issues; and potential consequences of resuming testing. This report will be updated periodically. See also CRS Issue Brief IB92099, *Nuclear Weapons: Comprehensive Test Ban Treaty*, and CRS Report 97-1007 F, *Nuclear Testing and Comprehensive Test Ban: Chronology Starting September 1992*.

Status

Following the treaty's defeat in 1999, and pursuant to Senate Rule XXX, paragraph 2, the treaty moved to the Senate Foreign Relations Committee calendar at the end of the 106th Congress, where it currently resides. In 2001, some in the Administration expressed interest in withdrawing the treaty from the Senate to mark formal U.S. rejection. Pursuant to Senate Rule XXX, paragraph 1(d), a Senate motion to return the treaty to the President would require a simple majority vote, but that motion would be debatable, and cloture would require 60 votes. No such motion has been made. As of June 28, 2005, 175 nations had signed the treaty and 121 had ratified it.

The CTBT and Nuclear Nonproliferation

Pro-treaty case: Many see halting nuclear proliferation as critical. Some link the CTBT and nonproliferation as follows. (1) The treaty will make it harder for nations to develop advanced nuclear weapons. (2) The parties to the 1970 Nuclear Nonproliferation Treaty (NPT), including the United States, pledged in Article VI 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 ..." When the parties decided in 1995 to extend the

treaty indefinitely, they agreed to complete CTBT negotiations by 1996. These steps were a *quid pro quo*, proponents stress: nuclear weapon states agreed to work to halt testing; nonnuclear weapon states agreed to forgo nuclear weapons. (3) The Administration views international cooperation as crucial to U.S. efforts to combat weapons of mass destruction (WMD). CTBT supporters believe this nation could more readily secure such cooperation by ratifying the CTBT. At the May 2005 NPT review conference, Ambassador Ronaldo Sardenberg of Brazil said, “Brazil has consistently called for the universalization of the CTBT, which we consider to be an essential element of the disarmament and non-proliferation regime.”¹ Supporters fear that “A U.S. decision to resume testing to produce new nuclear weapons would ... dramatically undermine the NPT.”²

Anti-treaty case: Others hold that the CTBT and NPT will not halt proliferation. The NPT inspection regime, they assert, is of little value in stopping NPT parties from developing nuclear weapons, as shown by Iraq in the early 1990s and apparently by North Korea. Nations that want to develop nuclear weapons could simply not sign the NPT and CTBT and test, as India and Pakistan did in 1998. In this view, nations will decide whether to go nuclear based on their security goals, not U.S. rejection of the CTBT. Some argue that U.S. CTBT ratification would *increase* the risk of proliferation: potential foes, believing the U.S. arsenal was becoming less reliable, would feel less deterred by it. U.S. friends and allies would feel pressed to develop nuclear weapons if their foes went nuclear. A nuclear North Korea, for example, might lead Japan and South Korea to go nuclear. Hence, in this view, a reliable U.S. nuclear deterrent is the most effective barrier against nuclear proliferation, and reliability requires testing.

Maintaining U.S. Nuclear Weapons Under the CTBT

Pro-treaty case: The National Nuclear Security Administration (NNSA) has a Stockpile Stewardship Program (SSP), for which \$6.630 billion was requested for FY2006, that seeks to maintain weapons without testing. SSP draws on nuclear test data, computer codes, supercomputers, experiments on large scientific facilities, and nuclear weapons experts to better understand the science underlying weapon behavior so as to solve weapon problems. CTBT supporters believe this effort is working. Despite the test moratorium, the Secretaries of Defense and Energy certified nine times, beginning in 1997, that the nuclear stockpile safe, secure, and reliable, and that testing is not needed.³ Lack of such certification could lead the President, in consultation with Congress, to withdraw from the treaty and conduct any needed tests. In July 2002, a National Academy of Sciences (NAS) panel “judge[d] that the United States has the technical capabilities to maintain confidence in the safety and reliability of its existing nuclear-weapon stockpile

¹ Statement by Ambassador Rolando Mota Sardenberg, Head of the Delegation of Brazil, at the VII Review Conference of Treaty on the Non-Proliferation of Nuclear Weapons, May 3, 2005, at [<http://www.un.int/brazil/speech/005d-rms-non-ploriferation-0305.htm>].

² Sidney Drell and James Goodby, *The Gravest Danger: Nuclear Weapons*, Stanford, CA, Hoover Institution Press, c. September 2003, p. 89.

³ Testimony of Linton Brooks, Administrator, National Nuclear Security Administration, before Senate Armed Services Committee, Subcommittee on Strategic Forces, April 4, 2005.

under the CTBT” given adequate resources.⁴ A new program that builds on SSP, Reliable Replacement Warhead (RRW), is underway. If RRW works as anticipated, it would replace existing warheads with warheads of modified, simpler design that would reduce the need to conduct nuclear tests.⁵

Anti-treaty case: The President’s *National Security Strategy of the United States of America* of September 2002 discusses the possible need for preemption to counter WMD threats; his *National Strategy to Combat Weapons of Mass Destruction* of December 2002 “reserves the right to respond with overwhelming force — including through resort to all of our options — to the use of WMD.” It is argued that a possibility of using nuclear weapons demands certainty that they will work, yet this certainty is missing without testing. NNSA head Linton Brooks said, “while there is no reason to doubt the ability of a stockpile stewardship program to ensure the safety, security, and reliability of the deterrent, we believe the nation must be prepared to carry out an underground nuclear test in the event of unforeseen problems that can’t be resolved by other means.”⁶ Chemical interactions and radioactive decay cause nuclear weapons to deteriorate. If the United States continues to maintain warheads through refurbishment, CTBT critics fear that current warheads, which were designed, tested, and produced during the Cold War, are so sophisticated that small changes may make them fail. RRW, which would replace current warheads with ones designed to be easier to manufacture and certify, could also introduce problems. Many weapons scientists who gained expertise through testing will retire soon; a return to testing would develop expertise of the next generation of weapon scientists. Thus the CTBT, in this view, would reduce confidence in weapons and the people who maintain them.

The CTBT and the “Value” of Nuclear Weapons

Pro-treaty case: Many supporters believe that the CTBT would help to delegitimize nuclear weapons and strengthen the norm against their use. This norm has been in place since 1945 even though there have been many conflicts in which nations might have sought military advantage by using nuclear weapons. Preserving this norm puts greater emphasis on U.S. conventional forces, by far the strongest in the world, while allowing the United States to maintain its nuclear deterrent.

Anti-treaty case: Others see U.S. nuclear weapons as central to world security. They kept the peace in the Cold War, arguably kept Iraq from using chemical weapons in the 1991 Gulf War, and are part of the Administration’s plan of December 2002 to deter use of WMD. Rogue states that obtained nuclear weapons when confidence in U.S.

⁴ National Academy of Sciences. Committee on Technical Issues Related to Ratification of the Comprehensive Nuclear Test Ban Treaty. *Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty*. Washington, National Academy Press, 2002, p. 1.

⁵ For more on RRW, see U.S. Congress. Congressional Research Service. *Nuclear Weapons: The Reliable Replacement Warhead Program*, CRS Report RL32929, by Jonathan Medalia; and K. Henry O’Brien et al., *Sustaining the Nuclear Enterprise — A New Approach*, UCRL-AR-212442, issued jointly by Lawrence Livermore, Los Alamos, and Sandia National Laboratories, May 20, 2005.

⁶ Testimony of Linton Brooks, Administrator, National Nuclear Security Administration, before House Armed Services Committee, Strategic Forces Subcommittee, March 2, 2005.

weapons had weakened might deter a U.S. response to regional threats. Maintaining high confidence in U.S. weapons preserves the deterrent function of these weapons and makes it unlikely that they would be used. In this view, maintaining weapons requires testing.

The Treaty and the U.S. Advantage in Nuclear Weapons

Pro-treaty case: Proponents contend that the CTBT would permit the United States to widen its immense lead in nuclear weapons technology. This nation has conducted more tests than all others combined, and SSP is improving U.S. weapons knowledge. China has conducted 45 nuclear tests, vs. 1,030 for the United States. The CTBT would prevent China from testing new warheads based on technical advances; without testing, it could not have the confidence needed to build such warheads or rely on them militarily. Russia spends much less on nuclear weapons and its weapons labs have fallen on hard times, making its ability to maintain weapons increasingly questionable. Without testing, it is argued, rogue nations and perhaps terrorist groups could develop simple but not advanced nuclear weapons.

Anti-treaty case: Some critics fear SSP will lock the United States into a stockpile so sophisticated that confidence will decline without testing. Alternatively, if the United States proceeds with RRW, confidence in replacement warheads may be questionable without testing. Some assert that Russia avoids these problems because its warheads are simpler and less sensitive to minor changes. It maintains its stockpile by an ongoing production program that manufactures new warheads to replace aged ones.⁷ China conducted tests through 1996 of what are apparently new-design warheads. Clandestine tests would let both nations improve their military capability while the CTBT would keep the United States from doing the same through testing. Even though U.S. weapons are more advanced than those of rogue states, critics believe crude weapons, which might be developed without testing, might suffice to deter U.S. involvement in regional conflicts.

Monitoring and Verification

Pro-treaty case: Scientists recognize that below a threshold, nuclear explosions cannot be distinguished from earthquakes or industrial explosions, and that improved monitoring ability lowers the threshold. CTBT supporters expect technical progress to lower the threshold further. They expect evasion technology will not progress as fast because would-be nuclear states lack the data on weapon yield and explosion containment required for an evasion attempt. Key treaty provisions aid monitoring. The treaty would provide a central point for data acquisition and distribution, would allow on-site inspections to investigate suspicious events, and would establish a worldwide network of seismic and other sensors that greatly increases capabilities. The International Monitoring System (IMS), set up by the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, is to contain 321 monitoring stations; as of December 2004, 119 stations had been certified, and 204 had been completed or fully upgraded to specifications. The NAS report of July 2002 judges that IMS, when done, will prevent a 1 or 2 kiloton nuclear test from being confidently hidden even with evasion techniques.

⁷ See National Academy of Sciences, *Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty*, Washington, National Academy Press, 2002, p. 70.

CTBT advocates hold that tiny explosions will not be militarily significant, and point to support of the treaty by several former Chairmen of the Joint Chiefs of Staff as evidence.

Anti-treaty case: Critics point to many ways to hide tests. A test in a large underground cavity would muffle the explosion's seismic signals. A test during an earthquake would make the seismic signals from the explosion hard to ferret out. A nation could test "anonymously" in remote ocean areas. Very low yield tests are hard to distinguish from the large number of industrial explosions (e.g., for mining or excavation) or small earthquakes. Reportedly, for reasons such as these, "the Central Intelligence Agency has concluded that it cannot monitor low-level nuclear tests by Russia precisely enough to ensure compliance with the Comprehensive Test Ban Treaty ..."⁸ Treaty opponents fear that clandestine tests would offer military advantage to cheaters. A rogue state could obtain confidence in more advanced weapons. China might be able to conduct sophisticated low-yield tests that would help it advance its weapons. According to one intelligence assessment, Russia reportedly used clandestine tests in the late 1990s "to develop a low-yield tactical nuclear weapon that is the linchpin of a new military doctrine to counter U.S. superiority in precision guided munitions."⁹ Thus, the CTBT would deny U.S. ability to maintain and improve its weaponry while ceding that capability to others.

The Treaty and the Development of New Weapons

Some in the Administration, in Congress, and elsewhere have expressed interest in new types of nuclear weapons, such as (1) a "Robust Nuclear Earth Penetrator" (RNEP) that would burrow a few meters into the ground before detonating, thereby coupling a much larger fraction of its energy to the ground than would a surface-burst weapon; and (2) low-yield nuclear weapons that might be used to incinerate biological agents.¹⁰

Pro-treaty case: In this view, the United States does not need new weapons. Its current weapons suffice for almost any conceivable military mission. Earth penetrators would create much fallout and blast damage. Buried targets at shallow depth are vulnerable to conventional penetrators; others are so deep as to be protected against higher-yield nuclear penetrators; and some could be defeated by destroying exits, etc., with conventional weapons. A National Academy of Sciences (NAS) report finds nuclear weapons are of limited use against chemical or biological weapons in buried chambers.¹¹ Redesigning warheads through RRW would incur risks: "It takes an extraordinary flight of imagination to postulate a modern new arsenal composed of such untested designs that would be more reliable, safe, and effective than the current U.S. arsenal based on more

⁸ Roberto Suro, "CIA Unable to Precisely Track Testing," *Washington Post*, Oct. 3, 1999: 1.

⁹ *Ibid.*, p. 19.

¹⁰ See CRS Report RL32130, *Nuclear Weapon Initiatives: Low-Yield R&D, Advanced Concepts, Earth Penetrators, Test Readiness*, and CRS Report RL32347, "Bunker Busters": *Robust Nuclear Earth Penetrator Issues, FY2005 and FY2006*, by Jonathan Medalia.

¹¹ National Academy of Sciences. National Research Council. Division on Engineering and Physical Sciences. Committee on the Effects of Nuclear Earth-Penetrator and Other Weapons. *Effects of Nuclear Earth-Penetrator and Other Weapons*. Washington, National Academies Press, 2005; prepublication copy, p. 9-2, 9-3.

than 1,000 tests since 1945.”¹² New weapons would imply U.S. interest in making weapons more usable and in retaining its nuclear stockpile indefinitely, contrary to NPT Article VI. New weapons could require testing, with harmful international repercussions.

Anti-treaty case: In this view, credible deterrence of current threats may require new nuclear weapons. As Linton Brooks said, “it is unwise for there to be anything that’s beyond the reach of U.S. power.”¹³ RNEP supporters see this weapon as of value for destroying buried facilities, and point to the NAS report on penetrators, which states that many important buried targets “can be held at risk of destruction only with nuclear weapons.”¹⁴ CTBT opponents suspect this nation might be self-deterred from using high-yield weapons because of the massive fallout they could cause. Accordingly, in this view, the United States needs to study its nuclear options, and must reserve the right to test.

Consequences of U.S. Resumption of Testing

Pro-treaty case: The treaty’s supporters fear that resumed U.S. testing could lead to a worldwide push for testing and new weapons. U.S. testing could compel Russia to test, giving that nation confidence in weapons it has not tested for many years and allowing it to develop new weapons. U.S. and Russian testing could, in this view, lead China to test. China could develop warheads that posed a greater threat to the United States and others. Chinese testing could lead India to test, forcing Pakistan to test. North Korea might test, enabling it to sell ready-to-use nuclear weapons of proven performance to eager-to-buy clients and perhaps leading South Korea and Japan to go nuclear. Proliferation would increase the risk of nuclear attacks on regional adversaries and the United States. Ratifying the CTBT, in this view, would forestall that chain of events.

Anti-treaty case: The treaty’s critics assert that testing, if needed, would make the world more secure by showing that this nation would do whatever is needed to maintain its military strength. All nations would know that U.S. weapons would remain reliable, and the United States could confidently develop new weapons. They assert that SSP by itself is inadequate, but when coupled with testing would enable great strides in U.S. weapons science, engineering, and manufacture. Testing would help train scientists, showing, for example, the many ways that computer models may not capture in which a design can fail. Further, critics believe, testing would help attract top scientists to the weapons laboratories, as they would be doing real science rather than science without experiments. Improved recruitment and training would further assure U.S. ability to maintain weapons. Gains from testing would, in this view, boost the credibility of U.S. efforts to deter or defeat use of WMD by others, thereby promoting U.S. security.

¹² Sidney Drell and James Goodby, *What Are Nuclear Weapons For?*, Washington, Arms Control Association, April 2005, p. 20.

¹³ U.S. Congress. Senate. Committee on Appropriations. Subcommittee on Energy and Water Development. Hearing on FY2006 NNSA appropriations, April 14, 2005.

¹⁴ National Academy of Sciences, *Effects of Nuclear Earth-Penetrator and Other Weapons*, p. 9-1.