

THE COMPREHENSIVE NUCLEAR TEST BAN TREATY

By

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“There are some who believe that failing to invest adequately in our nuclear deterrent will move us closer to a nuclear-free world. In fact, blocking crucial modernization means unilateral disarmament by unilateral obsolescence. This unilateral disarmament will only encourage nuclear proliferation, since our allies will see the danger and our adversaries the opportunity.”¹

Introduction

Since 1996, the Comprehensive Nuclear Test Ban Treaty (CTBT) has been open to states for signature with a goal of ending all nuclear testing. While it has had moderate success, several key states have not yet ratified it and brought it into force. To date, 181 countries have signed the treaty and 149 have ratified it, with ratification being the sticking point with China, Egypt, India, Indonesia, Israel, North Korea, Pakistan, and the United States. If President Barack Obama’s administration follows through with its stated goal of ratifying the CTBT, what are the pros, cons for us national security, and specifically what are the associated impacts on the U.S. nuclear stockpile, its deterrence capabilities, and global nuclear arms control?

The Comprehensive Test Ban should be ratified if three conditions are satisfied if is determined that:

- The US nuclear weapons stockpile can be reliably maintained without farther nuclear explosive test;
- The US extended deterrent to the 31 allied States that depend on it for their security is not harmed by a lack of testing;

¹ Sen. Jon Kyl (R-AZ) and Richard Perle (former assistant secretary of Defense), “Unilateral Obsolescence,” *Air Force Magazine*, (September 2009), p 60.

- Treaty compliance by the signatory states can be adequately verified.

It is also important to understand that the CTBT is limited instrument that can aid US nonproliferation efforts but cannot stop determined proliferation since some states may choose not to sign, ratify and/or comply with its terms. Other measures will be required to cope with such threats in addition to treaties. Before arguing this, it is useful to first review the CTBT history, structure and current status will be reviewed to form a working foundation. Second, the United State's CTBT role and ratification efforts will be examined through President George H.W. Bush's, President Bill Clinton's, President George W. Bush's and President Barack Obama's administrations. Third, the essay will examine the pros of United States CTBT ratification pertaining to nuclear arms control and nuclear non-proliferation, the nuclear Non-Proliferation Treaty, and the CTBT monitoring and inspection network. To conclude, the cons of United States CTBT ratification will be evaluated with emphasis on the nuclear weapon Stockpile Stewardship Program, Life Extension Programs, the Reliable Replacement Warhead, and United States deterrence and nuclear proliferation impacts.

The Comprehensive Nuclear Test Ban Treaty

The main goal of the CTBT is to outlaw global atmospheric, surface, underwater and underground nuclear testing. Through denial of nuclear testing, the treaty's intent is to obstruct initial development of nuclear weapons by states that don't have them, to thwart states that have nuclear weapons from designing new variants, to prevent public health issues and to stop

environmental damage.² Ratification of the CTBT by the United States is also a means of pressuring other hold out states like China to do likewise.

History

Since the world's first nuclear explosion on July 16, 1945 (the United State's Trinity Shot), through 1996, the United States performed over 1, 000 nuclear tests: Soviet Union (700+), France (200+), United Kingdom (45), and China (45). Significant international and domestic pressure to ban nuclear tests resulted in the 1963 Partial Test Ban Treaty which halted nuclear atmospheric testing. While signaled by some as a breakthrough, the true end state of the Partial Test Ban Treaty was as a public health measure. While it stopped above-ground nuclear fallout, it did not stop testing as it merely drove nuclear testing underground, and the Cold War arms race continued.³ Between January 1994 and August 1996, representatives from the member states at the United Nations Geneva Conference on Disarmament negotiated the CTBT and on Sept. 10, 1996, the General Assembly adopted it (158 in favor, 3 opposed, with 5 abstentions).

Structure

The body in charge, the Preparatory Commission for the Comprehensive Nuclear Test Ban Organization (CTBTO) headquartered in Vienna, is chaired by Executive Secretary Tibor Tóth from Hungary. The CTBTO was open for signature in 1996 and is staffed by 250 members from 180 of the signatory states.⁴ The primary task of the CTBTO is to promote the treaty in order to get states to sign it, ratify it, and thereby bring the treaty into force. Once the treaty is in force, the body will formally become the Comprehensive Nuclear Test Ban Organization comprised of

² CTBTO Preparatory Commission, "CTBTO Fact Sheet," (Oct. 3, 2009), www.ctbto.org.

³ Daryl G. Kimball, "Learning from the 1999 Vote on the Nuclear Test Ban Treaty," (Oct. 5, 2009), www.armscontrol.org.

⁴ CTBTO Preparatory Commission, "CTBTO Fact Sheet," (Oct. 3, 2009), www.ctbto.org.

a Conference of State Parties, a Technical Secretariat, and an Executive Council responsible for implementing the CTBT's requirements and international verification measures.⁵

Current Status

As previously stated, the CTBTO is currently a preparatory body because the treaty itself has yet to come into force. The reason behind the 13-year-plus gap between September 1996 and December 2009 is due to several key states either not signing the treaty, or failing to ratify it. Signing the treaty is the first step, with ratification (a state's formal government approval) occurring next. There are 195 states the CTBTO currently tracks, and 182 of those have signed (13 have not), 151 have ratified (44 have not), and those 13 that haven't signed the treaty are also ones that haven't ratified it. When the CTBT opened for signature, 44 states were listed as having the technological means for nuclear reactors or nuclear research reactors, and it is these states that must sign and ratify the CTBT for it to become enforceable. Those states are referred as CTBT Annex 2 States (see figure 1).

⁵ The White House Office of the Press Secretary, "White House CTBT Fact Sheet," (July 20, 1999), www.state.gov.

	STATES	SIGNATURE	RATIFICATION
1	Algeria	Oct. 15, 1996	July 11, 2003
2	Argentina	Sept. 24, 1996	Dec. 4, 1998
3	Australia	Sept. 24, 1996	July 9, 1998
4	Austria	Sept. 24, 1996	March 13, 1998
5	Bangladesh	Oct. 24, 1996	March 8, 2000
6	Belgium	Sept. 24, 1996	June 29, 1999
7	Brazil	Sept. 24, 1996	July 24, 1998
8	Bulgaria	Sept. 24, 1996	Sept. 29, 1999
9	Canada	Sept. 24, 1996	Dec. 18, 1998
10	Chile	Sept. 24, 1996	July 12, 2000
11	China	Sept. 24, 1996	
12	Colombia	Sept. 24, 1996	Jan. 29, 2008
13	Democratic People`s Republic of Korea		
14	Democratic Republic of the Congo	Oct. 4, 1996	Sept. 28, 2004
15	Egypt	Oct. 14, 1996	
16	Finland	Sept. 24, 1996	Jan. 15, 1999
17	France	Sept. 24, 1996	April 6, 1998
18	Germany	Sept. 24, 1996	Aug. 20, 1998
19	Hungary	Sept. 25, 1996	July 13, 1999
20	India		
21	Indonesia	Sept. 24, 1996	
22	Iran (Islamic Republic of)	Sept. 24, 1996	
23	Israel	Sept. 25, 1996	
24	Italy	Sept. 24, 1996	Feb. 1, 1999
25	Japan	Sept. 24, 1996	July 8, 1997
26	Mexico	Sept. 24, 1996	Oct. 5, 1999
27	Netherlands	Sept. 24, 1996	March 23, 1999
28	Norway	Sept. 24, 1996	July 15, 1999
29	Pakistan		
30	Peru	Sept. 25, 1996	Nov. 12, 1999
31	Poland	Sept. 24, 1996	May 25, 1999
32	Republic of Korea	Sept. 24, 1996	Sept. 24, 1999
33	Romania	Sept. 24, 1996	Oct. 5, 1999
34	Russian Federation	Sept. 24, 1996	June 30, 2000
35	Slovakia	Sept. 24, 1996	March 3, 1998
36	South Africa	Sept. 24, 1996	March 30, 1999
37	Spain	Sept. 24, 1996	July 31, 1998
38	Sweden	Sept. 24, 1996	Dec. 2, 1998
39	Switzerland	Sept. 24, 1996	Oct. 1, 1999
40	Turkey	Sept. 24, 1996	Feb. 16, 2000
41	Ukraine	Sept. 24, 1996	Feb. 23, 2001
42	United Kingdom of Great Britain and Northern Ireland	Sept. 24, 1996	April 6, 1998
43	United States of America	Sept. 24, 1996	
44	Viet Nam	Sept. 24, 1996	March 10, 2006

Figure 1. Comprehensive Test Ban Treaty Annex 2 States⁶

⁶ CTBTO Preparatory Commission, "CTBT Annex 2 States," (Oct. 3, 2009), www.ctbto.org.

The U.S. Role in Moving Toward the CTBT

Korea, India, and Pakistan have yet to sign the CTBT, with China, Egypt, Indonesia, Iran, Israel, and the United States signing but not ratifying the treaty. The CTBT will enter into force 180 days after the last of the 44 Annex 2 states ratifies the treaty, with the Secretary General of the United Nations receiving all signatures, and ratifications.⁷ On Sept. 24, 1996, United States President Bill Clinton was the first world leader to sign the treaty.

Presidents George H.W. Bush, Bill Clinton, and George W. Bush Administration's Efforts

In 1992, President George H.W. Bush established a moratorium on all United States nuclear testing that holds to this day. While the United States was involved in the 1994 development of the CTBT, and although President Clinton signed it first in, it has still not been ratified by the United States. For ratification the United States must get a two-thirds majority vote, at least 67 of 100 senators, in favor of the CTBT.⁸

One year after signing, President Clinton sent it to the Senate on Sept. 23, 1997, for deliberation. In October 1997 and 1998, Congressional CTBT and nuclear stockpile testimony was presented to the Senates Armed Services Committee and the Energy and Water Development Appropriations Subcommittee. In between, the Senate Committee on Governmental Affairs, International Security, Proliferation and Federal Services had hearings to discuss the CTBT in context of the U.S. nuclear stockpile with Under Secretary of State for Arms Control John Holum testifying for President Clinton the treaty was verifiable.⁹

⁷ The White House Office of the Press Secretary, "White House CTBT Fact Sheet," (July 20, 1999), www.state.gov.

⁸ Nuclear and WMD, "Status of CTBT Ratification," (Oct. 9, 2009), www.basicint.org.

⁹ Ibid.

During this period, the Republican Party headed by Sen. Trent Lott had the majority in the United States Senate and did not allow hearings or votes to take place based on South Asian nuclear tests, questions over the Stockpile Stewardship Program, potential negative impacts on the United States nuclear laboratory infrastructure, and doubts whether the CTBT was truly verifiable. President Clinton called the CTBT “the longest-sought, hardest fought prize in arms control history.”¹⁰ With U.S. political lines drawn, the republicans in the Senate held an unplanned vote for CTBT ratification on Oct. 13, 1999. Voting went along party lines 51 to 48 against ratification (one senator voted “present,” which equated to an abstention). This was the first time a state’s legislature failed to ratify the CTBT when it was put to a vote.¹¹

When President George W. Bush took office in January 2001, his inauguration speech made it clear the CTBT was not a high priority when he said, “We can fight the spread of nuclear weapons, but we cannot wish them away with unwise treaties.”¹² His nomination for secretary of state, former Chairman of the Joint Chiefs of Staff Gen. Colin Powell, also stated in his 2001 confirmation hearing the United States would not seek CTBT ratification.¹³ While President George W. Bush did uphold the moratorium on nuclear testing, the CTBT did not get ratified during his tenure from 2001 to 2008. The 2008 U.S. presidential race led to the election of Barack Obama, who favors CTBT ratification and who has declared that step to be part of his nonproliferation agenda, Ratification, however, is something only the US Senate can do and getting 67 votes for any measure in the Senate is a difficult political task, especially in an atmosphere marked by partisan gridlock.

¹⁰ Daryl G. Kimball, “Learning from the 1999 Vote on the Nuclear Test Ban Treaty,” (Oct. 5, 2009), www.armscontrol.org.

¹¹ Nuclear and WMD, “Status of CTBT Ratification,” (Oct. 9, 2009), www.basicint.org.

¹² Ibid.

¹³ Ibid.

President Barack Obama's Administration's Efforts

Early statements by President Obama reversed the United State's vector concerning the CTBT by vowing to actively pursue ratification once the administration is convinced it has the required 67 Senate votes. Secretary of State Hilary Clinton also pledged that the administration "would work intensively with senators to reassure them on such technical issues as the verifiability of a test ban."¹⁴ Based on the previous United States Senate CTBT ratification rejection on Oct. 13, 1999, and its January 2011 composition, clearly President Obama's administration indeed has some intensive work ahead to win the support of 67 U.S. Senators.

On Oct. 13, 1999, the CTBT ratification vote was 48 for, 51 against, and one present. If the vote went strictly by party lines, the vote would have been 45 for and 55 against since the "present" vote was cast by Sen. Robert Byrd from West Virginia (a Democrat), and four Republicans voted for ratification (Senators Gordon Smith from Oregon, Arlen Specter from Pennsylvania, Lincoln Chafee from Rhode Island, and Jim Jeffords from Vermont).

It is unclear how the newly elected U.S. Senate, seated in January 2011, will act on the CTBT if and when it comes up for a ratification vote. The United States' financial contributions to the CTBTO are also an issue for President Obama since the Bush administration opposed it and did not fully fund it. Funding for the CTBTO is an issue since a state's voting rights are tied to contributions (those states not paying contributions lose voting rights). A look at the U.S. dollar contribution over the past two years shows \$12.1 million due in 2008 (\$1.2 million paid, \$10.9 million outstanding) and \$11.3 million due in 2009 (\$4.6 million paid, \$6.7 million outstanding).

¹⁴ Cole Harvey, "Obama Sets New Course on Arms Control," *Arms Control Today*, (March 2009), pp 35-36.

The next two highest programmed contributing states are Japan (\$9.2 million in 2008, \$8.5 million in 2009), and Germany (\$4.7 million in 2008, and \$4.4 million in 2009). Surprisingly, China (slated for \$1.5 million in 2008 and \$1.4 million in 2009) and Russia (slated for \$0.7 million in 2008 and \$0.6 million in 2009) pay significantly less when considering their nuclear weapon history, stockpile and gross domestic product. Of note, each country makes contributions in both U.S. dollars and Euros, but China's and Russia's euro contributions do not change the disparity when compared to the United States euro contribution.¹⁵

In Secretary of State Clinton's words, the difference between the previous and current administration was the Bush administration did not agree with arms-control treaties because they believed "good people don't need them and bad people won't follow them," but they are "passionate concerns of President Obama"¹⁶. Secretary of State Clinton stated this stance on a formal nuclear test ban exactly 13 years after the CTBT was open for signature when she said "as long as we are confronted with the prospect of nuclear testing by others, we will face the potential threat of newer, more powerful, and more sophisticated weapons that could cause damage beyond our imagination."¹⁷

Pros of U.S. CTBT Ratification

Many believe it is imperative for the United States to ratify the CTBT, and to ratify it as soon as possible. Nine of the 44 Annex 2 states required for the CTBT to enter into force have yet to ratify the treaty (China, Egypt, India, Indonesia, Israel, Iran, North Korea, Pakistan and the United States). China and the United States are viewed as key players with the most CTBT responsibilities yet to be met, and some believe the remaining eight Annex 2 states will follow

¹⁵ CTBTO Preparatory Commission, "CTBT Assessed Contributions 2008 and 2009," (Oct. 7, 2009), www.ctbto.org.

¹⁶ Cole Harvey, "Obama Sets New Course on Arms Control," *Arms Control Today*, (March 2009), p 36.

¹⁷ Meri Lugo, "Clinton Makes Case for CTBT at Conference," (Oct 14 2009), www.armscontrol.org.

their ratification examples. Pro-CTBT individuals feel the delay in bringing the treaty into force has not allowed the world the full security benefits the treaty affords. While the politics of who should sign the CTBT first has existed for more than 13 years, a wider perspective of the remaining nine states warrants discussion.

Impact on Nuclear Arms Control

The United States, Russia and China have nuclear-weapon stockpiles, and have not tested them since 1996. Of the remaining six Annex 2 states, Iran's, India's, North Korea's and Pakistan's intentions with regard to nuclear weapons are less clear (Indonesia and China stated they will likely ratify once the United States does). Three of the four states have tested nuclear weapons since the CTBT was opened for signature: India in 1996, Pakistan in 1998 and North Korea in 2006 and in Prague on April 5, 2009, President Obama stated in one of his first foreign policy speeches of his wish to "seek the peace and security of a world free of nuclear weapons, and as long as these weapons exist, the United States will maintain a safe, secure and effective arsenal."¹⁸

While the United States and others have nuclear stockpiles created during the Cold War, other states are trying to acquire new nuclear weapons. Advocates of the CTBT argue that a test ban will inhibit the development of new and additional nuclear weapons. Understanding President Obama's thinking helps explain his desire ultimately to rid the world of nuclear weapons, yet keep them in the United States' stockpile in order to deal with old, current, and possible future threats as required for deterrence. As Assistant Secretary of State Rose Gottenmoeller stated during an August 2009 Weapons of Mass Destruction conference, "ironically, now 20 years after

¹⁸ Assistant Secretary of State Rose Gottenmoeller, Remarks to the August 2009 USAF/DTRA Conference "Confronting Global WMD, Threats – New Direction of a New Administration", *The Long Road from Prague – The Administration's Views on Nuclear Weapons Reduction and Arms Control*, (Williamsburg, Va., Aug. 14, 2009), p 2.

the fall of the Berlin Wall and the end of the Cold War, and despite the implementation of arms control agreements between Russia and the United States, the chances of a nuclear detonation somewhere in the world seem greater than at points during the Cold War.”¹⁹

Ultimately, can the United States and China, along with the CTBT ratified states of France, Russia and the United Kingdom, convince Egypt, India, Indonesia, Israel, Iran, North Korea and Pakistan to ratify and abide by the CTBT? The United States recently held its first formal talks with Iran in over 30 years, and India made a pledge over 11 years ago to not be one of the states to stand in the way of ratification. If India ratifies, Pakistan is expected to follow.²⁰ In the end, Egypt, Iran, Israel, and North Korea may be the last of the 44 Annex 2 states to hold out from ratifying the CTBT. If that becomes the case, the CTBTO could propose an amendment allowing it to enter into force without these four states.

Another factor impacting CTBT ratification is the other nuclear treaties on the world’s agenda. The START treaty with Russia expired in December 2009, and the New START Treaty that follows it was signed in April 2010 and awaits reification by the US Senate. The November 2010 elections have changed the composition of the US Senate, probably making near-term ratification less likely. Failure to ratify ti New STRAT could delay or prevent CTBT from ratification, since the Obama Administration come up for a vote unless they had 67 votes. This lowers the number of nuclear vehicles and associated nuclear warheads. Without nuclear testing, and depending on the number of s warheads and delivery vehicles allowed by the terms, the CTBT becomes an integral part in future nuclear-arms discussions.

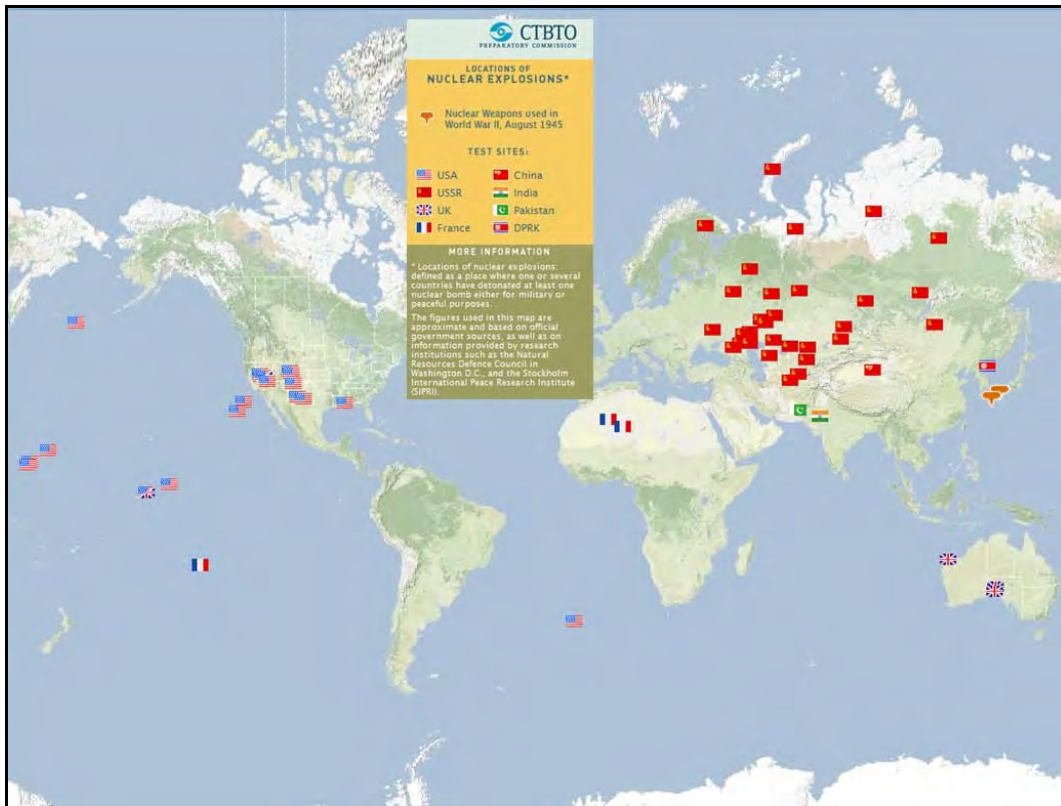
¹⁹ Assistant Secretary of State Rose Gottenmoeller, Remarks to the USAF/DTRA “Confronting Global WMD, Threats – New Direction of a New Administration,” *The Long Road from Prague – The Administration’s Views on Nuclear Weapons Reduction and Arms Control*, (Williamsburg, Va., Aug. 14, 2009), p 4.

²⁰ Jessica Mathews, “This Time, Ban the Test,” *International Herald Tribune*, (Oct. 21, 2009).

The United States is also working toward a treaty to reduce the fissile materials, plutonium and uranium, required to produce nuclear weapons. This treaty, called the Fissile Material Cutoff Treaty, will fall under the United Nations Committee on Disarmament, and is considered vital because “as nuclear arsenals come down, it will be increasingly important to have limitations on fissile material that could be used to produce new weapons.”²¹ Currently, the Committee on Disarmament agreed on Aug. 11, 1998, to create a committee to negotiate the Fissile Material Cutoff Treaty, with further discussions scheduled at the May 2010 Non-Proliferation of Nuclear Weapons conference in New York.

Also at the May 2010 United Nations meetings will be a review of the Nuclear Non-Proliferation Treaty (NPT), which is held every five years. The synergy between the START follow-on negotiations, Fissile Material Cutoff Treaty, NPT and CTBT is crucial for President Obama’s administration because he has the unique opportunity to link long-term nuclear policies. Since these nuclear treaties are being discussed/negotiated at roughly the same time, his priority is likely to reduce warheads via the START follow-on treaty, and then use that as a foundation to show strengthened United States resolve for reducing nuclear capabilities at the NPT review (and to give the United States credibility and leverage for keeping states desiring nuclear capabilities in the NPT regime).

²¹ Assistant Secretary of State Rose Gottenmoeller, Remarks to the August 2009 USAF/DTRA Conference “Confronting Global WMD, Threats – New Direction of a New Administration,” *The Long Road from Prague – The Administration’s Views on Nuclear Weapons Reduction and Arms Control*, (Williamsburg, Va., Aug. 14, 2009), pp 8-9.



*Figure 2. Nuclear Weapon Test Sites*²²

At the core of the CTBT is the positive belief that by banning nuclear testing, established nuclear states will be limited in their ability to create new and, or more sophisticated nuclear weapons. This essentially attempts to prevent an arms race where one country competes with another country’s newer designs, capabilities, and stockpile quantities. The CTBT also takes aim at those states with no nuclear weapons by making it much more difficult for them to go through the same technological development cycle. With nuclear testing, states like the United States and the former Soviet Union were able to detect nuclear design problems, incorporate changes, test the new weapon, and then add to its stockpile. Figure 2 shows displays where the United States, the Soviet Union, and other countries performed these tests.

²² CTBTO Preparatory Commission, “Nuclear Weapon Test Sites,” (Oct. 3, 2009), www.ctbto.org.

Link to the Nuclear Non-Proliferation Treaty

The Nuclear Non-Proliferation Treaty (NPT) was created in 1968 among the five states with nuclear capabilities (China, France, Russia, United Kingdom and United States) and entered into force in 1970. The purpose was to ban NPT members from transferring or aiding other countries to obtain nuclear weapons. It also committed those five states to eventually eliminate nuclear weapons. Currently 189 states are members of the NPT, and the CTBT links to it through these three key articles.²³ Article I: each NPT nuclear weapon state agrees not to transfer nuclear weapons, or nuclear explosive devices, and to not assist non-nuclear states to acquire nuclear weapons. Article IV: parties to the treaty have the right to pursue research and production of nuclear energy for peaceful purposes. Article VI: NPT states will pursue negotiations in good faith on measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament.²⁴

Impact on Nuclear Proliferation

There are 189 NPT member states. Unfortunately, India, Israel, North Korea and Pakistan are not NPT members. Instead, they have joined the ranks of nuclear weapon states. North Korea is an exception to the rule. It joined the NPT in 1985, but withdrew in 2003.

Many believe that historically, more countries would have acquired nuclear capabilities had the NPT not been negotiated and served as a legal barrier to proliferation. But after the 1991 Gulf War when Iraq's clandestine nuclear weapons program was discovered, this served as a clear example of a nuclear power program being used as a cover for a nuclear weapons program.

²³ George Bunn, "The Nuclear Nonproliferation Treaty: History & Current Problems," (Oct. 14, 2009), www.armcontrol.org.

²⁴ Treaty On The Non-Proliferation Of Nuclear Weapons, (Oct. 14, 2009), www.state.gov.

Cheating on the treaty limits allowed Iraq to covertly develop nuclear weapons while simultaneously enjoying the nuclear power program benefits provided by NPT membership. This same path to a nuclear weapons program was followed by North Korea and, now, Iran.

Libya was in the process of acquiring a turn-key nuclear program, but abandoned it, and more recently Iran was caught with nuclear enriching facilities not declared to the International Atomic Energy Agency (and therefore not previously open to inspection). These cases of NPT violations and clandestine proliferation programs by Iran Iraq, and Libya show the difficulty of treaty verification the CTBTO must also address how to verify member compliance in order to enforce the CTBT.²⁵ When the U.S. Senate voted against ratifying the CTBT in 1999, a limiting factor in the eyes of anti-CTBT United States Senators was the perceived inability to accurately monitor and verify the world for nuclear tests. That was highly debatable 13 years ago, but today the CTBTO's verification system is more robust due to modernization and and augmentation of the system as shown for example, by its success in monitoring the North Korean nuclear tests.

CTBT Monitoring and Inspection Network

In order to detect a nuclear test, the CTBTO will depend on an International Monitoring System which consists of 337 global facilities (see Figure 3). Of these 337 sites, 249 are currently certified to send information to the International Data Centre in Vienna, 26 are being tested, 29 are under construction, and 33 more are planned. The International Monitoring

²⁵ George Bunn, "The Nuclear Nonproliferation Treaty: History & Current Problems," (Oct. 14, 2009), www.arncontrol.org.

System is composed of four parts to detect a nuclear explosion: seismic, hydroacoustic, infrasound and radionuclide.



*Figure 3. CTBTO International Monitoring System Sites*²⁶

These stations are able to detect a nuclear explosion as small as one-tenth of a kiloton (200,000 lbs)²⁷ and of note, China has yet to allow International Monitoring Stations on its border to transmit data to the International Data Centre.²⁸

The seismic portion has 170 sites, 50 primary and 120 auxiliary, to monitor and detect shockwaves below the Earth's surface.²⁹ These sites detect thousands of events a year, mainly

²⁶ CTBTO Preparatory Commission, "CTBTO International Monitoring System Sites," (Oct. 3, 2009), www.ctbto.org.

²⁷ CTBTO Preparatory Commission, "CTBTO Fact Sheet," (Oct. 3, 2009), www.ctbto.org.

²⁸ Meri Lugo, "Clinton Makes Case for CTBT at Conference," (Oct. 14, 2009), www.armscontrol.org.

from earthquakes and mining explosions, but have proved effective in detecting past nuclear tests. In October 2006, 22 International Monitoring System seismic stations detected North Korea's underground nuclear test, including one 4,350 miles away. In two hours, the data were received, analyzed by CTBTO headquarters in Vienna, and then sent to CTBT member states for review.³⁰ In May 2009, 61 seismic stations detected another North Korean nuclear test, proving the International Monitoring System credibility. In the last decade, especially since the October 1999 United States Senate vote against CTBT ratification, the seismic array of the International Monitoring System has advanced technologically, and along with the two detected North Korean nuclear tests, should help dismiss doubts world-leaders might have about detection capabilities and relevance.

The 11 hydroacoustic monitoring stations detect sound waves in the oceans, and the 60 infrasound stations detect above ground, ultra-low frequency sound waves emitted by nuclear explosions. The last piece is 80 radionuclide stations able to detect radioactive particles in the atmosphere, with 40 able to detect noble gases which are odorless, colorless and with a low chemical radioactivity. To highlight this capability, the United States and South Korean International Monitoring Systems detected radioactive gases from the October 2006 North Korean nuclear explosion and as well as one in Canada 4,600 miles away.

If International Monitoring System stations detect a nuclear explosion, a CTBT member state may seek an on-site inspection. This derives a final assessment and assists in making a decision with regard to CTBT violations. However, on-site inspections are only an option after the CTBT

²⁹ Ibid.

³⁰ Jessica Mathews, "This Time, Ban the Test," *International Herald Tribune*, (Oct. 21, 2009).

enters into force.³¹ While ratification of the CTBT by the Annex 2 states, and entry into force would be a positive step toward a nuclear weapon free world, there are drawbacks.

Cons of U.S. CTBT Ratification

From the U.S. perspective, the lack of nuclear testing since 1996 has left an aging nuclear stockpile. Some nuclear weapons lack the most current safety features, and the downturn of the nuclear infrastructure technical knowledge required to maintain it goes directly against our goal of having safe, secure and reliable nuclear weapons. Established in 1998 by the National Defense Act, the Stockpile Stewardship Program was created in order to deal with an aging stockpile without nuclear testing.

Stockpile Stewardship Program

The Stockpile Stewardship Program “is the implementing strategy of the National Nuclear Security Administration to ensure a credible United States nuclear deterrent without underground testing.”³² In the past, testing and constantly upgrading the nuclear stockpile gave a high-level of confidence to the United States and its allies. Since that is no longer the case, and the United States has not fielded a new nuclear weapon since the early 1990s, the Stockpile Stewardship Program strives to use a science-based approach with advance simulation and modeling tools as a substitute for actual nuclear weapons testing. The biggest doubt raised among the nuclear community scientists responsible for the weapons design is the lack of empirical test data. The hopes are that new capabilities will arrive, allowing scientific simulations to be more accurate than actual underground testing. That time has not come, so Life Extension Programs are how

³¹ CTBTO Preparatory Commission, “CTBTO Fact Sheet,” (Oct. 3, 2009), www.ctbto.org.

³² Office of the Deputy Assistant of the Secretary of Defense, *Nuclear Matters – A Practical Guide*, Washington D.C., p 51.

the United States presently deals with an aging Cold War nuclear stockpile at the core of its retaliatory capability that hopefully creates substantial deterrent effects.

Life Extension Programs

With the end of the Cold War and the self-imposed ban on nuclear testing in 1992, the United States outlook on world affairs was much different than it is today. Since then India, North Korea and Pakistan have all tested nuclear weapons (and have not signed the CTBT); China, France, Russia and the United Kingdom plan to modernize nuclear arsenals;³³ rogue states like Iran attempt to obtain nuclear weapons and the proliferation of nuclear weapons technology is wider than ever before. This leaves the United States in the undesirable position of trying to maintain a dominant position with a Cold War designed, focused and aging stockpile. This leaves Life Extension Programs as the only measure to keep the nuclear stockpile relevant for years to come. Recent Life Extension Program efforts have met with criticism based on budgetary constraints and the perception of “new” capabilities added to the stockpile. One of the most recent heated debates to take place revolves around the Reliable Replacement Warhead.

Reliable Replacement Warhead

The Reliable Replacement Warhead effort has taken many turns and was cancelled in 2009. The goal was to create a safer, more secure and more reliable nuclear warhead than what is currently in the United States stockpile. Secretary of Defense Robert Gates recently stated that a “congressionally mandated review of U.S. nuclear strategy is likely to recommend developing a

³³ Bill Sweetman, “U.S. Rethinks Nuclear Strategy,” (Sept. 3, 2009), www.aviationweek.com.

safer and more reliable warhead design as part of a broader effort to modernize and maintain the nation's nuclear deterrent.”³⁴ The Reliable Replacement Warhead (or a similar program under a different title) is a positive step toward modernizing the stockpile, and is an essential offset to ratifying the CTBT.

A new warhead, which has already shown to be very politically sensitive, will also come at the price of obtaining a much needed upgrade to our nuclear deterrent without actual testing. John Foster, a veteran Lawrence Livermore National Laboratory nuclear weapons specialist, states, “If the labs are not permitted to practice design, then the development of any warhead can't assume competence and proficiency, and a credible deterrent cannot be maintained.”³⁵ While Foster's opinion may not reflect an official Department of Energy position, it does underscore the associated risk of fielding a new critical nuclear capability without actually physically testing its reliability.

Impact on United States Deterrence and Nuclear Proliferation

The goal of deterrence is to have a credible and visible means to alter an adversary's behavior. Our Cold War stockpile was built to counteract and deter the Soviet Union, not the rogue state and terrorist threats of today. When India, North Korea and Pakistan tested their nuclear weapons, it sent a clear message the non-proliferation intent of the NPT did not stop them and along those lines, neither will the CTBT. One of the worst cases of nuclear proliferation came from the nuclear black market sales of the former scientific leader of Pakistan's nuclear program, A.Q. Khan.

³⁴ John Fleck, “Gates Hints at Call for New Warhead Designs in Nuclear Posture Review,” (Sept. 23, 2009), www.globalsecuritynewswire.org.

³⁵ Bill Sweetman, “U.S. Rethinks Nuclear Strategy,” (Sept. 3, 2009), www.aviationweek.com.

A.Q. Khan's black market illegal nuclear proliferation operation proved extremely detrimental to the attempt to prohibit the spread of nuclear weapons and showed how a non-nuclear state can relatively quickly and easily obtain all the parts necessary to become a nuclear weapon state. Iran acquired significant nuclear weapons technology through the A.Q. Khan network, including enrichment capabilities for nuclear weapons material designs, and the nuclear technology for both gun-type and implosion-type weapons. Iran has also concentrated on configuring nuclear warheads for use on medium-range missiles, and, as the world recently discovered, has several dispersed facilities capable of enriching uranium.³⁶

Even if the United States and China join the other permanent members of the UN Security Council in full membership of the CTBT, there will likely still be other improvement States not in agreement to a test ban: Iran, North Korea, India, Pakistan, and Israel. Of the group, only North Korea is presently actively testing nuclear weapons but Iran may be doing so in the future. If true, this poses a major threat to international non-proliferation as efforts since Iran is a radical regime whose President has publicly denounced Israel's right to exist and whose government is the leading State sponsor of terrorism in the world. The CTBT will be important in preventing such a regime from developing and testing nuclear weapons and, unfortunately the Iranian and North Korean nuclear programs may spur their neighbors in the Middle East and North East Asia to develop their own nuclear weapons to counter them. Determined nuclear proliferation may therefore undermine the nonproliferation efforts of which the CTBT is a part

States like Turkey, South Korea or Japan may feel threatened into creating nuclear capabilities based on North Korea's and Iran's actions, and the potential for a new nuclear arms race in the Middle East or East Asia exists. What the United States has done in the past to prevent countries

³⁶ Anthony Cordesman, "The Iran Attack Plan," *The Wall Street Journal*, (Sept. 25, 2009), www.online.wsj.com.

like these from creating nuclear weapons is to extend a nuclear deterrence “umbrella” to them in exchange for abandoning nuclear weapons programs. The United States needs a safe, and secure and nuclear retaliatory force marked by nuclear stockpile that is reliable and perceived to be reliable in order to deter potential adversaries.

Other than military airstrikes like Israel’s airstrikes against Iraq’s Osirak nuclear plant in 1981, and the U.S. 1991 Gulf War where International Atomic Energy Agency inspectors found Iraq. President Obama stated “if the governments of Iran and North Korea choose to ignore international standards; if they put the pursuit of nuclear weapons ahead of regional stability and the security and opportunity of their own people; if they are oblivious to the dangers of escalating nuclear arms races in both East Asia and the Middle East, then they must be held accountable.”³⁷ It sounds good, but sanctions through United Nations resolutions have not stopped determined rogue regimes from proceeding toward a nuclear weapon capability. North Unfortunately, how poorly sanctions have worked to stop them from acquiring, testing and proliferating nuclear weapon technology, stands as a good example for other bad actors to follow.

Russian President Medvedev said, “Sanctions rarely lead to productive results, but in some cases, sanctions are inevitable.”³⁸ If North Korea and Iran don’t “end their excuses and negotiate on significant issues,”³⁹ and abide by the treaties they have signed (Iran is a NPT participant, and signed the CTBT), military action or regime changes may be the only way to stop their nuclear weapons programs

³⁷ Helen Cooper, “Obama Makes Gains at U.N. on Iran and Proliferation,” *The New York Times*, (Sept. 24, 2009), www.nytimes.com.

³⁸ Ibid.

³⁹ Ali Sheikholeslami, “Iran May Quit Nuclear Treaty,” (Sept. 29, 2009), www.bloomberg.com.

Conclusion

Distressing nuclear proliferation has occurred despite International Atomic Energy Agency and United Nations efforts. States willing to covertly develop and test nuclear weapons, despite their treaties obligations and world-opinion, have continued without severe consequences. Treaties like the CTBT are necessary but not sufficient nonproliferation elements. They must be accompanied by other measures to make sense.

Since 1996, the CTBT has successfully curtailed nuclear tests of all but four of the CTBT signatory states have curtailed their nuclear tests. What the CTBT has not done, and may not do, is convince states like Iran and North Korea to join the regime and to stop nuclear weapon development and testing. If President Obama's administration is able to accomplish its goal of ratifying the CTBT, it would be a huge accomplishment and will provide international legal barriers to nuclear testing. US ratification also should add pressure to other states like China that is still unsure about a commitment to ban nuclear tests without a similar pledge by the United States.. While politically and diplomatically significant, ratification of the CTBT without additional measures could increase United States security risks in a number of key critical areas.

First, security and reliability concerns continue to rise with aging nuclear warheads and weapons. The lack of actual testing is only mitigated, not eliminated, by the Stockpile Stewardship and Life Extension Programs. We are at a crossroads where we will have to rely on computer designs and modeling in order to establish an acceptable level of confidence regarding current and future nuclear weapons if we ratify the CTBT. If an issue arises with the United States stockpile, and we determine testing is required to maintain an effective and credible

deterrent, the value of the CTBT could be erased, opening the door for other states to do the same.

Second, the combined impact from the previous risks has states like Egypt, Japan, South Korea and Turkey reviewing again whether they need their own nuclear weapons. If the United States nuclear stockpile is in question, or nuclear proliferation cannot be stopped to their satisfaction, these sovereign states may feel the extended deterrence provided by the United States is no longer adequate.

Third, the CTBT verification regime must be able to detect cheating by member states. Fortunately, the multiplicity of seismic solution that now surrounds the globe appears able to detect nuclear test explosions with a great deal of fidelity

While a new warhead for the United States would address the first security risk, the others will not be solved by the CTBT and its supporting organization alone. The CTBT, if augmented by a reliable Stockpile program, a sound extended deterrent to dissuade our non-nuclear allies from going nuclear, and a continued robust verification program is an asset to US security and, therefore, should be ratified by the US Senate. As the first to test and use nuclear weapons, the United States has the obligation to lead the world toward a safer and more secure environment regarding nuclear weapons. The comprehensive Test Ban Treaty will put legal limits on testing, and a test ban will be an added inhibitor of development of additional or new types of nuclear weapons. For those reasons the CTBT, given certain conditions, is in the US national interest and deserves ratification by the US Senate.

Bibliography

Bunn, George. "The Nuclear Nonproliferation Treaty: History and Current Problems," *Arms Control Association*, (December 2003), www.armscontrol.org.

Comprehensive Test Ban Treaty Organization. "CTBTO Fact Sheet," (Oct. 3, 2009), www.ctbto.org.

Cooper, Helene. "Obama Makes Gains at U.N. on Iran and Proliferation," *New York Times* (Sept. 24, 2009), www.nytimes.com.

Cordesman, Anthony, H., "The Iran Plan," *Wall Street Journal* (Sept. 25, 2009), www.online.wsj.com.

Defense, Office of the Deputy Assistant of the Secretary, *Nuclear Matters Guide – A Practical Guide*, (Washington DC: Government Printing Office, October 2007).

Geneva Conference on Disarmament, *Comprehensive Test Ban Treaty* (August 1996).

Gottenmoeller, Rose, Assistant Secretary of State, "Confronting Global WMD Threats – New Direction of a New Administration," Remarks to August 2009 USAF/DTRA Conference, (Aug. 14, 2009).

Elder, Robert, J., Lt Gen (Ret), USAF, "Air-Mindedness," *Air & Space Power Journal* (Fall 2009), pp 11-17.

Fleck, John, "Gates Hints at Call for New Warhead Designs in Nuclear Posture Review," *Albuquerque Journal*, (Sept. 24, 2009), www.globalsecuritynewswire.com.

Hanley, Charles, J., "U.S. Faces U.N. Pressure on Nuclear Test-Ban Treaty," *Associated Press News*, (Sept. 23, 2009).

Harvey, Cole, "Obama Sets New Course on Arms Control," *Arms Control Today*, (March 2009), pp 35-36.

International Atomic Energy Agency (Staff Report), "IAEA Chief Addresses Historic U.N. Security Council Meeting," (Sept. 24, 2009), www.iaea.org.

Jennings, Jessica, "Nongovernmental Experts Urge Action on Nuclear Weapons Test Ban Treaty," Carnegie Endowment for International Peace, (New York, N.Y., Sept. 23, 2009).

Kimball, Daryl, G., "How The U.S. Senate Rejected CTBT Ratification," The Acronym Institute for Disarmament Diplomacy, (Oct. 9, 2009), www.acronym.org.uk.

Kimball, Daryl, G., "Learning From the 199 Vote on the Nuclear Test Ban Treaty," *Arms Control Association*, (Oct. 14, 2009), www.armscontrol.org.

Kyl, Jon (Senator, R-AZ) and Perle, Richard (former Assistant Secretary of Defense), "Unilateral Obsolescence," *Air Force Magazine*, (September 2009), p 60.

Lennon, Alexander, T. J., *Contemporary Nuclear Debates*, (Massachusetts, The MIT Press, 2002).

Lugo, Meri, "Clinton Makes Case for CTBT at Conference," *Arms Control Association*, (Oct. 14, 2009), www.armscontrol.org.

Lyle, Amaani, TSgt USAF, "Air Force Stands Up Global Strike Command," *B-52 Stratofortress Association News*, (Fall 2009), vol. 17, no. 3, issue 61.

Mathews, Jessica, "Accelerating the Entry Into Force of the CTBT: Now is the Time," *Arms Control Association*, (Sept. 25, 2009), www.armscontrol.org.

Monroe, Robert, R., VADM (Ret), USN, "A Perfect Storm Over Nuclear Weapons," *Air & Space Power Journal*, (Fall 2009), pp 19-29.

Mueller, Karl, P., Dr., "The Essence Of Coercive Air Power: A Primer For Military Strategist," *RAF Air Power Review*, (Autumn 2001), pp 45-56.

Non-Governmental Organizations, Statement by Representatives to the Article XIV Conference On Facilitating the Entry Into Force of the CTBT, "Accelerating the Entry Into Force of the CTBT: Now is the Time," *Arms Control Association*, (Sept. 25, 2009), <http://armscontrol.org>.

Nuclear and WMD, "Status of CTBT Ratification," (Oct. 9, 2009), www.basicint.org.

Perry, William J. and Scowcroft, Brent (Chairs), Ferguson, Charles, D. (Project Director), "U.S. Nuclear Weapons Policy," *Independent Task Force Report No. 62*, Council on Foreign Relations, (2009), www.cfr.org.

Sanger, David, E. and Broad, William, J., "U.S. And Allies Warn Iran Over Nuclear 'Deception,'" *New York Times*, (Sept. 26, 2009), www.nytime.com.

Schlesinger, James, The Honorable, "Task Force on Nuclear Weapons Management Report," Office of the Secretary of Defense, (Sept. 12, 2008).

Senate, United States, Voting Record On the Resolution of Ratification of Treaty Document 105-28, The Comprehensive Nuclear Test Ban Treaty, (Oct. 13, 1999), www.senate.gov.

Shalikhshvili, John, M., Gen (Ret), USA, “Findings and Recommendations Concerning the CTBT,” Report to the President of the United States, (Jan. 4, 2001).

Shaud, John, A. Gen (Ret), USAF, “Framing Deterrence in the Twenty-First Century,” *Strategic Studies Quarterly*, (Fall 2009), pp 4-7.

Sheikholeslami, Ali, “Iran May Quit Nuclear Treaty If Geneva Talks Fail,” *Bloomberg News*, (Sept. 29, 2009), www.bloomberg.com.

State, Department of, “Comprehensive Test Ban Treaty Fact Sheet,” (Oct. 9, 2009), www.state.gov.

State, Department of, “Nuclear Posture Review 2010 – Messages and Talking Points,” (Aug. 17, 2009), www.state.gov.

State, Department of, *Treaty on the Non-Proliferation of Nuclear Weapons (NPT)*, (Oct. 14, 2009), www.state.gov.

Sweetman, Bill, “U.S. Rethinks Nuclear Strategy,” *Aviation Week*, (Sept. 3, 2009), www.aviationweek.com.