The Case for the CTBT

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Prospects for ratification of the Comprehensive Nuclear Test Ban Treaty are much improved. Here is why.

By Daryl G. Kimball

A global halt to nuclear weapons testing has been a central, bipartisan national objective of the United States since the late 1950s, when President Dwight Eisenhower sought a comprehensive test ban. Following the end of the Cold War, Russia declared a moratorium on testing, followed by France, and then, in 1992, by the United States. The world's nations finally came together in 1994 to negotiate a comprehensive, verifiable treaty banning nuclear testing in order to help curb the spread of nuclear weapons and ensure an end to superpower nuclear arms competition.

In September 1996, the United States was the first nation to sign the Comprehensive Nuclear Test Ban Treaty, which "prohibits any nuclear weapon test explosion or any other nuclear explosion" and establishes a global monitoring network and the option of short-notice, on-site inspections to detect and deter cheating. To date, 182 countries have signed the treaty and 150 of them have ratified it, including three of the original five nuclear weapon states: France, Russia and the United Kingdom.

In the U.S., however, the Senate's 51-48 vote against the CTBT in October 1999, followed by the George W. Bush administration's opposition to the treaty, stalled ratification. While Washington had already been observing a voluntary moratorium on nuclear testing since 1992, opponents were concerned that the U.S. would not be able to maintain the safety and reliability of its nuclear arsenal without ongoing testing. They also doubted that national and international verification capabilities would be rigorous enough to detect low-yield nuclear explosions. And, finally, they did not believe that the treaty offered meaningful political or military benefits.

Today, however, 10 years after the first Senate vote, the prospects for U.S. ratification are much improved. Scientific and technical advances during the past decade that address the main concerns of opponents have led to a reconsideration of the issue by a growing array of Republican and Democratic national security figures. President Barack Obama has pledged to make ratification of the treaty a priority, and the benefits of doing so are significant.

Although there is now no technical need — nor is there any political support — for a renewal of U.S. nuclear testing, ratification of the CTBT is vital to reducing the risk that other nations might conduct nuclear tests that could improve their nuclear capabilities. In addition to the U.S., eight other states — China, Egypt, India, Indonesia, Iran, Israel, North Korea and Pakistan — must ratify the CTBT to trigger its formal entry into force. Ratification will not only improve our ability to detect and deter clandestine nuclear testing; it will enable us to credibly prod these nations to join, as well.

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Time to Take Another Look

In the past several years, bipartisan support for ratification of the CTBT has grown. In 2007, former Secretaries of State George Shultz and Henry Kissinger, along with former Secretary of Defense Bill Perry and former Senator Sam Nunn, called on the Senate to initiate a bipartisan process "to achieve ratification of the Comprehensive Test Ban Treaty, taking advantage of recent technical advances, and working to secure ratification by other key states." President George H.W. Bush's national security adviser, Gen. Brent Scowcroft, and former National Nuclear Security Administrator Linton Brooks have also recently endorsed U.S. ratification of the treaty.

During the 2008 presidential campaign, Senator John McCain, R-Ariz., promised to "continue America's current moratorium on testing" and to "[take] another look at the Comprehensive Test Ban Treaty." Candidate Barack Obama pledged to "reach out to the Senate to secure the ratification of the CTBT at the earliest practical date and then launch a diplomatic effort to bring onboard other states whose ratifications are required for the treaty to enter into force."

In his April 5 speech in Prague, President Obama declared that his administration "will immediately and aggressively pursue U.S. ratification of the Comprehensive Test Ban Treaty." As Gary Samore, special assistant to the president and White House coordinator for arms control and WMD, told the Arms Control Association annual meeting in May, the administration is "moving very deliberately in terms of doing the necessary technical and intelligence work to look at the important questions of verification, questions of American stockpile stewardship." Samore believes that the current pace could allow for reconsideration of the treaty by mid-2010.

The task will be very difficult, but is within reach. The Democrats' 60-seat majority in the Senate is far larger than the 45-seat minority they held in 1999. But to succeed, the president and his team must follow through on the pledge to make the CTBT a high priority and win the support of a group of approximately 10 skeptical senators.

While the final outcome will depend on the politics of the moment, it will also hinge on the administration's abil-

ity to make the case that: 1) U.S. ratification will, on balance, improve national security and advance progress toward entry into force; 2) technical advances in test ban monitoring make the treaty effectively verifiable; and 3) scientific and technical advances ensure the ability of U.S. weapons labs to maintain an effective arsenal without further test explosions. As George Shultz said on April 17, his fellow Republicans "might have been right voting against [the CTBT] some years ago, but they would be right voting for it now, based on these new facts."

The Security Benefits

For decades, nuclear testing has propelled the arms race. Since the beginning of the nuclear age, eight countries have conducted 2,052 test explosions. The U.S. accounts for half of that total with 1,030 tests. A verifiable global ban on nuclear testing is a vital step toward ending this dangerous competition. Given that it is highly unlikely that the United States will ever conduct another nuclear explosive test, it is in the U.S. interest to do all it can to ensure that other nations are not free to do so.

Limiting Other States' Capabilities. From a technical perspective, a ban on nuclear test explosions makes it harder for nations already possessing nuclear weapons — like China, India, Pakistan and Russia — to field new, more sophisticated nuclear warheads. Except for Russia, which already has an arsenal that is as large and sophisticated as that of the United States, testing could facilitate significant advances in the capabilities of other states. In China's case, a new round of test explosions would allow it to miniaturize warhead designs and put multiple warheads on its relatively small arsenal of strategic ballistic missiles — allowing it to rapidly increase its nuclear strike capability.

Likewise, without nuclear weapon test explosions, nations like Iran would not be able to "proof test" the more advanced, smaller warhead designs needed to deliver such weapons using ballistic missiles. Given Tehran's advancing uranium enrichment and missile capabilities, it is important to establish additional barriers against a sophisticated Iranian nuclear weapons capability in the years ahead.

Strengthening the Nonproliferation Bargain. Tangible progress toward U.S. ratification of the CTBT is also vital to restoring U.S. global leadership and strengthening international support for the Nuclear Non-Proliferation Treaty, the bedrock of all efforts to stop the spread of nuclear weapons. In 1995, the U.S. and the other nuclear powers promised to deliver on the CTBT in exchange for the indefinite extension of the NPT — a good deal that must be honored. U.S. progress toward reconsideration and ratification of the CTBT before the May 2010 NPT Review Conference will be essential to achieving agreement on new measures to strengthen global nonproliferation rules.

The importance of the CTBT was reinforced on Sept. 24, when the U.N. Security Council unanimously adopted Resolution 1887. That wide-ranging resolution on nonproliferation, disarmament and nuclear materiel security calls on all states to refrain from nuclear testing and to ratify the CTBT to enable entry into force at an early date.

Accelerating Entry into Force. Some Senate opponents of the CTBT argue that U.S. ratification matters little because other key holdout states will not follow our lead. On the contrary, U.S. ratification will prompt other holdouts to follow suit. In June, Indonesia's Foreign Minister Hassan Wirajuda declared: "We share [Pres. Obama's] vision of a world in which nuclear weapons have been eradicated. We trust that he will succeed in getting the CTBT ratified — and we promise that when that happens, Indonesia will immediately follow suit."

The prospect of U.S. ratification has already begun to spur new thinking in India. In an Aug. 30 interview in *The Hindu*, National Security Adviser M. K. Narayanan was asked if India would join the CTBT if others did so. He said: "I think we need to now have a full-fledged discussion on the CTBT. We'll cross that hurdle when we come to it."

Ratification of the CTBT by the remaining holdout states would also significantly contribute to regional security. Ratification by Israel, Egypt and Iran would reduce nuclear weapons-related security concerns and bring those states further into the nuclear nonproliferation mainstream. Action by Israel to ratify could put pressure on other states in the region to do so.

Iranian ratification would help reduce concerns that its nuclear program could be used to develop and deploy deliverable nuclear warheads. Conversely, continued failure to ratify the CTBT raises further questions about the nature of Tehran's sensitive nuclear fuel cycle activities and could increase support for tougher measures to comply with Security Council and international safeguards requirements.

Detecting and Deterring Clandestine Testing

The U.S. capability to detect and deter possible clandestine nuclear testing by other states will be significantly

greater with the CTBT in force than without it. Ratification is essential to making short-notice, on-site inspections possible and maintaining long-term political and financial support from other nations for the operation of the CTBT's International Monitoring System and International Data Center. Over the past decade, national and international monitoring for nuclear weapon test explosions has become so effective that no would-be cheater could be confident that a nuclear explosion sufficient to threaten U.S. security would escape detection.

Additional Verification Tools. The CTBT establishes a far-reaching International Monitoring System to detect potential nuclear explosions using four technologies: seismic, hydroacoustic, radionuclide and infrasound. Since 1999, many more of these stations have been built and are delivering data. To date, more than 280 of the planned IMS stations have been built, including a new array of highly capable "noble gas" monitoring stations that can detect minute amounts of the radioactive gases emitted by underground explosions into the atmosphere. The International Data Center, based in Vienna, collects and analyzes information from the IMS and disseminates the raw and processed data to member-states for their own evaluation.

Under the CTBT, member-states are allowed to monitor compliance with their own satellites and other national intelligence means. In the U.S., new technologies such as interferometric synthetic aperture radar can now provide detailed monitoring of vertical deformations caused by underground nuclear test explosions. Thousands of high-quality civilian seismic stations around the world provide further detection capabilities.

Detection Capabilities. During the Senate debate on the CTBT in 1999, some critics claimed that the IMS could only monitor for underground explosions at yields at or above the equivalent of one kiloton of TNT. In reality, IMS capabilities were much better even then and have continued to improve; moreover, they are only intended to supplement the United States' very capable national monitoring and intelligence capacity.

In 2002, a National Academy of Sciences panel determined that "underground nuclear explosions can be reliably detected and can be identified as explosions using IMS data down to a yield of 0.1 kilotons (100 tons) in hard rock if conducted anywhere in Europe, Asia, North Africa and North America." Advances in regional seismology have provided additional confidence. For some locations, such as Russia's former nuclear test site at Novaya Zemlya, the use of new seismic arrays and regional seismic stations has lowered the detection threshold to below 0.01 kilotons.

Skeptics have also claimed that there is no certain method of detecting very low-yield nuclear explosions, including so-called hydronuclear tests. However, this argument misses the point on verification: explosions below a few hundred tons in yield — potentially low enough to evade detection — are not very useful in assessing a new nuclear warhead design.

High Confidence. CTBT skeptics have also suggested that it may be possible for some states to hide full-scale nuclear tests. But according to the NAS panel report, "those countries that are best able to successfully conduct such clandestine testing already possess advanced nuclear weapons of a number of types and could add little, with additional testing, to the threats they already pose to the United States. Countries of lesser nuclear test experience and/or design sophistication would be unable to conceal tests in the numbers and yields required to master weapons more advanced than the ones they could develop and deploy without any testing at all."

On-Site Inspections. The CTBT would provide, for the first time, the option of short-notice inspections, an important form of deterrent against potential clandestine nuclear testing. However, some critics complain that because the treaty requires 30 of 51 nations on its Executive Council to agree to an on-site inspection if there is evidence of a clandestine test, such inspections could be blocked by states unfriendly to the United States. In reality, the CTBT's OSI provisions were established to balance the need for rapid response to a suspected test against the possibility of "frivolous or abusive" inspections. OSIs would be approved as needed, but not by a small minority with questionable motives.

Similarly, to protect national security interests unrelated to the OSI, states are allowed to restrict access to parts of the inspection area no larger than four square kilometers each, or a total of no more than 50 square kilometers. However, if an inspected state restricts access it must provide alternative ways for the inspection team to carry out its mission. If the bar for OSIs had been set much lower, or if no allowances had been made for unrelated national security interests, one could imagine that there might be concerns in the Senate that CTBT on-site inspections unduly infringe on U.S. (or Israeli) sovereignty.

Zero Means Zero. Another misconception that is repeated by CTBT critics is that some countries, such as Russia, consider hydronuclear experiments (which produce a

low-energy yield from a self-sustained chain reaction) to be a "permitted" activity under the treaty. But as the Russian government made clear when it ratified the CTBT in 2000: "Qualitative modernization of nuclear weapons is only possible through full-scale and hydronuclear tests with the emission of fissile energy, the carrying out of which directly contradicts the CTBT." In other words, it is undeniable that the treaty establishes a "zero-yield" prohibition on nuclear test explosions.

Effective Stockpile Stewardship

Contrary to myth, maintaining the reliability of proven U.S. nuclear warhead designs does not depend on a program of nuclear test explosions. Instead, the U.S. nuclear arsenal has been — and can continue to be — maintained through non-nuclear tests and evaluations, combined with the replacement or remanufacture of key components to previous design specifications. Since 1994, each warhead type in the U.S. nuclear arsenal has been determined to be safe and reliable through a rigorous certification process instituted following the end of U.S. nuclear testing.

For more than 15 years, a nationwide infrastructure of nuclear weapons research, evaluation and manufacturing sites and laboratories has been maintained and enhanced for this purpose under the Stockpile Stewardship Program. The United States spends more than $6 billion annually on this program, which includes nuclear weapons surveillance and maintenance, non-nuclear and subcritical nuclear experiments, sophisticated supercomputer modeling and life-extension programs for the existing warhead types.

The 2002 National Academy of Science panel, which included three former nuclear weapons lab directors, found that the current Stockpile Stewardship Program provides the technical capabilities necessary to maintain confidence in the safety and reliability of the existing seven types of nuclear warheads in the stockpile — "provided that adequate resources are made available ... and are properly focused on this task." According to the NAS panel, age-related defects mainly related to non-nuclear components can be expected, "but nuclear testing is not needed to discover these problems and is not likely to be needed to address them."

Indeed, the U.S. nuclear arsenal has been — and can continue to be — maintained with high confidence through non-nuclear tests and evaluations and, as necessary, the remanufacture of key components to previous design specifications. Independent technical experts have determined that the United States can maintain its existing arsenal through a conservative program of warhead refurbishment rather than through new design "replacement" warheads.

Though the U.S. nuclear arsenal is aging, more is known today about such weapons than ever before, and confidence in our ability to maintain the warheads is increasing at a faster rate than the uncertainties. For example, in 2006 the Department of Energy announced that studies by the Lawrence Livermore and Los Alamos National Laboratories show that the plutonium primaries, or pits, of most U.S. nuclear weapons "will have minimum lifetimes of at least 85 years" — about twice as long as previous official estimates. In recent years, the weapons labs have begun to increase the reliability of existing warheads by adding more boost gas to increase the explosive energy of the primary stage of the weapon well above the minimum needed to ignite the secondary, or main, stage.

Contrary to the concerns of some CTBT skeptics, the cessation of nuclear explosive testing has not caused the laboratories to lose technical competence. Rather, significant advances have been achieved as researchers are able to study the physics underlying weapon performance in greater depth, undistracted by the demands of a nuclear weapons test explosion program.

Senate approval of the CTBT would strengthen bipartisan support for effective stockpile stewardship efforts to ensure that as long as the United States has nuclear weapons, they will remain safe and reliable without the resumption of nuclear testing. It will also ensure that should Washington ever decide to exercise the treaty's "supreme national interest" withdrawal clause, the United States will have the competence to resume testing.

For a Safe World

Leaving the Comprehensive Nuclear Test Ban Treaty unratified would increase uncertainty and reduce U.S. security. While it might be possible to sustain the unilateral moratoria undertaken by the major nuclear states for several more years, uncertainties and the risk of a resumption of testing will only grow over time. Moreover, concerns about clandestine nuclear testing might arise that could not be resolved in the absence of inspections provided for under the treaty.

The choice is clear: A world without nuclear testing is a safer world. The United States stands to lose nothing and would gain an important constraint on the nuclear weapons capabilities of others that could pose a threat to America's security. The time for the CTBT is now. ■