

AIR WAR COLLEGE

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DETERRENCE REQUIREMENTS AND ARMS CONTROL RESPONSIBILITIES

THE UNITED STATE'S OBLIGATION TO RATIFY
THE COMPREHENSIVE NUCLEAR TEST BAN TREATY

by

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Biography

Lieutenant Colonel Jeffrey D. Neischel is a 1989 graduate of Embry-Riddle Aeronautical University where he earned a Bachelor of Science in Aeronautical Studies and a USAF ROTC commission. He graduated from pilot training at Laughlin AFB, TX and attended the B-52 Combat Crew Training Course at Castle AFB, CA. He served B-52 operational flying assignments in the 23rd Bomb Squadron at Minot AFB, ND and the 20th Bomb Squadron at Barksdale AFB, LA as a standardization and evaluation co-pilot, aircraft commander, squadron safety officer, instructor pilot, and weapons and tactics flight commander. As an aircraft commander he and his crew were awarded the Air Force Association's 1999 General Curtis E. LeMay Award for actions during Operation Allied Force. He then served as a USAF Weapons School B-52 instructor pilot at Detachment 2 and Detachment 5 at Barksdale AFB, LA. After graduating from Air Command and Staff College at Maxwell AFB, AL he was assigned to the USAF Headquarters at the Pentagon, Washington D.C. as Requirements Policy Branch Chief , B-52 Program Element Monitor, and Global Strike Branch Chief. He then became the 49 Test Squadron Director of Operations at Barksdale AFB, LA and prior to attending Air War College, was the 340 Weapons Squadron Commander at Barksdale AFB, LA. Lt Col Neischel is a command pilot with more than 3,600 flying hours in the T-37, T-38, B-52G and B-52H with over 130 combat hours in the B-52H.

He would like to thank his wife for her tremendous understanding, support, and dedication to the United States Air Force.

He would also like to thank Dr. Barry Schneider for his guidance, assistance, and professional expertise.

*“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 ratified it and brought it into force. To date, 182 countries have signed the treaty and 151 have ratified it, with signing and/or ratification being the sticking point with China, Egypt, India, Indonesia, Iran, Israel, North Korea, Pakistan, and the United States.

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, thwart states that have nuclear weapons from designing new variants, prevent public health issues, and stop environmental damage.²

History

From the world’s first nuclear explosion on 16 July 1945 (United State’s Trinity Shot) through 1996, there were over 2000 nuclear tests performed by the United States (1000+), Soviet Union (700+), France (200+), United Kingdom (45), and China (45). Significant international

¹ Senator Jon Kyl (R-AZ) and Richard Perle (former Assistant Secretary of Defense), “Unilateral Obsolescence,” *Air Force Magazine*, September 2009, 60.

² CTBTO Preparatory Commission, “CTBTO Fact Sheet”, www.ctbto.org, 3 October 2009.

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 an arms control breakthrough, perhaps the main benefit 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 10 September 1996, the General Assembly adopted it (158 in favor, 3 opposed, with 5 abstentions).

Structure

Currently, the body in charge is the Preparatory Commission for the Comprehensive Nuclear Test Ban Organization (CTBTO), headquartered in Vienna, and chaired by Executive Secretary Tibor Tóth from Hungary. The CTBTO began operation in 1996, and is currently staffed by 250 members from the 182 signatory states.⁴ Once the treaty is in force it will be comprised of 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

The treaty has yet to come into force. The reason behind the 13-year plus gap between September 1996 and December 2009 is that several key states either have not signed the treaty, or have failed to ratify it. Currently the CTBTO tracks 195 states, and of the 182 states that have signed the treaty, 31 have yet to ratify it (13 states have done neither). When the CTBT opened

³ Daryl G. Kimball, "Learning from the 1999 Vote on the Nuclear Test Ban Treaty", www.armscontrol.org, 14 Oct 2009.

⁴ CTBTO Preparatory Commission, "CTBTO Fact Sheet", www.ctbto.org, 3 October 2009.

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

for signature, 44 states were listed as having technological means to operate 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).

	STATES	SIGNATURE	RATIFICATION
1	Algeria	15-Oct-96	11-Jul-03
2	Argentina	24-Sep-96	4-Dec-98
3	Australia	24-Sep-96	9-Jul-98
4	Austria	24-Sep-96	13-Mar-98
5	Bangladesh	24-Oct-96	8-Mar-00
6	Belgium	24-Sep-96	29-Jun-99
7	Brazil	24-Sep-96	24-Jul-98
8	Bulgaria	24-Sep-96	29-Sep-99
9	Canada	24-Sep-96	18-Dec-98
10	Chile	24-Sep-96	12-Jul-00
11	China	24-Sep-96	
12	Colombia	24-Sep-96	29-Jan-08
13	Democratic People's Republic of Korea (North Korea)		
14	Democratic Republic of the Congo	4-Oct-96	28-Sep-04
15	Egypt	14-Oct-96	
16	Finland	24-Sep-96	15-Jan-99
17	France	24-Sep-96	6-Apr-98
18	Germany	24-Sep-96	20-Aug-98
19	Hungary	25-Sep-96	13-Jul-99
20	India		
21	Indonesia	24-Sep-96	
22	Iran (Islamic Republic of)	24-Sep-96	
23	Israel	25-Sep-96	
24	Italy	24-Sep-96	1-Feb-99
25	Japan	24-Sep-96	8-Jul-97
26	Mexico	24-Sep-96	5-Oct-99
27	Netherlands	24-Sep-96	23-Mar-99
28	Norway	24-Sep-96	15-Jul-99
29	Pakistan		
30	Peru	25-Sep-96	12-Nov-97
31	Poland	24-Sep-96	25-May-99
32	Republic of Korea	24-Sep-96	24-Sep-99
33	Romania	24-Sep-96	5-Oct-99
34	Russian Federation	24-Sep-96	30-Jun-00
35	Slovakia	30-Sep-96	3-Mar-98
36	South Africa	24-Sep-96	30-Mar-99
37	Spain	24-Sep-96	31-Jul-98
38	Sweden	24-Sep-96	2-Dec-98
39	Switzerland	24-Sep-96	1-Oct-99
40	Turkey	24-Sep-96	16-Feb-00
41	Ukraine	27-Sep-96	23-Feb-01
42	United Kingdom of Great Britain and Northern Ireland	24-Sep-96	6-Apr-98
43	United States of America	24-Sep-96	
44	Viet Nam	24-Sep-96	10-Mar-06

Figure 1. Comprehensive Test Ban Treaty Annex 2 States⁶

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

United States Role in the CTBT

Korea, India, and Pakistan have yet to sign the CTBT, while China, Egypt, Indonesia, Iran, Israel, and the United States comprise those Annex 2 states that signed, but have not yet ratified 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 U.N. receiving all signatures, and ratifications.⁷ On 24 September 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 September 1996, it has still not been ratified by the United States. For ratification the United States needs at least two-thirds, 67 of 100 Senators, voting in favor of the CTBT.⁸

One year after signing, President Clinton sent the CTBT to the Senate on 23 September 1997 for advice and consent for ratification and called it “the longest-sought, hardest fought prize in arms control history”.⁹ During this period, the Republican Party headed by Trent Lott, had a majority of seats in the United States Senate and led efforts against ratifying the CTBT.

In October 1997 and 1998, Congressional CTBT and nuclear stockpile testimony was presented to the Senates Armed Services Committee, and Energy and Water Development Appropriations Subcommittee. In between, the Senate Committee on Governmental Affairs,

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

⁸ Nuclear and WMD, “Status of CTBT Ratification”, www.basicint.org, 9 October 2009.

⁹ Daryl G. Kimball, “Learning from the 1999 Vote on the Nuclear Test Ban Treaty”, www.armscontrol.org, 14 Oct 2009.

International Security, Proliferation, and Federal Services held hearings to discuss the CTBT in context of the U.S. nuclear stockpile with John Holum (Under Secretary of State for Arms Control) testifying that the treaty was verifiable.¹⁰

By September 1999 it was estimated that pro-CTBT Senate members (mainly Democrats) would need to sway 15 of approximately 20-25 undecided Senators (mainly Republicans) to vote in favor of ratification. Lobbying on the Republican side of the Senate also occurred in order to secure enough votes to prevent ratification.

With political lines drawn, the Republicans in the Senate held a short-notice vote on CTBT ratification on 13 October 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 country’s legislature failed to ratify the CTBT when it was put to a vote.¹¹

Several Republican rationales for defeating ratification were based on reactions to South Asian nuclear tests that took place just prior to the Senate vote, questions over the Stockpile Stewardship Program and the ability to maintain a nuclear deterrent without testing, and potential negative impacts on the United States nuclear laboratory infrastructure. While these rationales influenced Republican votes, the main rationale was based on doubts whether CTBT member state compliance was adequately verifiable. Fears were expressed that the treaty might be violated, allowing other states to test illegally and gain advantages.¹² Senator Lott argued that “If there were a test ban, we would not know with certainty whether our nuclear weapons are as safe and reliable as they can be. On the other hand, Russia, China, and others might be able to

¹⁰ Nuclear and WMD, “Status of CTBT Ratification”, www.basicint.org, 9 October 2009.

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

¹² Daryl G. Kimball, “How The US Senate Rejected CTBT Ratification”, www.acronym.org.uk, 9 October 09.

continue nuclear testing without being detected. This is because the CTBT is simply not verifiable”.¹³

When President George W. Bush took office in January 2001, his inauguration speech made it clear that 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”.¹⁴ His nomination for Secretary of State, former Chairman of the Joint Chiefs of Staff General Colin Powell, also stated in his 2001 confirmation hearing that the United States would not seek CTBT ratification.¹⁵ While President George W. Bush did uphold the moratorium on nuclear testing, the CTBT was not submitted again to the Senate for ratification during his tenure from 2001 to 2008. The 2008 U.S. Presidential race led to the election of Barack Obama, and with a significant 9-vote Democratic advantage in the Senate, there is newfound optimism concerning CTBT ratification, although it would require bipartisan support to reach 67 votes.

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 Hillary Clinton also pledged that the administration “would work intensively with Senators to reassure them on such technical issues as to the verifiability of a comprehensive test ban.”¹⁶ Clearly, President Obama’s administration has some intensive work ahead.

¹³ Lott, Trent, “Congressional Record Of The 106th Congress, First Session”, www.gpoaccess.gov, 13 October 99.

¹⁴ Daryl G. Kimball, “How The US Senate Rejected CTBT Ratification”, www.acronym.org.uk, 9 October 09.

¹⁵ Ibid.

¹⁶ Cole Harvey, “Obama Sets New Course on Arms Control”, *Arms Control Today*, March 2009, 35-36.

Based on the current 2010 Senate makeup, a party-line vote would likely be 59 for (57 Democrats and two Independent Senators; Liberman from Connecticut since he voted for ratification in 1999 as a Democrat, and Sanders from Vermont who took Republican Jefford's seat), and 41 against (all Republicans). Of the four Republicans who voted "for" ratification in 1999, two of those seats are now occupied by Democrat Senators Merkley (Oregon) and Whitehouse (Rhode Island), while Senator Specter remains in Pennsylvania (but is now a Democrat) and Republican Senator Jefford's Vermont seat was lost to Independent Senator Sanders (the assumption being Sanders would vote "for" ratification).¹⁷ While President Obama could potentially gain 11 votes for CTBT ratification (59 in 2010 vs. 48 in 1999), he would still be short of the 67 votes required, and would have to convince eight Republicans to vote in favor of ratification.

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".¹⁸ This is not the view of the current administration, and are indeed "passionate concerns"¹⁹ of President Obama. Secretary of State Clinton also recently stated, "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".²⁰

¹⁷ United States Senate Voting Record On the Resolution of Ratification of Treaty Document 105-28 (The Comprehensive Nuclear Test Ban Treaty), www.senate.gov, 13 October 1999.

¹⁸ Cole Harvey, "Obama Sets New Course on Arms Control", *Arms Control Today*, March 2009, 36.

¹⁹ Ibid.

²⁰ Meri Lugo, "Clinton Makes Case for CTBT at Conference", www.armscontrol.org, 14 October 2009.

Arguments For United States CTBT Ratification

Many believe it is imperative for the United States to ratify the CTBT, and to ratify it as soon as possible. Of the nine remaining 44 Annex 2 states required for the CTBT to enter into force, India, North Korea, and Pakistan have yet to sign and ratify the treaty. The remaining states of China, Egypt, Indonesia, Israel, Iran, and the United States have signed, but not ratified the treaty. China and the United States are viewed as key players that have the most CTBT responsibilities yet to be met, and some believe the remaining seven Annex 2 states will follow their ratification example. Pro-CTBT individuals feel the delay in bringing the treaty into force has not allowed the world the full security benefits the treaty affords.

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 regards to nuclear weapons are less clear (Indonesia and China stated they will likely ratify once the United States does). These four states include three that have tested nuclear weapons since the CTBT was opened for signature; India in 1996, Pakistan in 1998, and North Korea in 2006 and 2009. In Prague on 5 April 2009, President Obama stated in one of his first foreign policy speeches that he wishes 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".²¹

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., 14 August 2009, 2.

While the United States and others have nuclear stockpiles created during the Cold War, other states are trying to acquire new nuclear weapons. The CTBT, ratified, can damper this trend somewhat. However, until we achieve a world of no nuclear arms, it is important to maintain a strong and reliable nuclear deterrent force to deal with old, new, and possible future threats. As Assistant Secretary of State Rose Gottenmoeller stated during a August 2009 Weapons of Mass Destruction conference, “ironically, now twenty years after 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”.²²

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 the CTBT coming into force (and if India ratifies, Pakistan is expected to follow).²³ 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 signatory states could propose an amendment allowing it to enter into force without these four states.

Under Article VI of the nuclear Non-Proliferation Treaty (NPT), nuclear weapons states have pledged to reduce their nuclear arsenals ultimately to zero, if the non-nuclear weapons states continue to agree not to develop or acquire such weapons. Therefore, every five years at NPT

²² 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., 14 August 2009, 4.

²³ Jessica Mathews, “This Time, Ban the Test”, *International Herald Tribune*, 21 October 2009.

review conferences the nuclear “haves” are asked to prove they are moving toward fewer and more restricted nuclear arsenals as the price to keep the “have-nots” de-nuclearized.

Thus, at the May 2010 NPT Review Conference in New York City, the United States and others will be attempting to show good faith in compliance with Article VI by such progress seen in the START Follow-On Treaty negotiations, progress in Fissile Material Cutoff negotiations, and evidence of intent to ratify the CTBT.

With 36 of 100 Senate seats up for re-election on 2 November 2010, and with those terms beginning on 3 January 2011, President Obama and Secretary of State Clinton have to convince all 57 Democrats, two Independents, and eight Republican Senators to vote for CTBT ratification to obtain the required 67 votes. If President Obama can gain positive political momentum with the START Follow-On Treaty and a successful NPT review conference, synchronize these events for maximum effect, and if he believes the Democrats will not win more Senate seats after the November 2010 elections, his best chance for CTBT ratification may occur in the early summer of 2010.

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 more sophisticated nuclear weapons. This essentially attempts to prevent arms races where countries compete to produce newer nuclear weapons designs, capabilities, and numbers. The CTBT also would create a legal barrier and diplomatic pressure on nuclear “have-nots” to stay that way.

Link to the Nuclear Non-Proliferation Treaty

The NPT was created in 1968 between the five states that had nuclear capabilities (China, France, Russia, United Kingdom, and United States) and entered into force in 1970. Its purpose

was to ban NPT members from transferring or aiding other countries to obtain nuclear weapons. Article VI of the NPT also committed those five states to eventually eliminate their nuclear weapons. Currently 189 states are members of the NPT, and the CTBT links to it through the following three key articles.²⁴ 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.²⁵

Impact on Nuclear Non-Proliferation

There are 189 NPT member states, but India, Israel, North Korea, and Pakistan have not joined the NPT. Instead, they have joined the ranks of nuclear weapon states (North Korea joined the NPT in 1985, but withdrew in 2003). It is likely that many more countries would have acquired nuclear weapons capabilities without the NPT, but, some member states have also cheated. When Iraq was found to have a clandestine nuclear weapon program by U.N. inspectors after the 1991 Gulf War, it illustrated the ability of a NPT member state to covertly progress toward a nuclear weapons capability while still enjoying the nuclear power program benefits of NPT membership. Later in 2003, NPT member state Libya was in the process of acquiring a turn-key nuclear program from the A.Q. Khan network, but abandoned it when this was discovered. More recently Iran, another NPT member state, was caught with nuclear enrichment facilities not declared to the International Atomic Energy Agency (and therefore not previously

²⁴ George Bunn, “The Nuclear Nonproliferation Treaty: History & Current Problems”, www.armcontrol.org, 14 October 2009.

²⁵ Treaty On The Non-Proliferation Of Nuclear Weapons, www.state.gov, 14 October 2009.

open to inspection). NPT violations and illegal clandestine proliferation programs by Iran, Iraq, Libya and North Korea show the difficulty of treaty verification that the CTBTO must also address.²⁶ When the United States Senate voted against ratifying the CTBT in 1999, a limiting factor in the eyes of anti-CTBT U.S. Senators was the perceived inability to accurately verify compliance with the treaty, and to detect clandestine nuclear tests. Whether this was indeed true was debatable 13 years ago, but today's CTBTO's verification system is even more robust, and has shown to have a proven track record.

CTBT Monitoring and Inspection Network

In order to detect a nuclear test, the CTBTO will depend on a robust international monitoring system which consists of 337 global facilities (see Figure 2). Of these 337 sites, 249 are currently certified to send information to the International Data Centre in Vienna, 26 are currently being tested, 29 are under construction, and 33 more are planned. The international monitoring system is composed of four types of systems to detect a nuclear explosion; seismic, hydroacoustic, infrasound, and radionuclide.

These stations are able to detect a nuclear explosion as small as one-tenth of a kiloton (200,000 lbs)²⁷ from remote sensors. However some problems remain. For example, China has yet to allow international monitoring stations on its border to transmit data to the International Data Centre, and this will have to be resolved before the CTBT enters into force.²⁸

²⁶ George Bunn, "The Nuclear Nonproliferation Treaty: History & Current Problems", www.armcontrol.org, 14 October 2009.

²⁷ CTBTO Preparatory Commission, "CTBTO Fact Sheet", www.ctbto.org, 3 October 2009.

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



Figure 2. CTBTO International Monitoring System Sites²⁹

The seismic portion of the system has 170 sites (50 primary and 120 auxiliary) to monitor and detect shockwaves below the Earth's surface.³⁰ These sites detect thousands of seismic events a year, mainly from earthquakes and mining explosions, and have proved effective in detecting past nuclear tests. In October 2006, North Korea's underground nuclear test was detected by 22 international monitoring system seismic stations, including one 4,350 miles away. In two hours, the data was received, analyzed by CTBTO headquarters in Vienna, and then sent to CTBT member states for review.³¹ In May 2009, another North Korean nuclear test was detected by 61

²⁹ CTBTO Preparatory Commission, "CTBTO International Monitoring System Sites", www.ctbto.org, 3 October 2009.

³⁰ Ibid.

³¹ Jessica Mathews, "This Time, Ban the Test", *International Herald Tribune*, 21 October 2009.

seismic stations showing the international monitoring system's capability. In the last decade since the October 1999 U.S. Senate vote was taken against CTBT ratification, the seismic arrays of the international monitoring system have advanced technologically, and were able to detect both North Korean nuclear tests. This should help dismiss doubts world-leaders might have about its detection and verification capabilities, and relevance.

Another component of the CTBT monitoring system is the eleven hydroacoustic monitoring stations that detect sound waves in the oceans, and the 60 infrasound stations above ground that detect ultra-low frequency sound waves emitted by nuclear explosions. An additional means of detecting nuclear explosions is via 80 radionuclide stations that are able to detect radioactive particles in the atmosphere, with 40 facilities capable of detecting noble gases which are odorless, colorless and emit a low chemical radioactivity. To highlight this capability, radioactive gases from the October 2006 North Korean nuclear explosion were detected by several United States and South Korean monitoring stations, and also by 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 provides a final assessment, and assists in making a determination as whether there has been a CTBT violation. However, on-site inspections are only an option after the CTBT enters into force.³² While ratification of the CTBT, and its entry into force, would be a positive step towards a nuclear weapon free world, there are also some drawbacks.

³² CTBTO Preparatory Commission, "CTBTO Fact Sheet", www.ctbto.org, 3 October 2009.

Arguments Against United States CTBT Ratification

From the United States perspective, the lack of nuclear testing since 1996 has left it with 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 also makes it more difficult to retain 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.”³³ In the past, testing and constantly upgrading the nuclear stockpile gave a high-level of weapons system reliability confidence to the United States and its allies. Now reliability is insured by the Stockpile Stewardship Program, and it uses a science-based approach with advanced simulation and modeling tools as a substitute for actual nuclear weapons testing. The biggest doubt raised amongst nuclear community scientists responsible for weapons design is the lack of empirical test data. The hopes are that new capabilities will be approved, which without actual testing, would give greater confidence that our nuclear weapons would work. That time has not yet come, so Life Extension Programs are how the United States presently deals with an aging Cold War nuclear stockpile that forms the core of its retaliatory capability that, hopefully, creates substantial deterrent effects.

³³ Office of the Deputy Assistant of the Secretary of Defense, *Nuclear Matters – A Practical Guide*, Washington D.C., 51.

Life Extension Programs

Today, with the end of the Cold War and the self-imposed ban on nuclear testing in 1992, the United States outlook on world affairs is much different than it was then. In the intervening years, India, North Korea, and Pakistan have all tested nuclear weapons (and have not signed the CTBT); China, France, Russia, and the United Kingdom are modernizing their nuclear arsenals;³⁴ rogue states like Iran are attempting to obtain nuclear weapons; and the proliferation of nuclear weapons technology is somewhat wider than before. This leaves the United States in the undesirable position of trying to maintain its dominant position with a Cold War designed, focused, and aging stockpile.

This leaves Life Extension Programs as the only means to verify that the nuclear stockpile will retain its capability for years to come. Recent Life Extension Program efforts have met with criticism based on budgetary constraints and the perception that the U.S. is adding “new” capabilities to the stockpile. In fiscal 2010, \$65 million dollars was requested to fund B-61 warhead life extension studies, “but the House Appropriations energy and water subcommittee, which oversees Department of Energy programs, zeroed out the funding.”³⁵ The B-61’s yield would not change, the program would be to improve its safety and reliability. 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. Its stated goal was to create a nuclear warhead that is safer, more secure and more reliable than

³⁴ Bill Sweetman, “U.S. Rethinks Nuclear Strategy”, www.aviationweek.com, 3 September 2009.

³⁵ Adam J. Herbert, “New Nukes, Old Nukes”, Air Force Magazine, October 2009: 20.

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 safer and more reliable warhead design as part of a broader effort to modernize and maintain the nation’s nuclear deterrent.”³⁶ The Reliable Replacement Warhead (or a similar program under a different title) is a positive step towards modernizing the stockpile, and is considered essential by some if the United States is to ratify the CTBT and yet retain its retaliatory/deterrent capabilities.

John Foster, a veteran Lawrence Livermore National Laboratory technologist 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.”³⁷ While Mr. Foster’s opinion may not reflect an official Department of Energy position, it does underscore the associated risk some perceive of fielding a new critical nuclear capability without actually physically testing its reliability.

Conclusion

If President Obama’s administration follows through with its stated goal of ratifying the CTBT, it would be seen by most as a huge accomplishment and a large step towards the treaty entering into force. Yet, while politically and diplomatically significant, ratification of the CTBT may also increase the United States security risks in a number of key critical ways.

First, security and reliability concerns continue to rise with the aging of United States nuclear warheads and delivery systems. The problems linked to the lack of actual testing are only

³⁶ John Fleck, “Gates Hints at Call for New Warhead Designs in Nuclear Posture Review”, www.globalsecuritynewswire.org, 23 September 2009.

³⁷ Bill Sweetman, “U.S. Rethinks Nuclear Strategy”, www.aviationweek.com, 3 September 2009.

mitigated, not totally 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 what some believe to be an acceptable level of confidence regarding current and future nuclear weapons if we were to 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, then the United States Government might be forced to withdraw from the CTBT, thereby re-opening the door for other states to do the same.

Second, dangerous nuclear proliferation has occurred despite International Atomic Energy Agency and U.N. efforts. States willing to covertly develop and test nuclear weapons, despite their treaty obligations and world-opinion that favors not testing, have continued without severe consequences for such behavior. The recent A.Q. Khan nuclear black market network and the long-term terrible example set by North Korea regarding its nuclear weapons program serve as stark reminders that treaties alone have not stopped bad actors. On the other hand, while treaties do not solve all security problems, they can create some additional security by keeping the numbers of nuclear players limited and by prohibiting destabilizing actors. Because of this, the CTBT is essential for several key reasons.

Most importantly, there exists proven technological means to detect, and verify, nuclear tests around the world. By detecting the 2006 and 2009 North Korean nuclear tests, the CTBT international monitoring system proved its capabilities to detect even very small explosions above or below ground. This should eliminate concerns of those who are willing to be educated on this issue. Being able to detect nuclear tests also makes it much more difficult for non-nuclear states to cheat and acquire credible nuclear weapon capabilities through clandestine

development and testing of their designs. Thus, any test program, once detected, signals their nuclear intentions to the world.

Next, by ratifying the CTBT, the United States puts international political and diplomatic pressure on China. Since China stated it would ratify the CTBT after the United States did the same, they would need to follow through with this pledge to maintain credibility. Once the big five nuclear states have adhered to the CTBT, it, together with other nuclear arms control and disarmament steps like the U.S.-Russian START Follow-On Treaty, progress in negotiating a Fissile Material Cutoff Treaty, and worldwide efforts to consolidate and secure all nuclear materials that could otherwise be used to construct nuclear weapons, will help demonstrate their commitment to honoring Article VI of the NPT.

In a net assessment of risks and gains, it is recommended that the U.S. ratify the CTBT in the summer of 2010. Even if the remaining Annex 2 states fail to ratify the treaty in a timely manner, it is also recommended that the CTBT signatory states propose an amendment in order to bring the CTBT into force as soon as practical. As the first to test and use nuclear weapons, the United States should take the lead in guiding the world towards a safer and more secure environment regarding nuclear weapons.

Along with CTBT ratification, the U.S. must maintain an effective nuclear arsenal by modernizing its current stockpile because its nuclear forces must maintain the ability to support allies, and deter adversaries. This requires that we maintain safe, secure, reliable, and credible nuclear weapons in our arsenal by adequately funding deterrent forces and nuclear laboratory infrastructure to support stockpile dependability. If this is done, then the CTBT should add to

U.S. security and ratification by the U.S. should pressure key states like China to join for mutual security.

As U.S. national security experts George Shultz, William Perry, Sam Nunn, and Henry Kissinger recently stated, “we must move in two parallel paths - one path which reduces nuclear dangers by maintaining our deterrence, and the other which reduces nuclear dangers through arms control and international programs to prevent proliferation. Given today’s threats of nuclear proliferation and nuclear terrorism, these are not mutually exclusive imperatives. To protect the nation’s security, we must succeed in both.”³⁸

³⁸ George P. Shultz, William J. Perry, Henry A. Kissinger, and Sam Nunn, “How to Protect Our Nuclear Deterrent: Maintaining confidence in our nuclear arsenal is necessary as the number of weapons goes down”, www.online.wsj.com, 19 January 2010.

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