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The Comprehensive Nuclear-Test-Ban Treaty Negotiations: A Case Study

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Cover: Meeting of the Conference on Disarmament in the Council Chamber of the Palace of Nations (U.S. Mission/Eric Bridiers)

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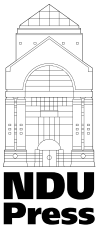

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Introduction

On July 16, 1945, the United States conducted the world's first nuclear explosive test in Alamagordo, New Mexico. The test went off as planned; a nuclear chain reaction, in the form of an explosion, could be created.[1] Less than a month later, nuclear weapons were used to support Allied efforts to end World War II.

Just 4 years later, on August 29, 1949, the Soviet Union conducted its first nuclear test. The United States intensified efforts to develop the hydrogen bomb, which it tested in 1952. The development of new nuclear weapon designs, as well as the imperative to test these designs, were now inextricably linked. Nuclear tests were considered essential to maintaining confidence in the effectiveness and usability of these weapons.

Since the Alamogordo test, upwards of 2,000 nuclear tests have taken place globally. Of these, 528 were conducted in the atmosphere, with significant environmental consequences.[2] Between 1945 and 1950, seven atmospheric nuclear tests took place. As the Cold War escalated, weapons testing accelerated: 63 such tests occurred between 1951 and 1954.[3] Three of these were conducted by the United Kingdom, who joined the nuclear "club" with a test in 1952 (France tested in 1960, followed by China in 1964).

In 1954, after an unexpectedly powerful and environmentally damaging test called Castle Bravo took place over Bikini Atoll in the Asia Pacific,[4] Indian Prime Minister Jawaharlal Nehru called for a "standstill" in nuclear explosive testing: "Pending progress towards some solution, full or partial, in respect of the prohibition of these weapons of mass destruction, the Government would consider, some sort of what may be called a "standstill agreement" in respect, at least, of these actual explosions."[5]

In 1958 the United States, the Soviet Union, and the United Kingdom undertook negotiations over a cessation of nuclear testing, but a number of issues, mostly related to verifying compliance, proved intractable.[6] Some success was attained after the Cuban Missile Crisis, as the three parties agreed in 1963 to the Limited Test Ban Treaty (LTBT), which banned all nuclear testing in the atmosphere, in space, or underwater. Nuclear tests would henceforth be permitted only underground. Subsequent efforts to negotiate a complete cessation proved unsuccessful until 1994, when negotiations on a multilateral comprehensive nuclear test ban began in earnest.[7]

These negotiations were completed in 1996. Shortly thereafter, a treaty text was overwhelmingly supported at the United Nations. However, over 20 years later, the Comprehensive

Nuclear-Test-Ban Treaty (CTBT) has not yet entered into force. As such, this case study will consider the following:

- the developments that led to the start of negotiations
- the perspectives of the key actors and their impacts upon the negotiations
- a summary of the negotiations, focusing on key issues and the efforts to reach resolution on them
- the endgame of the negotiations
- a few key lessons learned, which may have utility for future multilateral negotiations, touching on issues associated with leadership, factors that impact decisionmaking, and how a negotiation must balance national interests and negotiating objectives.

Developments Leading to Negotiations

In the preamble to the LTBT, the United States and the Soviet Union affirmed their commitment to the "speediest possible achievement of an agreement on general and complete disarmament," as well as "the discontinuance of all test explosions of nuclear weapons for all time" and "negotiations to this end." As preambular language, however, these objectives were generally considered to be aspirational rather than binding commitments. The arms race—and nuclear weapons testing—continued apace.

As the LTBT was being negotiated, international discussions were also taking place over a treaty to address growing concerns about the spread, or proliferation, of nuclear weapons. These made little progress until the Chinese detonated a nuclear device in 1964, after which the talks took on new urgency. In 1968, negotiations on the Treaty on the Nonproliferation of Nuclear Weapons, or the NPT, were completed.

The NPT entered into force on March 5, 1970, initially with 43 state parties.[8] Currently, 190 United Nations (UN) member states are parties to the treaty. Under the NPT, countries that had tested nuclear weapons before January 1, 1967, are classified as nuclear-weapon states (NWS). These countries were the United States, the Soviet Union, United Kingdom, France, and China. All other states join the treaty as non-nuclear-weapon states (NNWS).

Under the NPT, the NWS commit not to acquire, or assist other states to acquire, nuclear weapons. In turn, the NWS commit to pursue nuclear disarmament objectives, as per the NPT's Article VI: "Each of the parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear

disarmament, and on a treaty on general and complete disarmament under strict and effective international control."[9]

Many NNWS contend that the NPT is "discriminatory" in creating two separate classes of states, and that the NWS have not taken sufficient steps to meet their Article VI commitments. A cessation of nuclear testing is often cited as such a step. It is not a coincidence that the NPT's preamble recalls "the determination expressed by the parties to the 1963 [LTBT] in its Preamble to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time and to continue negotiations to this end."[10]

Every 5 years beginning in 1975, the NPT treaty parties meet to discuss progress on implementing the treaty.[11] At the meeting in 1990, the issue of a test-ban treaty was extremely contentious, largely because the NWS were still not ready to undertake test-ban negotiations. As a result, no final document was agreed to at this meeting.

This outcome did not auger well for the NPT's 1995 Review and Extension Conference, which was specifically required by the treaty.[12] At this conference, NPT parties were to decide whether or not to extend the NPT indefinitely, which was a high priority for the United States and the NWS because they did not want to see the NPT put at risk. Given the priority of a comprehensive nuclear test ban among the non-nuclear-weapon states, it was evident to the nuclear-weapon states that a demonstration of support for a comprehensive ban on nuclear testing would greatly enhance the prospects for indefinite extension.[13]

As a result, the nuclear-weapon states began to revisit the test ban issue. With the Cold War over, the United States and Russia were more open to steps that would reduce nuclear dangers. One such step would be to support a nuclear test ban. In October 1991, Russia's President Mikhail Gorbachev announced a 1-year unilateral moratorium on nuclear testing. In April 1992, France announced its own moratorium and in June Gorbachev's successor, Boris Yeltsin, extended Russia's self-imposed halt.

In October 1992, U.S. President George H.W. Bush signed into law the Hatfield-Exon-Mitchell amendment, which imposed a 9-month U.S. moratorium on testing and permitted limited testing for safety and reliability over the subsequent 3 years. This law instructed the Bush administration to seek a comprehensive cessation to testing by 1996.[14]

On July 3, 1993, shortly after assuming office, the Clinton administration released a statement announcing that the United States would extend its moratorium (unless another state tested first). The administration also declared that the stockpile was "safe and reliable," and that nuclear testing was not needed for the foreseeable future. In the July 3 statement, the administration also made clear that it would "explore other means of maintaining our confidence in

the safety, reliability, and performance of our nuclear weapons."[15] The link between the moratorium and developing the means to ensure the continued viability of the nuclear stockpile was intentional. The administration needed to make clear to the international community—and to Congress—its commitment to the continued viability of U.S. nuclear assets.

With the United States and Russia, as well as the United Kingdom and France, committed to a moratorium on nuclear testing, the table was set for Comprehensive Test-Ban negotiations in the Geneva-based Conference on Disarmament (CD), which began in 1994. As this case study will discuss, the five NWS were deeply involved from the outset. India and Pakistan, two of the so-called threshold nuclear-weapon states, were also active participants.[16] Israel, the third country sometimes referred to as a threshold state, kept a close eye on the negotiations. In June of 1996, Israel (as well as North Korea and others) joined the CD as observers and began to play a more direct role in the negotiations.[17]

These ongoing negotiations helped pave the way for a successful NPT Review and Extension Conference in May of 1995, where the NWS reinforced their commitment to "the completion by the Conference on Disarmament of a universal and international and effectively verifiable Comprehensive Test Ban Treaty no later than 1996."[18] The NPT was indefinitely extended, but as the negotiations ran their course and issues crystalized, it was clear that concluding the negotiations would not be an easy task.[19]

Perspectives of Key Actors on Essential Treaty Objectives

In large part, challenges in concluding the negotiations reflected the often-contrasting perspectives of the key actors involved. As noted, the majority of non-nuclear-weapon states prioritized nuclear disarmament, which, the argument went, would be facilitated by constraining the NWS from modernizing their nuclear arsenals or possibly testing new designs. For their part, the nuclear-weapon states acknowledged the potential disarmament impacts of a Comprehensive Nuclear-Test-Ban Treaty, but sought a treaty that would minimize those impacts. They were not prepared to negotiate a treaty that would lower confidence in the security and reliability of their weapons. Their primary objective was to raise the bar for new states seeking to cross the nuclear threshold. India and Pakistan were believed to be moving forward on nuclear weapon programs. North Korea was clearly exploring a nuclear option. The CTBT's value, therefore, was in impeding the nuclear pathway for potential nuclear-weapon states.

The perspectives of India and Pakistan reflected not only nonproliferation and disarmament priorities, but also their regional security concerns, which were to a good extent intertwined. India had long viewed itself as a key leader of international nuclear disarmament efforts.

India never wavered in seeking a commitment from the NWS to a "time-bound" framework for nuclear disarmament and sought to incorporate language into the CTBT reflecting that priority. However, India also had to prioritize the protection of its regional security, given historical animosities with a nuclear-armed China and potentially Pakistan.

Pakistan positioned itself as a leader among the states seeking a CTBT with potentially significant disarmament impacts. But Pakistan was not prepared to cede any nuclear advantage to its regional rival and made clear fairly early on that while it would participate constructively in the negotiations, it would not become a party to a CTBT unless India did so as well.

The varying perspectives of these states, as well as other key NNWS, would significantly influence both the process and the outcome of the test-ban negotiations.

The Negotiations Move Forward

The Geneva-based Conference on Disarmament was established in 1979 to negotiate multilateral arms control. Prior to the CTBT negotiations, its members had successfully negotiated the Chemical Weapons Convention and the CD was generally acknowledged by the international community to be the logical home for the CTBT talks.[20]

The 38 members of the CD were organized into an Eastern Group, a Western Group, and a Group of Non-Aligned States (NAS), which consisted of a group of non-nuclear-weapon state parties to the NPT, as well as India and Pakistan, who were not members of the NPT. Sweden acted independently, but worked closely with the Western Group. China was a self-proclaimed "group of one," working with the nuclear-weapon-states while keeping ties to the NAS.[21]

Every year the CD, which makes decisions on a consensus basis, selects chairmen for the "ad hoc" committees that coordinate consultations and potential negotiations on agreed topics. The chairmen are selected on a rotating basis among the three groups of CD member states. In 1994 the chairman of the CD's Ad Hoc Committee on a Nuclear Test Ban (AHC) was Ambassador Miguel Marin-Bosch of Mexico, from the Group of Non-Aligned States. In 1995 the chairman was from the Eastern Group and in 1996, the final year of the negotiations, the chairman was from the Western Group.

Marin-Bosch established two working groups to support the negotiations. One focused on verification and the other on legal and institutional aspects of the treaty. He also appointed a number of "friends of the chair," giving negotiators access to international experts on legal and technical issues associated with a CTBT.

Under Ambassador Marin-Bosch, negotiations proceeded on the basis of a so-called rolling text. CD members with competing perspectives on any aspect of the treaty could provide

text that reflected their position. This language would be added to the rolling text and bracketed. The idea was that the CD would gradually negotiate a resolution to the issues reflected in the brackets. This approach was continued in 1995 under Marin-Bosch's successor, Ambassador Ludwik Dembinski of Poland.

When the NPT's Review and Extension Conference convened in May 1995, CD states negotiating the CTBT were divided on many key issues, such as the treaty's basic obligations, its verification and monitoring system, and its provisions for entering into force. Despite continued negotiations after the Review and Extension Conference, these issues were not settled until the following year. It did not help that shortly after the Review and Extension Conference adjourned, China conducted a nuclear explosive test and France announced that it would undertake a series of eight tests prior to agreeing to a CTBT.

In January 1996, shortly before the CD reconvened, the United Nations General Assembly (UNGA) adopted a resolution calling for the CTBT negotiations to be completed and opened for signature "by the outset of the fifty-first session of the General Assembly," [22] which would convene in early September 1996. For all intents and purposes, the CD now had a deadline to complete its work.

When the CD reconvened on January 22, 1996, the rolling text was almost 100 pages long with over 1,200 bracketed inserts. Ambassador Jaap Ramaker of the Netherlands, who succeeded Dembinski as the Chairman of the CTBT Ad Hoc Committee, assessed that it would not be possible for the CD to resolve all the bracketed issues by September 1996. In his view, "it was pure fiction to think that eliminating the bracketed texts would produce a consistent Treaty text conforming to the standards of a legal instrument."[23]

Each year, the CD divides its negotiating sessions into three parts. In 1996, these were scheduled for January 22–March 29, May 13–June 28, and July 29–September 13. Despite his pessimism over the bracketed text, Ramaker sought to conclude the negotiations well before the end of the third part and keyed his efforts to these dates.

Early in the first session, Iran and Australia submitted complete CTBT texts for the CD members to consider, even as work continued on the rolling text. The Iranian text called for a time-bound framework for nuclear disarmament, which was unacceptable to the NWS. Australia's text was closely aligned with Western Group positions and was not as forward leaning on the disarmament question. Overall, however, the texts shared much in common. For example, both articulated specific lists of states that would have to join the treaty in order for it to enter into force.

The dynamics of the negotiations were clearly evolving, given the challenge of negotiating on the basis of the rolling text. On March 28, just prior to the CD's first intersessional, Ramaker introduced an "Outline of a Draft Comprehensive Test Ban Treaty," and began a 2-month period of intensive consultations. When the CD reconvened on May 28, he unveiled his first Chairman's Text, which tracked closely to the March 28 paper.

Many key states, including India, China, and Russia, raised objections. Pakistani Ambassador Munir Akram warned that, "[a] Treaty which descends from heaven or elsewhere may arrest rather that accelerate our negotiations and the fulfilment of our deadline."[24] In fact, while the rolling text remained the titular basis for negotiations, the CD negotiators focused their attention on the Chairman's Text. While plenary and other public sessions continued, the actual work of finding consensus was undertaken through intensive Chairman's consultations, informal meetings among delegations and groups, the assignment of "Friends of the Chair" to focus on specific issues, and consultations in capitals. Ramaker was intent on finding resolution to the key issues that divided the negotiators.

Key Issues

Basic Obligation

The issue of the CTBT's basic obligation—what the prospective treaty would fundamentally require of the states that joined it—was one of the most challenging issues to resolve. Delegations sought a wide range of prohibitions that often went beyond a simple ban on nuclear weapons tests. For example, Iran and other nations sought the closing of all test sites. China sought to allow for so-called peaceful nuclear explosions, discussed below. But broadly speaking, debate centered on two competing visions for the treaty's basic obligation:

- A "zero-yield" ban, meaning that all nuclear *explosive* testing would be prohibited. Nuclear weapons-related tests that did not result in a nuclear explosion (that is, did not result in a self-sustaining chain reaction, or yield) would not be impacted by the treaty.

- A ban on *all* nuclear weapons testing, whether or not the test resulted in a nuclear explosion (that is, reached criticality and resulted in a self-sustaining nuclear reaction). This would include tests at very low levels (a so-called threshold), as well as non-nuclear-explosive tests conducted in laboratories or other controlled environments.

Nuclear explosive testing, for example to ensure that a basic design will work as intended, is an important and generally necessary step toward crossing the nuclear threshold. A ban on

such tests would, therefore, be a significant constraint to a potential proliferator. Such a ban, however, would still permit the NWS to conduct so-called sub-critical tests, to ensure the long-term safety and reliability of their stockpiles. Moreover, a broader ban that included *all* nuclear weapons-related testing—whether or not it resulted in a nuclear explosion—was an important objective for those states seeking to maximize the CTBT's disarmament impact.

A True Zero-Yield Treaty. In the first year of the negotiations, the NWS were considering a so-called threshold treaty that would permit low-yield explosive tests that might result in only a few pounds of yield. As summarized by Keith Hansen: "Reports indicated that the P-5 [the five permanent members of the UN Security Council: China, France, Russia, the United Kingdom, and the United States] wanted to conduct . . . hydronuclear tests, which result in very small yield but no full-scale nuclear explosions. Some of the P-5 countries were reportedly calling for a limit of several pounds of yield, while others wanted hundreds of tons of yield to ensure the safety and reliability of their stockpiles."[25]

The idea of negotiating a treaty that permitted threshold tests was anathema to the NNWS and the concept was largely condemned. It was clear to the NWS that a threshold treaty would be a nonstarter in the CD. The NWS had to decide whether they could accept a ban on *all* nuclear testing, or only on nuclear *explosive* testing—the zero-yield option.

Gradually, the NWS embraced a zero-yield treaty. France, facing severe international backlash against its resumed testing, announced in August 1995 that once its tests were completed, it would support a true zero-yield treaty. Shortly thereafter, on August 11, the White House announced that it would support a "true zero yield ban" on *all* nuclear explosions. Consistent with the July 3 statement, this was conditioned on a number of "safeguards," including the formal establishment of a Stockpile Stewardship program, to ensure the long-term safety and reliability of the stockpile without nuclear explosive testing.[26]

The U.S. announcement was a major impetus to the negotiations. The United Kingdom endorsed a zero-yield treaty shortly thereafter. China announced its support in March 1996. President Yeltsin formally announced Russia's support in April. All five NWS now supported a zero-yield treaty.

India, Pakistan, and others expressed disappointment that a ban on all nuclear weapons-related testing was seemingly out of reach. Arundhati Ghose, India's ambassador to the CD, stated that the CTBT should "leave no loophole for activity, either explosive based or non-explosive based, aimed at the continued development and refinement of nuclear weapons."[27] Pakistan's ambassador expressed concern that the NWS felt *entitled* to conduct safety and reliability tests. Ramaker et al., have summarized Pakistan's view thusly: "[Pakistan] believed that

if a nuclear weapon was not safe or reliable any longer, it should be dismantled. The argument that nuclear weapons should remain safe and reliable would perpetuate the existence of nuclear weapons indefinitely, which Pakistan found contrary to the purpose of a CTBT."[28]

The NWS were unwilling to go beyond the prohibition on nuclear explosive testing, which they argued would advance disarmament by constraining their ability to modernize their weapons or develop new designs. John Holum, Director of the United States Arms Control and Disarmament Agency, noted a number of technological advancements, such as directed-energy weapons, that would be foreclosed by a zero-yield treaty. He concluded that "the CTBT's "great practical (arms control) impact will . . . be to end development of advanced new weapons and keep new military applications from emerging."[29]

Whether or not the NNWS were persuaded is open to question, but the significance of a zero-yield CTBT, as well as the real constraints it would put on the NWS, were not lost on the majority of negotiators. As such, the CTBT's Article I states that "Each State Party undertakes not to carry out any nuclear weapon test explosion or any other nuclear explosion."[30]

Peaceful Nuclear Explosions. An ancillary scope-related issue concerned China's insistence that the CTBT not foreclose the option for peaceful nuclear explosions (PNEs), a position it held deep into negotiations. China suggested that it had construction projects for which such explosions could potentially be useful and pointed to the 1976 U.S.-USSR Peaceful Nuclear Explosions Treaty as a precedent.[31] But as Hansen notes, "both the United States and USSR argued that such explosions had not been useful or safe, and all other members of the CD were opposed to such an exemption. . . . Moreover, some in the CD feared that China and others would use PNEs as a loophole to continue developing such weapons."[32]

China was isolated on the PNE issue and eventually settled for a reference to PNE in the CTBT's Article VIII, *Review of the Treaty*, which stipulates that unless a majority of the state parties to the treaty decided otherwise, a review conference would be held 10 years after the treaty's entry into force to review the "operation and effectiveness" of the treaty. The CTBT specifies that a delegation may seek to raise the PNE issue at this conference.

Verification

Technical issues associated with CTBT verification were largely addressed in subsidiary bodies to the conference, such as the Group of Scientific Experts (GSE), and in deliberations of the "friends of the chair" as designated by the chairmen.[33] Establishing an effective system to monitor compliance with a CTBT and ensuring that verification be as effective as possible were high priorities for CD negotiators. It was easy to envisage cheating scenarios and the CTBT's

verification system had to provide confidence that it would deter, or if necessary detect, a covert nuclear explosion. As summarized by Pierce Corden: "The verifying party naturally looks for high detection probability at low yield, but the potential cheater must take into account that the risk of detection has not disappeared, even at low probability, and must in addition factor in the risk of being caught by multiple systems. . . . [T]hus the cheater can never have an absolute assurance of success."[34]

To coordinate the CTBT's extensive verification and monitoring operations, the CD states established the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), consisting of all state parties to the CTBT.[35]

The CTBT further establishes under the CTBTO an International Monitoring System (IMS) as the technical basis for monitoring compliance with the CTBT.[36] Once fully operational, the IMS will consist of over 300 IMS stations, situated throughout the world, to conduct seismic monitoring for underground tests, hydroacoustic monitoring of the oceans, infrasound measurements in the atmosphere, and radionuclide monitoring "to detect radioactive debris from atmospheric explosions or vented by underground or underwater nuclear explosions."[37] Negotiators also established an International Data Center (IDC) to collect, process, analyze, and distribute the flow of data that was produced by the IMS, as well as by cooperating national facilities that will feed data into the IDC.

It was also agreed that the CTBT should provide for on-site inspections (OSIs) "on the territory or in any other place under the jurisdiction or control of a State Party."[38] On-site inspections are to be conducted on a challenge basis and are thus inherently sensitive propositions. A 51-member Executive Council consisting of six regional groupings created specifically for the CTBT will, among numerous other duties, help to manage issues associated with OSIs.[39]

Many OSI-related issues did not lend themselves to technical solutions, and had to be worked out among the CD state parties. These included:

- the role of national technical means (NTM), such as a state's sovereign intelligence and data collection assets, including satellites, to support an inspection request
- whether a request for a challenge inspection would have to be authorized by the Executive Council, and if so, on what basis
- the procedures for implementing challenge inspections, including how the inspectors' access would be managed to ensure that national security interests unrelated to a potential nuclear test were not compromised.

National Technical Means. For the Western Group states in particular, the inclusion of NTM was essential. The IMS would be highly effective but, as Ramaker has noted, the IMS "could not give a 100 percent guarantee of detecting any possible nuclear explosion, especially if conducted under an evasive scenario."[40]

China, as well as India, Pakistan, and others, argued that NTM would be biased toward the technologically advanced nations and could be used for purposes beyond CTBT monitoring. Russia shared those concerns, but was prepared to accept the use of NTM, so long as the means were strictly technical.[41]

Negotiators agreed that the treaty would permit the use of NTM.[42] Hansen notes, however, that while "this was a significant victory for those countries wanting the CTBT to be an aggressive tool to prevent or detect testing, [it] made those on the defensive side (and in particular China) take harder positions on the number of votes required to launch an inspection."[43]

Authorizing an Inspection. CD states were divided on the standard to be met before an inspection could take place. Most Western Group countries, including the United States, took the position that if a state requested an inspection, it would proceed *unless* the Executive Council voted to prevent it (for example, by putting up a so-called red light). However, China, India, Pakistan, Russia, and others foresaw numerous opportunities for politically motivated or frivolous demands for inspections. These states insisted that any inspection request would have to be authorized (or "green lighted") by the Executive Council.

The "red light" standard had won the day in the Chemical Weapons Convention (CWC), where it was agreed that an inspection would take place unless two-thirds of the Executive Council voted against it— that is, put up a red light. After much deliberation among the CTBT negotiators, however, the green light standard won out. This was seen as necessary to assuage key countries, including China, to join consensus. Initially, the CD negotiators agreed that a simple majority of the 51-member Executive Council would have to approve an OSI request before it could proceed. As discussed below, China would ultimately demand an even tougher standard.

Managed Access for On-Site Inspections. A challenging set of issues concerned how to manage the inspection team's access during an OSI. When conducting an OSI, the inspection team has to conduct its inspection as efficiently and unobtrusively as possible. The inspected state party has the right to protect assets unrelated to a possible nuclear test from inspection if it believes that their exposure carries a national security risk. However, that state must then make provisions to allay any concerns raised by the inspection team. For example, if an inspection takes place in a facility where sensitive equipment may be located, the inspected state party

would have the right to shroud that equipment, or work with the inspection team to develop alternative inspection routes that bypassed the equipment.

In the United States, a working group was formed consisting of all interested partners in the U.S. interagency. This group looked closely at the managed-access provisions developed for the CWC as a point of departure. At first, the group sought convergence on easily agreed issues, such as establishing that a state had a right to manage access if subject to an inspection. As resolution was reached, guidance was forwarded to the U.S. delegation in Geneva who then introduced the substance of the guidance and would work to attain consensus within the CD. The working group would then start on a new set of issues and the process would repeat itself. Finally, the thorniest issues were tackled, such as inspection timelines, permissible equipment, the inspection perimeter, permissible steps that a state party could take to protect sensitive equipment and materials, and alternative methods that a state could deploy to satisfy inspectors' concerns. The process played out in Geneva and a robust managed-access regime was established that was largely based on the U.S. guidance.[44]

Many states made important contributions to the managed-access regime and many OSI-related issues were strongly debated in the CD. The United States drew upon the vast expertise of its national laboratories to ensure technically sound positions. The U.S. guidance further reflected an approach that was developed with the support of numerous governmental agencies with often competing interests, which helped to ensure balance among its elements. Perhaps this helped to legitimize the U.S. guidance among the CD states.

Entry into Force (EIF)

An international treaty will generally stipulate conditions for its entry into force (EIF). Until those conditions are met, the treaty's value is in establishing an international norm, or at least a yardstick against which the behavior of states can be measured. To be sure, a state that signs a treaty is legally obligated to adhere to its basic obligations. But the treaty does not become law until it enters into force.

There was no disagreement among the CD negotiators that to maximize the potential benefits of the CTBT, the five NWS and the three threshold states should be treaty parties. The issue was twofold: first, whether to seek a simple numerical formulation that could lead to early EIF of the CTBT, even if it did not include all eight of those states at the outset; and second, whether to make their ratification a condition for EIF.

India argued strongly that the latter approach, which would specifically stipulate that India (and others) have to ratify the CTBT before it entered into force, was unacceptable. But there

was a second problem with this approach that was raised by any number of CD delegations. Specifically, a state whose ratification is required for the CTBT to go into effect could potentially hold the CTBT hostage, essentially exercising a veto over entry into force. Thus, for example, if North Korea was stipulated as a required state, the CTBT would not be able to enter into force until North Korea ratified it.

Ramaker consulted widely on the EIF issue and many formulations were discussed. Complicating the discussions was that on June 20, a little more than a week before Ramaker intended to present his final treaty text, Ambassador Ghose announced that India would not support the treaty that was being negotiated in the CD. Declaring that the emerging treaty was "not the CTBT India envisaged," Ghose went on to say that "India cannot accept any restraints on its capability, if other countries remain unwilling to accept the obligations to eliminate their nuclear weapons. Such a Treaty is not conceived as a measure toward universal nuclear disarmament and it is not in India's national security interest. India, therefore, cannot subscribe to it in any form."[45] India thus formally rejected the CTBT, even as it was still being negotiated. India further made clear that it would not accept the placement of four IMS stations in India, as it had previously agreed.

This added a new level of complexity to Ramaker's efforts. On one hand, a broad EIF formula that did not stipulate the nuclear-weapon and the threshold states to be CTBT adherents was unacceptable to many CD states. On the other, it was obvious that requiring a state that had rejected the treaty to ratify it before the treaty could enter into force was also highly problematic.

Ramaker worked tirelessly to find a compromise acceptable to all CD states, but ultimately had to conclude that "no other solution than to make ratification by all eight, and therefore by India, a condition *sine qua non* for entry into force, could find the necessary acceptance."[46] Thus, when Ramaker presented his final Chairman's Text on June 28, the EIF provision listed 44 countries that included the 8 key states as well as others that possessed nuclear research and/or power reactors, according to the International Atomic Energy Agency's April 1996 edition of "Nuclear Power Reactors in the World." These countries had also participated in the CTBT negotiations in 1996. The CTBT would enter into force after these 44 states deposited their instruments of ratification with the United Nations.[47]

The Endgame

On June 28, 1996, Ramaker announced that in his view, "convergence had reached its peak"[48] and introduced a revised Chairman's Text.[49] Ramaker discouraged further negotiations, urging delegates to consult with their capitals on whether they could accept the Chairman's Text.

The CD reconvened for its final negotiating session a month later, on July 29—just one day after China conducted a nuclear test. China also announced that it would now observe a unilateral moratorium on future testing, stating that "we share the international community's wish that yesterday's test should be the last ever" and announced its support for the Chairman's Text.[50]

The CD delegations, fresh from intersessional consultations as well as meetings in capitals, announced their position on the treaty. Most cited the text as imperfect, but supported its transmittal to the United Nations so it could be opened for signature.

On August 14, Ramaker presented the Chairman's Text as a Working Paper to the CD and recommended that it be transmitted through the CD Secretariat to the United Nations for consideration when the UNGA convened in September.

However, there was one key substantive change to the text. In consultations, China had insisted on a 30-state majority to govern an Executive Council decision to authorize an OSI, as opposed to the simple majority previously agreed. Ramaker determined that this change was necessary to attain NWS consensus and it was now reflected in the Chairman's draft.[51]

Outraged, India argued that once again the demands of a nuclear-weapon state were heeded while India's were ignored. A number of other states were also dissatisfied, as they had refrained from reopening the text at the strong urging of the Chairman. India offered a simplified entry-into-force formula that did not call out any state,[52] making clear that if the original EIF language were not changed it would not support the treaty, but would not stand in the way of its transmittal to the United Nations. Ramaker was not willing to re-open the EIF provision and India withheld its support.[53]

Ramaker sought to include the CTBT text in the CD's annual report to the UNGA, along with the normal record of the deliberations of the ad hoc committees and working groups. India was now joined by Iran, who objected to the treaty's inclusion of Israel in the CTBT's Middle East/South Asia group. Ramaker explained that this was necessary to strengthen IMS functionality in the Middle East and that six groups (as opposed to the traditional five designated by the UN) were necessary to ensure that all members of the regional groups would have the opportunity to serve on the Executive Council. Unconvinced, Iran joined India in refusing to allow the CD to include the treaty text in its annual report.

The August 22 Plenary

The CD met in plenary on August 22, 1996. Pakistan, seizing an opportunity to take the high road, proposed that the Ad Hoc Committee's report be forwarded to the UN "for informational purposes." India and others questioned whether this was possible and would not agree.

Toward the end of the plenary, in an otherwise routine speech thanking Ramaker and others for their efforts, the Belgian ambassador submitted a one-sentence national paper that stated, "On behalf of Belgium, I should be grateful if you would arrange for [the treaty text] to be circulated as an official document of the Conference on Disarmament."[54] As Rebecca Johnson sums up: "The CD President quickly recorded the decision … the CTBT text was accorded a CD reference number and official status."[55] The Belgian letter, with the text of the CTBT attached, was now an official CD document.

Just hours later in New York, Richard Butler, Australia's ambassador to the United Nations, requested to the UN Secretary-General that the General Assembly convene in plenary and consider the Belgian paper. As put by Johnson, "Australia requested that the CD document containing the full treaty text . . . be accorded status as a UN document and [proposed] its adoption by the General Assembly. It was duly accorded the document number A/50/1027, whereupon Australia followed with a resolution proposing the adoption of the CTBT as contained therein."[56]

On September 9, 1996, the resolution was brought to the General Assembly. Many countries expressed misgivings about how the negotiations were concluded and how the treaty found its way to the United Nations. Familiar issues associated with the treaty's basic obligation were also aired, as well as the EIF provision and the treaty's disarmament impacts. Nonetheless, on September 10 the CTBT resolution was endorsed in the UNGA by a vote of 158 to 3. India, Libya, and Bhutan voted against and five countries abstained (Cuba, Lebanon, Mauritius, Syria, and Tanzania). In a final statement after the vote, India's Ambassador Ghose famously declared: "India will never sign this unequal treaty. Not now, not later. As long as this text contains this (EIF) article, this Treaty will never come into force."[57]

On September 24, 1996, the CTBT was opened for signature. President Clinton was the first to sign the treaty. As of this writing, 183 nations have signed and 164 have ratified the CTBT. However, 8 of the 44 *required* for the CTBT to enter into force, including the United States, Iran, Israel, and China, have signed but not yet ratified. Russia, France, and the United Kingdom have ratified. Pakistan, India, and North Korea have not yet signed the CTBT. Thus entry into force is not on the immediate horizon.

With respect to the eight key states at the center of the entry-into-force debate:

- In 1999, the United States Senate considered CTBT ratification but did not provide its consent to ratify the treaty. Subsequent administrations have not yet sought Senate reconsideration.

- Russia, an early signatory in 1996, ratified the treaty in 2000 and actively participates in the work of the CTBTO Preparatory Commission.

- Both India and Pakistan have observed moratoriums since their tests in 1998. India's Prime Minister Vajpayee said in 1998 that "India will not stand in the way" of entry into force of the CTBT, a position India has reiterated numerous times.

- Pakistan has repeatedly reaffirmed its commitment to its voluntary nuclear test moratorium, noting that it won't be the first in South Asia to resume testing.[58] Pakistan has stated that a decision to ratify the CTBT will be based on its own security calculations, no longer linking its adherence to India doing so first.[59]

- Israel, an early CTBT signatory, actively participates in the CTBTO's Preparatory Commission. In 2014–2015, it was widely reported that Prime Minister Netanyahu stated that he sees the CTBT as "significant" and that he has "no problem" with it.[60]

Observations and Lessons Learned

Many lessons can be drawn from the events that preceded the CTBT negotiations, the negotiations process, and the endgame. In particular, there is much to consider for policymakers charged with leading, or supporting, future multilateral negotiations.

Most notably, the CTBT experience demonstrates the challenges faced by decisionmakers as they seek to balance well-intentioned international aspirations with domestic and national security factors at home. *When these interests converge, arms control can help to facilitate constraints upon armaments of concern. When interests do not converge, effectively negotiating treaties and agreements takes on new complexities that are usually difficult, if not impossible, to overcome regardless of how desirable they may be.*

To be sure, all of the CD state governments endorsed the objectives of a cessation to nuclear testing. But key states were balancing this objective against many factors directly related to how they perceived their national security interests.

For example, the non-nuclear-weapon states had to decide whether a CTBT that did not reference a time-bound framework for disarmament and did not ban *all* nuclear testing would satisfy their Article VI expectations. In the end, a majority of the NNWS accepted that "banning the bang, and not the bomb" was significant and worth supporting, even if it fell short of their ultimate objective.

Pakistan and India, on the other hand, had direct security issues to consider, in light of the animosities between them and the fact that they both had weapons programs. It is hard to gauge whether, under any circumstances, either would have been prepared to adhere to a CTBT at the time it was negotiated. Pakistan took a lower profile role in the negotiations, given India's proactive and central role. There should be no doubt, however, that Pakistan was fully committed

to its nuclear weapons program. As then-President Z.A. Bhutto famously said in 1965, "if India builds the bomb, we will eat grass or leaves, even go hungry, but we will get one of our own."[61]

India's nuclear program was also progressing rapidly, to the point that by May 1998, India surprised the world and tested a nuclear device.[62] Whether a different outcome in the negotiations would have affected India's plans to move forward on its nuclear program, or whether India's commitment to that program led it to take the positions that it did, may never be known. Regardless, India's inability to achieve its disarmament-related objectives ensured that its weapons program would proceed.[63] As India's Ambassador Ghose has said, "India's decision not to sign the Comprehensive Test Ban Treaty was based on its traditional approach to nuclear disarmament *and its national security concerns* [emphasis added]."[64]

Finally, each nuclear weapon state had its own considerations. None was prepared to accept a basic obligation that would end all nuclear weapons testing. At the time the CTBT was negotiated, thousands of nuclear weapons were still deployed, with the vast majority in the hands of the United States and Russia. It was simply untenable to risk undercutting the reliability, safety, and security of these weapons. In the United States, this consideration was a litmus test among Congressional critics. However unpopular in the CD, it would not be possible for the United States to agree to end all nuclear weapons testing.

This discussion tells us that Ambassador Ramaker's ability to influence the outcome of the negotiations was, therefore, limited, and it is to his credit that he made as much progress as he did. His efforts *well demonstrate the importance of strong, focused leadership in guiding negotiations to their conclusion*. Ambassador Ramaker did all he could to achieve consensus on a CTBT text. Given the state of the rolling text when he took the reins of the ad hoc committee, Ramaker's decision to abandon the rolling text was unpopular with many of the delegations, but provided the CD with a pathway to meeting the UNGA deadline.

Ramaker was ultimately unsuccessful in attaining a consensus among the negotiators. This suggests that *decisions impacting the course of a negotiation, or whether a state can accept the final product of those negotiations, are rarely made in the negotiating halls—they are made in state capitals.* Thus, as important as Ramaker's approach was, he was unable ultimately to achieve a negotiating consensus.

Nonetheless, a treaty that has not yet entered into force, but which enjoys a broad consensus, can still be a powerful expression of the international community. Since 1998, North Korea is the only state that has conducted a nuclear test and in fact, the five nuclear-weapon states, along with India and Pakistan, are adhering to self-imposed moratoriums on explosive testing.

For its part, Israel supports the CTBT and participates in the operations of the CTBTO's Preparatory Commission.

Whether and when the CTBT enters into force remains to be seen, but its value internationally remains significant.

Notes

[1] See, for example, Ola Dahlman, Svein Mykkeltveit, and Hein Haak, *Nuclear Test Ban: Converting Political Visions to Reality* (Berlin: Springer Science and Business Media, 2009), chapter one.

[2] See, for example, Arms Control Association, "Fact Sheet: The Nuclear Testing Tally," updated January 2016, available at <https://www.armscontrol.org/print/2600>.

[3] Ibid.

[4] The March 1954 Castle Bravo test reached 15 megatons well over the expectations of the scientists and technicians who planned the test. This is approximately 1,000 times more powerful than the Hiroshima or Nagasaki explosions. The test left the atoll uninhabitable, due to the high levels of radioactive fallout that resulted from the test. A 2012 United Nations report noted that the Castle Bravo test, along with others in the region, resulted in "near-irreversible" atmospheric contamination. See, for example, Colin Georgescu, A/HRC/21/48/Add.1, "Report of the Special Rapporteur on the Implications of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes," United Nations General Assembly, September 3, 2012, available at <www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session21/A-HRC-21-48-Add1_en.pdf>.

[5] Speech by Jawaharlal Nehru, in the Lok Sabha (the lower house of India's parliament), New Delhi, April 2, 1954, quoted in Arundhati Ghose, "Negotiating the CTBT: India's Security Concerns and Nuclear Disarmament," *Journal of International Affairs* (1997), 239–261, 241.

[6] After leaving office, President Eisenhower indicated that his greatest regret as President was not attaining a test ban treaty. Glenn T. Seaborg and Benjamin Loeb, *Kennedy, Khrushchev, and the Test Ban* (Berkeley, CA: University of California Press, 1981), 10.

[7] Two other treaties between the United States and Russia, the Threshold Test Ban Treaty (TTBT) and the Peaceful Nuclear Explosives Treaty (PNET), also put limited constraints on nuclear testing. Both were ratified in December of 1990. For an overview of the TTBT see U.S. Department of State, *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Underground Nuclear Weapons Tests: Text of the Treaty* (Washington, DC: U.S. Government Printing Office, 1974), available at <www.state.gov/t/isn/5204.htm>. For an overview of the PNET, see U.S. Department of State, *Treaty Between the United States of America and the Union of Soviet Socialist Republics on Underground Nuclear Explosions for Peaceful Purposes: Text of the Treaty* (Washington, DC: U.S. Government Printing Office, 1976), available at <www.state.gov/t/isn/5182.htm>. Negotiations on strengthened verification provisions for both treaties, contained in protocols, were agreed in June of 1990 and both treaties entered into force in December of that year.

[8] As per Article IX of the Treaty, the NPT entered into force once the three-designated depositary states (the United Kingdom, the Soviet Union, and the United States) and 40 other states deposited their instruments of ratification.

[9] The Treaty on the Nonproliferation of Nuclear Weapons (NPT), Article VI. See <www.un.org/en/confrnpt/2005/npttreaty.html>.

[10] Ibid.

[11] The NPT requires a review conference 5 years after entry into force, and states that parties may convene review conferences every 5 years thereafter if they decide to do so.

[12] The NPT's Article X stipulates that "Twenty-five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods."

[13] Mordechai Melamud, Paul Meerts, and I. William Zartman, eds., *Banning the Bang or the Bomb? Negotiating the Nuclear Test Ban Regime* (Cambridge: Cambridge University Press, 2014), 104.

[14] The legislation also allowed for up to three tests to be implemented in conjunction with the United Kingdom, who tested at the U.S. test site. President Bush did not strongly support a test ban; however, the amendment was attached to an appropriation bill that included funding for the superconducting supercollider in Texas, a Bush priority; per author's correspondence with Dunbar Lockwood, who has written extensively on this topic.

[15] U.S. White House, Office of the Press Secretary, "Background Information: U.S. Policy on Nuclear Testing and a Comprehensive Test Ban," July 3, 1993, available at <http://fas.org/irp/offdocs/pdd11.htm>.

[16] There is no specific definition of a "threshold" state. However, these three states shared certain characteristics. They had not foreclosed the nuclear weapons option; were not members of the NPT; and had advanced nuclear infrastructures that could, or were close to being able to, support a weapons program.

[17] The CD expanded to 61 states, with full membership coming into effect after the completion of the CTBT negotiations. Jenifer Mackby, who was a senior officer at the CD during the negotiations and served as the CD's technical secretariat, points out that observer states could actively participate in the negotiations, but were not permitted to break CD consensus. Israel, for example, was very effective as an observer, participating in the CD's discussions, submitting papers to the CD, and offering new language (to be bracketed) into the rolling text, for example on issues associated with verification. Private correspondence from Jenifer Mackby to the author, September 24, 2016.

[18] The commitment to a CTBT was enshrined in "NPT/CONF. 1995/32 (Part I), Annex, Principles and Objectives for Nuclear Non-proliferation and Disarmament" (Decision 2). This was the second of three "Decision Documents" taken at the conference. Decision 1 dealt with enhanced review processes for the NPT. Decision 3 enshrined the decision to indefinitely extend the NPT and can be found at "NPT/CONF. 1995/32 (Part I), Annex, Extension of the Treaty on the Nonproliferation of nuclear Weapons" (Decision 3).

[19] For a discussion of the relationship between the NPT and the CTBT, with a particular focus on the 1995 Review and Extension Conference, see Maurice A. Mallin, "CTBT and NPT: Options for U.S. Policy," *The Nonproliferation Review* (Winter 1995), 1–11.

[20] The CD was the successor organization to a range of UN-based negotiating forums focused on disarmament, including the Ten-Nation Committee on Disarmament (1960), the Eighteen-Nation Committee on Disarmament (1962–68), and the Conference of the Committee on Disarmament (1969–78), where the NPT was negotiated.

[21] Rebecca Johnson notes that "China engaged in rhetoric that echoed the [nonaligned states], but carried out testing and pursuing the modernization of its nuclear arsenal." See Johnson, "The Role of Civil Society in Negotiating the CTBT," in Melamud, et al., *Banning the Bang or the Bomb,* 105.

[22] Resolution of the General Assembly, "A/RES/50/65, 9 January 1996. Comprehensive Nuclear

Test Ban Treaty." The General Assembly began its work on September 10, 1996.

[23] Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). Interview with Jaap Ramaker, Chairman of the CTBT Negotiations in 1996.

[24] Johnson, "The Role of Civil Society in Negotiating the CTBT," in Melamud, et al., *Banning the Bang or the Bomb,* 105.

[25] Keith A. Hansen, *The Comprehensive Nuclear Test Ban Treaty—An Insider's Perspective* (Stanford: Stanford University Press, 2006), 24.

[26] The safeguards include (consistent with the July 3, 1993, statement discussed above) the establishment of the Stockpile Stewardship program, as well as the maintenance of the capability to resume nuclear testing prohibited by the treaty, should the United States cease to be bound to adhere to the treaty, and the requirement for annual certification from both the Secretary of Defense and the Secretary of Energy that the stockpile was safe and reliable. See U.S. White House, Office of the Press Secretary, "Fact Sheet: Comprehensive Test Ban Treaty Safeguards," August 11, 1995.

[27] Statement of Arundhati Ghose, Ambassador/Permanent Representative of India to UN, Geneva, in the Plenary of the Conference on Disarmament on January 25, 1996.

[28] Jaap Ramaker, Jenifer Mackby, Peter D. Marshall, and Robert Geil, *The Final Test: A History of the Comprehensive Nuclear-Test-Ban Negotiations* (Austria: Provisional Technical Secretary of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, 2003).

[29] John Holum, Director of the United States Arms Control and Disarmament Agency, Statement to the CD, in Conference on Disarmament, Final Record of the Seven Hundred and Twenty-first Plenary Meeting (CD document CD/PV.721, January 23, 1996), 14.

[30] CTBT, Article I. See Appendix A.

[31] Hansen, *The Comprehensive Nuclear Test Ban Treaty*, 27. Negotiations on the Peaceful Nuclear Explosions Treaty were completed in 1976. As noted in note 7, above, it was ratified in 1990 after the parties agreed on measures to strengthen verification. Among other limitations, the United States and the Soviet Union agreed not to carry out any individual nuclear explosions with a yield exceeding 150 kilotons; they also agreed to to intrusive verification procedures including national technical means, site access, and heightened information sharing. See, for example, U.S. Department of State,*Treaty between the United States of America and the Union of Soviet Socialist Republics on Underground Nuclear Explosions for Peaceful Purposes: Text of the Treaty* (Washington, DC: U.S. Government Printing Office, 1976). Available at <www.state.gov/t/isn/5182.htm>.

[32] Ibid., 27.

[33] See Ola Dahlman, "How Can Science Support a Process Towards a World Free of Nuclear Weapons?" *Science & Global Security* 21, no. 2 (2013), 95–105. Dahlman explains: "In July 1976, before the political CTBT negotiations started, the Conference of the Committee on Disarmament created the Group of Scientific Experts (GSE) to 'specify the characteristics of an international monitoring system.' The GSE worked for 20 years, until the nuclear test ban treaty negotiations were concluded in 1996, in a formal process to provide the groundwork on verification for a CTBT." This case study focuses primarily on the political and procedural issues that required diplomatic resolution.

[34] Pierce S. Corden, "The Comprehensive Nuclear-Test-Ban Treaty: Technical Issues for the United States," APS Physics Forum on Physics and Society, April, 2013. Available at <https://www.aps.

org/units/fps/newsletters/201304/test-ban.cfm>.

[35] Article II of the CTBT establishes the CTBTO. However, the CTBTO will not come into being until the CTBT enters into force. All technical, administrative, and other CTBT-related work is therefore carried out by the CTBT's Preparatory Commission for the Comprehensive Nuclear-Test-Ban-Treaty Organization and the Provisional Technical Secretariat.

[36] A good discussion of the International Monitoring System is at the CTBTO website, available at <https://www.ctbto.org/>.

[37] CTBTO, *Overview of the Verification Regime*, available at <www.ctbto.org/>.

[38] CTBT, Article IV.

[39] The composition of the Executive Council was the topic of significant debate in the CD. For one thing, UN bodies generally relied on five groupings; some states were unhappy that a six-group approach was developed specifically for the CTBT, and were concerned about unnecessarily setting a new precedent. Members of both the NWS and the NNWS argued for permanent representation. A number of proposals were considered. In the end, Ramaker went with the six regional groupings. He believed six were critical to ensure effective geographic distribution to support the IMS, as well as to ensure effective representation on the Executive Council. These six were: Africa; Eastern Europe; Latin America and the Caribbean; the Middle East and South Asia; South-East Asia, the Pacific, and the Far East; and North America and Western Europe.

[40] See Jaap Ramaker, "Towards a Nuclear Test Ban Treaty," *NATO Review* 44 (1996), 26–29. p. 5. The IMS was designed to reliably detect a nuclear explosion anywhere in the world, but the practical reality was that no verification system could be perfect.

[41] Ibid.

[42] Specifically, the treaty states that in addition to data collected by the IMS, an inspection can be based on "any relevant technical information obtained by national technical means of verification in a manner consistent with generally recognized principles of international law." CTBT, Article IV.

[43] Hansen, *The Comprehensive Nuclear Test Ban Treaty*, 35.

[44] Recollections of the author, who chaired the United States Working Group on Managed Access. This working group was part of the larger effort in the United States to develop appropriate guidance, and establish effective technical and operational parameters for, the CTBT.

[45] Ghose, "Negotiating the CTBT," 255.

[46] Ramaker, "Towards a Nuclear Test Ban Treaty."

[47] The 44 countries whose ratification is required for CTBT entry into force are: Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, the Democratic People's Republic of Korea (North Korea), Egypt, Finland, France, Germany, Hungary, India, Indonesia, Islamic Republic of Iran, Israel, Italy, Japan, Mexico, Netherlands, Norway, Pakistan, Peru, Poland, Romania, Republic of Korea, Russian Federation, Slovakia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Vietnam, and Zaire.

[48] Jaap Ramaker, "The Negotiating Process: 1994-1996: A View From The Chair," in *Banning the Bang or the Bomb* ed. Mordechai Melamud et al., 71.

[49] See, for example, Ramaker, "Towards a Nuclear Test Ban Treaty," 7.

[50] Teresa Poole, "China's Last Explosion Ends Nuclear Tests," *The Independent*, July 29, 1996, available at <www.independent.co.uk/news/world/chinas-last-explosion-ends-nuclear-tests-1331145.html>.

[51] Thirty was chosen as it was about halfway between a simple and two-thirds majority.

[52] Specifically, India urged the adoption of an EIF formula that simply stated:"This Treaty shall enter in to force 180 days after the date of the deposit of the Instruments of Ratification by 65 States and no less than two years after its opening for signature." See, for example, Ghose, August 8, 1996 Statement.

[53] Ghose, "Negotiating the CTBT," 225.

[54] CD/1427, Letter dated August 22, 1996, from the Permanent Representative of Australia to the United Nations addressed to the Secretary-General, UN document A/50/1027, August 26, 1996.

[55] Rebecca Johnson, *Unfinished Business: The Negotiation of the CTBT and the End of Nuclear Testing* (Geneva: United Nations Institute for Disarmament Research, 2009), 140. Johnson notes that "this tactic has been agreed in a private meeting of Western delegations, and spearheaded by Belgium in part because [its] ambassador, Baron Guillaume, was due to retire and would not therefore suffer if there was any backlash against the maneuver," 337, footnote.

[56] Ghose, "Negotiating the CTBT," 140.

[57] Arundhati Ghose, "Statement in Explanation of Vote by Ms. Arundhati Ghose" (speech, New York, NY, September 10, 1996), Federation of American Scientists, available at <http://fas.org/news/india/1996/ctbt_UN_september_10_96.htm>.

[58] See, for example, DAWN.COM, *Pakistan Reaffirms Commitment to N-test Moratorium,* June 15, 2016, available at <www.dawn.com/news/1264952/pakistan-reaffirms-commitment-to-n-test-moratorium/print>.

[59] See, for example, Nasim Zehra, "Pakistan and the CTBT" (undated), available at <www.defencejournal.com/oct99/pak-ctbt.htm>.

[60] See, for example, CTBTO Newsroom, "Prime Minster Netanyahu: 'Proud' to have signed CTBT,[and] 'never had a problem with the CTBT,'" available at <https://newsroom.ctbto.org/2014/03/20/prime-minister-netanyahu-proud-to-have-signed-ctbt-never-had-a-problem-with-the-ctbt/>.

[61] Bhutto's widely quoted remark can be found at the Nuclear Threat Initiative's analysis of Pakistan's nuclear program, available at <www.nti.org/learn/countries/pakistan/nuclear/>.

[62] India previously tested in 1974. India insists that the 1974 test was for "peaceful" purposes.

[63] An excellent discussion of the domestic and international issues that impacted India's decisionmaking can be found at Dinshaw Mistry, "Domestic-International Linkages: India and the Comprehensive Test Ban Treaty," *The Nonproliferation Review* 6, no. 1 (1998), 25–38.

[64] See Ghose, "Negotiating the CTBT," 239–261. 239.

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Prior to joining NNSA, Mr. Mallin worked at the Department of State and the Arms Control and Disarmament Agency. He was a Senior Advisor to the Undersecretary of State and directly supported numerous international negotiations including the Nuclear Non-Proliferation Treaty, Fissile Material Cutoff Treaty, and Comprehensive Nuclear-Test-Ban Treaty (CTBT). In that capacity, Mr. Mallin supported CTBT negotiations in Washington, DC, and Geneva, and led the Working Group in Washington that developed the CTBT's policy and guidelines for implementing on-site inspections, including its managed access provisions.

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