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BASIC OBLIGATIONS OF THE COMPREHENSIVE NUCLEAR TEST BAN TREATY

*Mitsuru Kurosawa**

The Comprehensive Nuclear Test Ban Treaty (CTBT) was adopted by the United Nations General Assembly on September 10, and opened for signature on September 24, 1996. Japan signed the Treaty following the five nuclear-weapon states on that same day, got approval for its ratification from the Diet, and deposited the instrument of ratification to the Secretary-General of the United Nations on July 8, 1997. Japan is the fourth country to ratify the Treaty following Fiji, Qatar and Uzbekistan. This fact shows Japan's positive attitude to the CTBT. As it was impossible for a draft Treaty to be adopted by the Conference on Disarmament (CD) in Geneva, because of strong opposition by India, the draft Treaty was sent directly to the UN General Assembly by circumventing the adoption by the CD. In addition, as the condition of its entry into force is extremely severe, we can not expect its early entry into force. However, the rules of the CTBT have already been accepted as an international norm, because the draft Treaty was adopted at the UN General Assembly by overwhelming majority, with 158 states agreed and only 3 states opposed.¹⁾

A nuclear test ban has been a central agenda of nuclear disarmament since 1950s. It is designed as a measure to stop a qualitative nuclear arms race, that is, to stop qualitative development of nuclear weapons. In 1954, Prime Minister of India, Nehru, advocated stopping nuclear tests, partly influenced by the fact that Japanese fishermen had suffered from the U.S. thermonuclear testing at Bikini Atoll. As a result of the negotiations among the U.S., the U.K. and the Soviet Union since the late 1950s, they agreed on the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water in August 1963. This Treaty does

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1) On the analysis of the negotiations in the last stage, see, Rebecca Johnson, "The In-Comprehensive Test Ban," *Bulletin of the Atomic Scientists*, Vol.52, No.6, November/December 1996, pp.30-35; Rebecca Johnson, "The Comprehensive Test Ban Treaty: Hanging in the Balance," *Arms Control Today*, Vol.26, No.5, July 1996, pp.3-8; Rebecca Johnson, "The CTBT and the 1997 NPT PrepCom," *The Non-proliferation Review*, Vol.3, No.3, Spring-Summer 1996, pp.55-62.

not prohibit testing underground and is called a Partial Test Ban Treaty. The three Governments said in its preamble, "seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end". This determination is recalled in the preamble of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) of 1968.

In 1974, the U.S. and the Soviet Union signed the Treaty on the Limitation of Underground Nuclear Weapon Tests, which prohibited underground tests having a yield exceeding 150 kilotons, as a first step toward a comprehensive ban. However, in the 1970s and 80s, many underground tests were conducted, and more sophisticated nuclear weapons have been continuously developed. The atmosphere for a comprehensive test ban emerged only after the end of the Cold War. With the end of the Cold War, the U.S. and the Soviet Union/Russian Federation agreed on a substantial reduction of their strategic nuclear weapons, and withdrew respective tactical nuclear weapons abroad unilaterally but in parallel. In addition, with the end of the Cold War, Russia, France and the U.S. proclaimed a moratorium on nuclear testing voluntarily. The U.K., using the U.S. Nevada test site, was obliged to follow the *de facto* moratorium.

Substantive negotiations for a CTBT began at the Conference on Disarmament in Geneva in January 1994. President Bush had not agreed on negotiations on a CTBT, arguing that a CTBT was only an ultimate goal. On July 7, 1993, President Clinton said; "I have decided to extend the current moratorium on United States nuclear testing... And I call on the other nuclear weapon powers to do the same. If these nations will join us in observing this moratorium, we will be in the strongest possible position to negotiate a comprehensive test ban." With this statement in the background, on January 25, 1994, "the Conference directs the Ad Hoc Committee to negotiate intensively a universal and multilaterally and effectively verifiable comprehensive nuclear test ban treaty, which would contribute effectively to the prevention of the proliferation of nuclear weapons in all its aspects, to the process of nuclear disarmament and therefore to the enhancement of international peace and security".

The negotiations of a CTBT were deeply interconnected with the issue of how to extend the NPT. The U.S. agreed to begin the negotiations, partly because they wanted to get general support for an indefinite extension of the NPT through the beginning of negotiations, which meant a fulfillment of the obligation under Article VI of the NPT. Non-nuclear-weapon states, in particular non-aligned states, saw the fulfillment of Article VI, that is, progress in nuclear disarmament, as a condition for its indefinite extension. They argued for the completion of the negotiations on a

CTBT before the NPT Review and Extension Conference of Spring 1995. On the other hand, the U.K. and France argued that the decision of an indefinite extension of the NPT was a precondition for the completion of a CTBT. As the negotiations on a CTBT were still ongoing when the NPT Conference was held in April and May 1995, the decision on the Principles and Objectives for Nuclear Non-Proliferation and Disarmament provided for the completion of the negotiations on a CTBT no later than 1996.²⁾ This set a deadline for the negotiations. In addition, as the General Assembly in 1995 asked for the submission of a draft treaty to the next session of the General Assembly, a draft treaty had to be completed by September 1996.

Under these circumstances, states continued the negotiations, discussing many issues, including the scope of prohibition, nature of a CTBT organization, content of the verification system including on-site inspections, and conditions of its entry into force. Although all these issues are worth a thorough examination, this article will confine itself to the issue of basic obligations. The purpose of this article is to make clear through the examination of the negotiation processes: what activities are prohibited; how and why these activities are prohibited; and the meaning of the prohibitions themselves.

You may assume that the CTBT prohibits any nuclear test in any circumstance including underground, because the Treaty is “comprehensive” in comparison with the “partial” one in the case of the 1963 Partial Test Ban Treaty. However, by precisely examining the negotiation processes, you will find the situation is much more complex. As the treaty does not define the meaning of “nuclear test”, it is necessary to make the meaning clear through the examination of treaty-making processes.

I. Negotiation Process of Basic Obligations

The first draft treaty was submitted by Sweden in June 1993, which was revised in December 1993.³⁾ After the negotiations started, Australia submitted a draft treaty in March 1994.⁴⁾ The form of these draft treaties was based on the Partial Test Ban Treaty (PTBT), and the way of stipulation was very similar to the PTBT.

2) On this issue, see, Jayantha Dhanapala, “Fulfilling the Promise of the NPT: The CTBT and Beyond,” *Arms Control Today*, Vol.26, No.4, May/June 1996, pp.3-6.

3) Sweden, Draft Comprehensive Nuclear Test-Ban Treaty, CD/1203, 3 June 1993, and CD/1232, 3 December 1993.

4) Australia, Working Paper, Comprehensive Test Ban Treaty, CD/NTB/WP.XX, 30 March 1994.

However, arguments in the Conference on Disarmament in 1994 were quite various and many different opinions were submitted. A rolling text, submitted by a chairman of the Ad Hoc Committee at the end of the negotiations in 1994, included almost all proposals exhaustively with many brackets as follows:⁵⁾

1. Each [State Party,] [of the Parties to this Treaty] undertakes [to prohibit, and to prevent, and] not to carry out, [at any place and] [in any environment,] any nuclear weapon test [explosion] [which releases nuclear energy] [in any form or any type], or any [other] [peaceful] nuclear [test] [explosion], [and undertakes to prohibit and prevent any such nuclear explosion] at any place [under [or beyond] its jurisdiction or control] [,with the exceptions which may be authorized in exceptional circumstances] [.] [:]
[(a) In the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or
(b) Underground.]
2. Each [State Party] [of the Parties to this Treaty] undertakes, furthermore, to refrain from causing, encouraging, [assisting,] [preparing,] [permitting] or [in any way] participating in, [the carrying out anywhere of] any [nuclear [test] [explosion] referred to in paragraph 1 of this Article] [nuclear weapon test [explosion] [as referred to in paragraph 1 of this Article] or any] [other] [peaceful] [nuclear explosion] [,which would take place in any of the environments described in paragraph 1 of this Article] .]

Many proposals were submitted as to the scope of prohibition, as is shown in the above provisions. In spite of the fact that the mandate is to negotiate a comprehensive nuclear test ban treaty, the following issues were controversial: Is a nuclear weapon test or nuclear weapon test explosion prohibited? Is a peaceful nuclear explosion permitted or prohibited? Is there an exceptional circumstance where the prohibition does not apply? Does the enumeration of circumstances in (a) and (b) mean to permit exceptions? Is preparation for test (explosions) prohibited?

During the negotiations in 1995, the same controversy continued. However, as the U.S. and France agreed on a zero yield prohibition, the phrase on exceptional

5) Chairman's Rolling Text of the Treaty, CD/I273/Rev.1, 5 September 1994.

circumstances was deleted. A rolling text submitted in September 1995, mostly the same as the previous year's, with a few new phrases, was as follows.⁶⁾

1. Each States Party undertakes [to prohibit, and to prevent, and] not to carry out, [at any place and] [in any environment,] any nuclear weapon test [explosion] [which releases nuclear energy], [or any other nuclear [test] [explosion]], [or any release of nuclear energy caused by the assembly or compression of fissile or fusion material by chemical explosive of other means,] [and to prohibit and prevent any such nuclear explosion] [at any place under [or beyond] its jurisdiction or control] [.] [:]
[(a) In the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or
(b) Underground.]
2. Each States Party undertakes, furthermore, to refrain from causing, encouraging, [assisting,] [preparing,] or in any way participating in, the carrying out [anywhere] of any nuclear weapon test [explosion] [or any other nuclear [test] [explosion]] [or any release] [referred to] [,which would take place in any of the environments described] [in paragraph 1 of this Article.]

Negotiations in 1996 were very intensive, and on May 28, the Chairman submitted a draft treaty with no brackets for the first time.⁷⁾ Article I on basic obligations was stipulated as follows, which has not changed thereafter and was later adopted as a treaty provision. The provision is the same as the one included in the Model Treaty Text⁸⁾ submitted by the Australian delegation in February 1996. Consensus was reached after the two-year negotiations.

Article I BASIC OBLIGATIONS

1. Each State Party undertakes not to carry out any nuclear weapon test explosion or any other nuclear explosion, and to prohibit and prevent any such nuclear explosion at any place under its jurisdiction or control.

6) Chairman's Rolling Test of the Treaty, CD/1364, 26 September 1995.

7) Chairman of the Ad Hoc Committee of a Nuclear Test Ban, Working Paper, Draft Comprehensive Nuclear Test-Ban Treaty, CD/NTB/WP.330, 28 May 1996.

8) Department of Foreign Affairs and Trade, Comprehensive Nuclear Test Ban Treaty, Australia Model Treaty Text, February 1996.

2. Each States Party undertakes, furthermore, to refrain from causing, encouraging, or in any way participating in the carrying out of any nuclear weapon test explosion or any other explosion.

It is clear from this final text that: what is prohibited is not nuclear weapon tests but nuclear weapon test explosions; other nuclear explosions, that is, peaceful nuclear explosions are prohibited; there is no exception to the prohibition; and, preparation for test explosions is not prohibited. I will examine each individual issue in the next section looking at which states submitted proposals with what intentions, and the final outcome of the negotiations.

II. Main Issues in the Negotiations

1. Peaceful Nuclear Explosions

The most controversial issue during the negotiations regarding the scope of prohibition by the Treaty was the subject of peaceful nuclear explosions, although it was not supported by many states. The issue was whether a treaty should prohibit any nuclear explosions or only nuclear weapon test explosions. Only China argued that peaceful nuclear explosions should not be prohibited, because the Treaty should not restrict peaceful uses of nuclear energy which was an inalienable right of all states. According to China's proposal, a state which wants to conduct peaceful nuclear explosions would have to submit an application to an executive council and the council would have to approve by a two-third majority. The rolling texts of 1994 and 1995 included this proposal by China, but they had a footnote as follows: "A number of delegations oppose the inclusion in this Treaty of any section on so-called 'Peaceful Nuclear Explosion'".

China conducted the least number of nuclear test explosions among the five nuclear-weapon states and its technical capability was least developed. China conducted nuclear tests constantly while the other four nuclear powers continued a moratorium of testing since 1991/2. Although, at the early stage of the negotiations, China said that it would stop testing in 1996, later they changed their position by saying that China would stop testing when a treaty entered into force. Because China's ratification was thought to be indispensable for the treaty to enter into force, China's statement meant that China could test as long as it wished, even if a treaty is signed.

Under the Partial Test Ban Treaty and the Nuclear Non-Proliferation Treaty, peaceful nuclear explosions are treated the same as nuclear weapon test explosions,

and both are prohibited. The Treaty on the Limitation of Underground Nuclear Weapon Tests of 1974, which prohibits tests having a yield exceeding 150 kilotons, has been complemented by the Treaty on Underground Nuclear Explosions for Peaceful Purposes of 1976, which sets the same threshold. The U.S. started research and development on peaceful nuclear explosions in the 1950s and the Soviet Union followed suit later, but both states have abandoned their projects because its usefulness was not sufficient and side effects like radioactivity were insurmountable.

With this background in mind, China's argument for peaceful nuclear explosions seemed strange, and many states argued against it. It was doubtful whether China really wanted to conduct peaceful nuclear explosions for their utility. It was generally assumed that China wanted to develop nuclear weapons under the pretext of peaceful nuclear explosions, or that China wanted to delay the negotiations because China needed more time to conduct tests before the completion of a treaty. In addition, China was thought to be demanding it as a bargaining chip in order to get something, and it was feared that China might destroy the negotiations.⁹⁾ In June 1996, China withdrew its proposal.

2. Tests for Safety and Reliability

The U.K. and France demanded the right to conduct nuclear test explosions in exceptional circumstances, because, in order to ensure the safety and reliability of the existing stockpile, it would be necessary to conduct tests in the future. This demand was reflected in the rolling text of 1994, which included a phrase "with the exception of any explosions which may be authorized in exceptional circumstances". The two states argued for tests for safety and reliability, on the basis that the number of their nuclear weapons and nuclear tests were less than those of the U.S. and Russia, and it was natural to conduct tests as the possession of nuclear weapons was legal. In comparison with the U.K. and France, it was argued, the U.S. and Russia had many more nuclear weapons, so that they could dismantle unreliable nuclear weapons, and they had enough data because of so many tests conducted.

These arguments could be convincing in relation to the two superpowers, but these were perceived as egoistic by non-nuclear-weapon states. In addition, the

9) Rebecca Johnson, "Endgame Issues in Geneva: Can the CD Deliver the CTBT in 1996?" *Arms Control Today*, Vol.26, No.3, April 1996, p.3. In addition, China proposed the Articles on no-first use of nuclear weapons, and positive and negative security assurances. Almost all other delegations thought that these issues were outside the mandate, and it was a tactic by China to delay the negotiations.

arguments were criticized as not fulfilling the standard of "comprehensiveness". These tests for safety and reliability could be conducted for developing new nuclear weapons. The U.K. and France withdrew their proposal in April 1995.

Russia and the U.S. also submitted proposals reflecting their special interests. Russia proposed a formula on the environment where testing was prohibited: "(a) In the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or (b) Underground", in place of "at any place". Many states were afraid that this formula seemed to provide a loophole for nuclear explosions in an artificial, contained environment, i.e. laboratory. The U.S. proposed a provision which would permit easy withdrawal from the Treaty, without any particular reason, at a review conference held ten years after its entry into force. Many states opposed this proposal because it would weaken the basis of the Treaty, and the U.S. withdrew it in January 1995.

These proposals were all intended to enable nuclear-weapon states to keep open the possibility of conducting nuclear test explosions under the Treaty. However, the Treaty finally adopted got rid of all these proposals, and the intention of nuclear-weapon states to keep exceptions was destroyed through the negotiations.

3. Hydronuclear Tests

The strongest advocate for permitting hydronuclear tests or experiments under the Treaty was the U.S. Hydronuclear tests produce a small nuclear yield and are useful for checking computer predictions of the performance of new designs of nuclear weapons. However, the U.S. said that the treaty would prohibit any explosion without exception, and 'zero yield' hydro-nuclear tests would not be considered nuclear explosions *per se*. In the early stage of the negotiations among the five nuclear-weapon states, all were ready to accept the U.S. argument, as well as exceptions advocated by other nuclear-weapon states. At the end of 1994, Eric Arnett and Annette Schaper said: "Initial signs indicate that the leading figures among the non-nuclear weapon states would rather have a comprehensive test ban that allows hydronuclear experiments than no ban at all. And that appears to be the choice." However, hydronuclear tests are nuclear explosions though their yields are very low, and they would be contrary to a comprehensive test ban.

On June 13, 1995, the Government of France announced the resumption of a series of nuclear tests from September 1995 to May 1996. International public

10) Eric Arnett and Annette Schaper, "No Hydronuclear Ban," *Bulletin of the Atomic Scientists*, Vol.50, No.6, November/December 1994, pp.22-23.

opinion criticized the announcement severely, because China conducted a nuclear test just a few days after the NPT Review and Extension Conference which asked the nuclear-weapon states to exercise utmost restraint, and then France announced the resumption of nuclear tests.¹¹⁾ It is logical from the viewpoint of France that they have to conduct necessary nuclear tests before the treaty is finalized. However, from the viewpoint of non-nuclear-weapon states, it represents France's nationalism and egoism. Partly in order to get rid of such criticism, on August 10, France agreed to a truly comprehensive ban, supporting the ban of low yield explosions.

President Clinton of the U.S., which was the most active advocate for hydronuclear tests, announced its clear commitment to "true zero yield" on August 11, mainly because of the recommendations by the JASON Committee¹²⁾ as well as strong international and domestic criticism. In particular, the JASON report seems to have influenced decisively the announcement by the President. The Panel, consisting of fourteen nuclear and security experts, concludes firstly: "The United States can, today, have high confidence in the safety, reliability, and performance margins of the nuclear weapons that are designated to remain in the enduring stockpile. This confidence is based on understanding gained from 50 years of experience and analysis of more than 1000 nuclear tests." It also states: "In the last analysis the technical contribution of such a testing program must be weighed against its costs and its political impact on the non-proliferation goals of the United States."

The U.K. agreed with this position on September 14, and Russia tentatively supported this formula on October 23, formally accepting a true zero yield at the Moscow Summit on Nuclear Safety and Security in April 1996. With these negotiations, the CTBT was agreed as providing for a truly comprehensive prohibition of nuclear explosions.

4. Preparation for Nuclear Testing

The Swedish draft treaty of December 1993 included the prohibition of "preparing" as well as causing, assisting, permitting or participating in the carrying out of any nuclear explosion. Many non-nuclear-weapon states, including Sweden, Germany, the Netherlands and many non-aligned states, argued that the preparation for nuclear testing should be prohibited as a means to strengthen the nuclear non-

11) On nuclear testing by France and China, *see*, Robert S. Norris, "France and Chinese Nuclear Weapon Testing," *Security Dialogue*, Vol.27, No.1, March 1996, pp.39-54.

12) "JASON Nuclear Testing Study," *Arms Control Today*, Vol.25, No.7, September 1995, pp.34-35.

proliferation and disarmament function of a CTBT, which would prevent rather than monitor violation. According to the opinion of Lars Norberg, Swedish Ambassador to the Conference on Disarmament: "unless something is done to limit or prevent pre-testing activities, a CTBT will have little or no effect on the proliferation of nuclear-weapons capabilities."¹³⁾

On the other hand, the U.S., Russia, the U.K., France, and Australia opposed including "preparation", because it was difficult to define "preparation" and to distinguish it from legal activities, and its verification would be costly and complex. Yoshitomo Tanaka, Japan's Ambassador to the Conference on Disarmament, explained: "While I understand the importance of problems relating to the preparation of nuclear explosion tests, I consider it unrealistic to include provisions on it in the treaty text. I foresee considerable difficulties in verifying such a prohibition. Because it is also difficult to define clearly what constitute preparations for a nuclear explosion, it may not be possible to provide a concrete list of activities to be prohibited by a CTBT.... At the same time, I must point out that any activities which are clearly preparations for an imminent nuclear test should be prohibited through the strict implementation of the basic CTBT objectives, even without an explicit provision to prohibit preparation."¹⁴⁾

Some states, including Indonesia, advocated prohibiting activities in laboratories, but the Swedish proposal intended to prohibit activities for preparation in the field such as digging holes for testing. However, the nuclear-weapon states, in particular the U.S., opposed the inclusion of preparation, because they wanted to be ready for testing should extraordinary events happen. Australia also opposed the inclusion in view of difficulty of verification. As a result, the CTBT does not prohibit the preparation of conducting nuclear explosions.

5. Closure of Test Sites

Although the provision for the closure of test sites was not included in the rolling texts in 1994 and 1995, some non-aligned states including Iran demanded the closure of the existing test sites and the destruction of facilities especially designed for nuclear testing. They thought the closure of test sites as a very effective measure to ensure a comprehensive nuclear weapon test ban. The nuclear-weapon states strongly opposed the proposal of the closure of test sites for the

13) Lars Norberg, "Current Efforts to Negotiate a Nuclear Test-Ban," *Disarmament*, Vol.XVI, No.3, 1993, p.15.

14) Yoshitomo Tanaka, "Reviewing the Negotiations – Assessing Prospects for Progress," *Disarmament*, Vol.XVIII, No.1, 1995, p.171.

reason that test sites are also scientific laboratories and could not be closed. However, they in fact wanted to keep test sites open in order to resume testing after exercising the right to withdraw from the Treaty, should extraordinary events related to the subject matter of this Treaty have jeopardized its supreme interests. The obligation to close test sites was not agreed, but France closed its only test site in Mururoa Atoll, and one of the test sites of the Soviet Union in Semipalatinsk was closed because it became the territory of Kazakhstan.

6. Tests without Explosion

As is shown in the rolling texts which bracketed “explosion” regarding prohibited activities, the proposal, that any nuclear weapon test should be prohibited whether it includes an explosion or not, was submitted by Indonesia. Soemadi D.M. Brotodiningrat, Indonesian Head of the delegation to the Conference on Disarmament argued: “The CD should not lose sight of the fact that a CTBT has two overriding objectives; to prevent further contamination of the environment caused by the conduct of nuclear tests and to halt vertical and horizontal proliferation of nuclear weapons as a first step towards completely eliminating them from the world’s arsenal. With those two objectives in mind, the scope of a CTBT should be as comprehensive as possible, closing any possible loophole that could be used by a State ambitious to develop or possess nuclear weapons. The scope of the treaty must be defined in such a way as to deny a States party the opportunity to undertake or carry out ‘any nuclear weapon test’, ‘in any environment’. In that way, the treaty would prevent States parties from conducting nuclear weapon tests of any kind using explosive techniques or such non-explosive techniques as above-ground experiments, hydrodynamic experiments, inertial confinement fusion and computer simulations.”¹⁵⁾

This argument was supported by non-aligned states including Egypt and Iran. They argued that a CTBT should prohibit any test in connection with nuclear weapons, including sub-critical tests or computer simulation. This total prohibition with no loophole would clearly show the way to the complete elimination of nuclear weapons. India proposed the prohibition of “any release of nuclear energy caused by the assembly or compression of fissile or fusion material by chemical explosive or other means”, in addition to any nuclear weapon explosion and any other nuclear test explosion. India argued for the prohibition which might be useful for further development and elaboration of nuclear weapons, with no regard

15) Soemadi D.M. Brotodiningrat, “An Indonesian Perspective,” *Disarmament*, Vol.XVIII, No.1, 1995, pp.114-115.

whether it had an explosion or not.

Opposition to both proposals by the nuclear-weapon-states was extremely strong. They argued that such a proposal would hinder peaceful uses of nuclear energy and require very complex verification measures. As a result, tests without explosion are not prohibited under the CTBT.

III. Significance of the Basic Obligations

Under the basic obligation of the CTBT, which was adopted after the controversial discussions on the above-mentioned issues, nuclear weapon test explosions and other nuclear explosions are prohibited. Explosions are completely prohibited, even if their yields are extremely small, and true zero yield is ensured. However, tests which are not accompanied explosions are not prohibited, even if they relate to nuclear weapons. Neither preparation for testing is prohibited, nor are test sites closed. In this section, I will examine the arguments on subcritical experiments in the United States, and explore the significance of the basic obligations of the CTBT.

1. Subcritical Experiments

On July 2, 1997, the United States conducted the first subcritical experiment, named "Rebound" at the Nevada Test Site, which took place in the U1A complex, a horizontal tunnel mined about 960 feet beneath the ground surface.¹⁶⁾ The purpose of Rebound was said to be to obtain information on the response of plutonium to shock wave compression under different high pressure conditions. Three different explosive assemblies containing a total of about 75 kilograms of chemical high explosive provided three different pressure conditions. This explosive energy was directed at about two dozen pieces of plutonium with a total mass of less than 1.5 kilograms, with the largest being 70 grams. A second experiment named "Holog" was conducted at the same place on September 18, 1997.

According to the U.S. Department of Energy (DOE), subcritical experiments are scientific experiments to obtain technical information in support of DOE's responsibility to maintain the safety and reliability of the U.S. nuclear weapons stockpile without nuclear testing. The configuration and quantities of explosives and nuclear materials will be such that no nuclear explosion will take place. Thus,

16) The U.S. initially announced the intention to conduct subcritical experiments in June and September 1996, but it postponed them because it was during the final and very important stage of the negotiations.

the experiments are consistent with the Comprehensive Nuclear Test Ban Treaty.¹⁷⁾

The subcritical experiment is a part of the DOE's Science-Based Stockpile Stewardship and Management Program, and its origin can be found in the President's Address in July 1993, when he suggested the start of CTBT negotiations, saying, "To assure that our nuclear deterrence remains unquestioned under a test ban, we will explore other means of maintaining our confidence in the safety, the reliability and the performance of our own weapons". Four types of tests that have been planned in this program were hydrodynamic tests, high-energy-density tests, weapons-effects tests and hydronuclear tests. The stewardship program includes increased activities in the areas of advanced computation and above-ground experiments, as well as support for new facilities construction projects.¹⁸⁾

Initially, the U.S. argued that hydronuclear tests would not be prohibited under a CTBT and planned to continue them under this program after the adoption of the Treaty. However, the U.S. changed its interpretation to prohibit hydronuclear testing with the submission of the JASON report in August 1995. The JASON report emphasized the importance of the stockpile stewardship program, and concludes: "the U.S. should affirm its readiness to invoke the supreme national interest clause should the need arise as a result of unanticipated technical problems in the enduring stockpile."

Against this program exists strong criticism like: "the program may mean that the CTB treaty contains the seeds of its own demise before it is even signed....the certification of safety and reliability may be scarcely more than a smokescreen behind which the nuclear weapons laboratories are hiding an extensive program to build up their capability to design new nuclear warheads."¹⁹⁾

2. Significance of the Basic Obligations of the CTBT

With those negotiations of the characteristics described above, the CTBT prohibits to carry out any nuclear weapon test explosion or any other nuclear explosion as basic obligations. According to the mandate given to the Ad Hoc Committee, the treaty would contribute effectively: (i) to the prevention of the

17) U.S. Department of Energy, Fact Sheet, Energy Experiments Comply with Test Ban Treaty, June 2, 1997.

18) Tom Zamora Collina and Ray E. Kidder, "Shopping Spree Softens Test-Ban Sorrows, *Bulletin of the Atomic Scientists*, Vol.50, No.4, July/August 1994, pp.26-29; U.S. Department of Energy, Office of Defense Program, *The Stockpile Stewardship and Management Program*, May 1995.

19) Hisham Zeffiffi and Arjun Makhijani, "The Stewardship Smokescreen," *Bulletin of the Atomic Scientists*, Vol.52, No.5, September/October 1996, pp.23-24.

proliferation of nuclear weapons in all its aspects; (ii) to the process of nuclear disarmament; and (iii) therefore to the enhancement of international peace and security. In other words, three purposes are mentioned here; first, the prevention of both horizontal proliferation, which is generally called proliferation, and vertical proliferation, which means nuclear development by the nuclear-weapon states; second, the contribution to the process of nuclear disarmament; and as a result, the enhancement of international peace and security is the third, indirect and general purpose.

President Clinton, in his address in July 1993, emphasized the non-proliferation aspect of a CTBT: "During my campaign for President, I promised a wholehearted commitment to achieving a comprehensive nuclear test ban treaty. A test ban can strengthen our efforts worldwide to halt the spread of nuclear technology in weapons.... Additional nuclear tests could help us prepare for a test ban and provide for some additional improvements in safety and reliability. However, the price we would pay in conducting those tests now by undercutting our own nonproliferation goals and ensuring that other nations would resume testing outweighs these benefits." As Stephen J. Ledogar, the U.S. Ambassador to the Conference on Disarmament, said, "the CTBT must be comprehensive and promote the vital U.S. national interest in curbing the further proliferation of nuclear weapons. At the same time, the CTBT must not prohibit activities necessary to maintain the safety and reliability of its stockpile".²⁰⁾ The U.S. treated non-proliferation, through a CTBT, as its national interest.

According to Grigori Berdennikov, Russian Permanent Representative to the Conference on Disarmament, "In the opinion of the Russian Federation, the scope of the ban should be fully in keeping with the objective of elaborating a comprehensive nuclear test ban treaty, yet must not impair basic scientific research.... The goal of a CTBT is to prevent a qualitative improvement of existing arsenals, not to eliminate them. Moreover, the scope of a treaty ban should not create insoluble problems for verification systems. That applies, above all, to the proposals by certain States to include in the scope of the ban the so-called preparations for nuclear tests and computer simulations of nuclear explosions. Both, in our view, relate to dual-use activities. A treaty banning preparations and computer simulations will complicate a verification system and significantly increase its cost. Further, it is generally impossible to verify whether simulations are being carried out or not."²¹⁾ Joëlle Bourgois, French Permanent Representative to the Conference

20) Stephen J. Ledogar, "Concluding the Negotiations," *Disarmament*, Vol.XVIII, No.1, 1995, p.149.

21) Grigori Berdennikov, "A Russian Viewpoint," *Disarmament*, Vol.XVIII, No.1, 1995, pp.100-101.

on Disarmament, said, "From the very start of the negotiation, France made clear that while accepting that it would have to put a final end to its nuclear testing, it was its responsibility, as a nuclear-weapon Power, to ensure the safety and the reliability of its weapons. In stressing its responsibility, France repeatedly recalled that the future treaty was about the prohibition of testing, not about the prohibition of nuclear weapons."²²⁾

From these statements by the nuclear-weapon states, it is clear that their main purpose of a CTBT is to prevent proliferation, and partly to prevent qualitative development of nuclear weapons, but the contribution to nuclear disarmament is not mentioned at all. Maurice A. Mallin analyzed: "Broadly defined, there can be three objectives for a CTBT: to impede the proliferation of nuclear weapons; to prevent the development of new nuclear capabilities; and to facilitate the process of disarmament. The United States wholly endorsed the first objective, accepts the second, but does not by any means subscribe to the third."²³⁾

On the other hand, the opinions of the non-nuclear-weapon states are entirely different. The document submitted by the Group 21 of non-aligned states in March 1994 stated: "The scope of a nuclear test ban should be directed to the prevention of both the acquisition of nuclear weapons and of the improvement of existing ones. Therefore a CTBT should not be seen merely as a non-proliferation agreement but an agreement that can contribute to nuclear disarmament."²⁴⁾ According to Ajit Kumar, Indian Counselor to the Conference on Disarmament, "Since their (five nuclear-weapon states) common position is that a CTBT is primarily a non-proliferation instrument rather than a measure relating to nuclear disarmament purpose, they all wanted to find a way of assuring their future weapon design, safety, reliability and/or manufacturing capability."²⁵⁾ Ledwik Dembinski, Polish Head of the Delegation to the Conference on Disarmament, analyzing nuclear-weapon states' position regarding their demand of exceptions, stated: "That position reflected the view of some nuclear-weapon Powers that CTBT was, above all, a non-proliferation measure rather than a nuclear disarmament measure which would lead ultimately to the total elimination of nuclear arsenals. Their concern

22) Joëlle Bourgois, "France's Commitment to a CTBT," *Disarmament*, Vol.XVIII, No.3, 1995, p.66.

23) Maurice A. Mallin, "CTBT and NPT: Options for U.S. Policy," *The Nonproliferation Review*, Vol.2, No.2, Winter 1995, p.4.

24) The Group of 21, Some Key Elements of a Comprehensive Nuclear Test Ban Treaty, CD/1252, 22 March 1994.

25) Ajit Kumar, "The Still Elusive CTBT," *Disarmament*, Vol.XVIII, No.1, 1995, p.122.

was to ensure the safety and reliability of their existing weapons.”²⁶⁾ Mounir Zahran, Ambassador of Egypt to the Conference on Disarmament explained: “The treaty should not be seen as a simple international instrument which promotes non-proliferation, but must be considered as a step leading to the full prohibition and elimination of nuclear weapons.”²⁷⁾

The opinions on the basic obligations are quite different between the nuclear-weapon states and the non-nuclear-weapon states. The nuclear-weapon-states are eager to keep the safety and reliability of stockpiles, and to test without explosions through means such as subcritical experiments, although nuclear weapon test explosions are prohibited. This situation does not completely eliminate the possibility of qualitative development of nuclear weapons, though full scale development of new nuclear weapons will not be possible. Regarding the condition for the treaty to enter into force, Russia, China and the U.K. strongly argued that a CTBT was fruitless without participation of India, Pakistan and Israel. Their argument means that a CTBT is for non-proliferation.

The non-nuclear-weapon states generally emphasized the aspect of the promotion of nuclear disarmament through a CTBT. On the other hand, the arguments by the nuclear-weapon states lacked this aspect. While the non-nuclear-weapon states tend to see a CTBT in a wide framework of the whole nuclear disarmament process, the nuclear-weapon states have a tendency to treat a CTBT as an independent measure.

Conclusion

First, the fact that the CTBT was adopted and signed by many states is a significant progress in nuclear disarmament. A CTBT has been pursued in negotiations for the last forty years, and it was generally thought impossible to accomplish until a few years ago. The five nuclear-weapon states have signed the CTBT, and they are under obligation not to jeopardize the purpose and object of the treaty they have signed. Although the treaty will not enter into force for a while, the content of the basic obligations has become *de facto* international norm, the deviation from which would be very difficult. The adoption of the treaty should be a fulfillment of the obligation under Article VI of the NPT. The treaty will be very useful to stop a qualitative nuclear arms race, though it is not complete.

26) Ludwik Dembinski and Henryk Pac, “Legal and Institutional Aspects,” *Disarmament*, Vol.XVIII, No.1, 1995, p.89.

27) Mounir Zahran, “Egypt and the CTBT,” *Disarmament*, Vol.XVIII, No.1, 1995, p.179.

Second, the treaty will strengthen the nuclear non-proliferation regime. The nuclear-weapon states have a tendency to stress this aspect. Among the five nuclear-weapon states, three continued a moratorium on nuclear testing, France stopped testing after a series of tests and China accepted a test ban at the very last stage of the negotiations. Thus, these five states share an interest in not permitting India, Pakistan and Israel to test. Israel has already signed the treaty, and Pakistan said it would sign if India signs. India is the most noteworthy state, but it would be very difficult for India to conduct nuclear tests against the treaty which was adopted by overwhelming majority in the UN General Assembly, though India has not signed it.

Third, one aspect of discrimination inherent in the nuclear non-proliferation regime is going to be eliminated through this treaty. That is, no state, including both nuclear- and non-nuclear-weapon states, can test any more. The treaty has the effect that the military and political usefulness of nuclear weapons will decrease, because there will be no significant qualitative nuclear arms race any more.²⁸⁾

Although the treaty has these three positive aspects, it also contains some shortcomings in substantial obligations, in addition to the fact that the treaty will not enter into force soon. The promotion of nuclear disarmament aiming at the ultimate goal of nuclear elimination is not clear enough in the treaty. The nuclear-weapon states intend to keep the military effectiveness of their stockpiles through subcritical experiments or computer simulations. From now on, best efforts should be made to prohibit any test or experiment which may be useful for the qualitative development of nuclear weapons.

28) On the significance of the treaty, see, Jozef Goldblat, "The Thorny Road to a Nuclear Test Ban," *Security Dialogue*, Vol.26, No.4, December 1995, pp.370-371; Spurgeon M. Keeny, Jr. and Craig Cerniello, "The CTB Treaty: A Historical Opportunity to Strengthen the Non-Proliferation Regime," *Arms Control Today*, Vol.26, No.6, August 1996, p.15.

