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Addressing International Nuclear Testing Sites

Elif İpek Eryılmaz



RESEARCH
REPORT



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Student Officer: Elif İpek Eryılmaz - Deputy President

Introduction

Nuclear testing has been a reality since the efforts for the development of an atomic bomb started towards the end of World War II. As a result of the numerous nuclear tests that have taken place in the first decades of the Cold War, the dangers of such tests and the health risk of the following nuclear fallout have been made evident. Even though treaties such as the Partial Test Ban Treaty and the cessation of nuclear tests by many countries have largely been successful in preventing nuclear tests of a size similar to those in 1950s and 60s, nuclear tests—such as those by the Democratic People’s Republic of Korea (DPRK)—still occur. In addition, nuclear tests pose a danger not only because of the risk of contamination or due to them being useful in developing nuclear weapons technologies, but also due to their use by countries in displaying their nuclear capabilities, which may result in an escalation of tensions between different Member States. Taking this into account, the urgency and the importance of ensuring accountability for Member States in nuclear testing becomes apparent,

Definition of Key Terms

Nuclear weapon: A weapon that utilizes the processes of nuclear fission (splitting apart of atomic nuclei) and/or nuclear fusion (fusing together of atomic nuclei) to release energy (Cochran and Norris).

Hydrogen bomb: A hydrogen bomb, also known as a thermonuclear bomb or H-bomb, produces energy as a result of the fusion of nuclei, most commonly that of hydrogen isotopes (Cochran and Norris).

Nuclear fallout: Radioactive material that is sent to the atmosphere as a result of a nuclear explosion may be carried to other locations depending on wind patterns and precipitation, and can lead to contamination.

Radiation: Transmission of energy via electromagnetic waves or particles. Radiation can be categorized as non-ionizing and ionizing radiation. Ionizing radiation has enough energy to displace electrons, thus to break molecular bonds. Therefore, exposure to ionizing radiation can damage cells and DNA (Land).

General Overview

The first nuclear weapons test was the “Trinity” nuclear test conducted by the United States of America (USA) in Alamogordo, New Mexico. It was conducted as part of the Manhattan Project. Manhattan Project was established during World War II by the USA upon intelligence that the Nazi Germany was working on using nuclear fission reaction for the development of weapon technologies. Less than a month after the Trinity test, the destructive potential of atomic bombs were demonstrated when an atomic bomb

named “Little Boy” was dropped on Hiroshima on 6 August 1945 and another bomb named “Fat Man” was dropped on Nagasaki resulting in, although estimates differ, about 200,000 deaths by the end of 1945, with more deaths caused by the long-term effects of the explosion (“Nuclear Testing 1945”).

World War II ended with Japan signing a surrender on 2 September 1945. The tension between USA and the Union of Soviet Socialist Republics (USSR) that became evident towards the end of World War II led to the Cold War that would last until the end of the century. One of the defining features of the Cold War was the constant developments of nuclear weaponry technologies by both sides, which, inevitably, required nuclear testing. Furthermore, nuclear testing was not only used to enhance weapon technologies, but also as a way for each country to demonstrate its capabilities to the rest of the world.

On 29 August 1949, the USSR successfully tested its first nuclear weapon, resulting in a fundamental change in the world order. The first hydrogen bomb test was conducted by the USA on 1 November 1952. However, it was the 1954 test in Bikini Atoll, Marshall Islands called the “Bravo” test that drew attention to the dangers of nuclear testing. The yield of the bomb was calculated, erroneously, as “five to six megatons (a megaton is the equivalent of one million tons of TNT”); however, the actual yield was 15 megatons (Rowberry). This fact was discovered only after the explosion occurred. As a result, the fallout resulted in the serious contamination in other atolls in Marshall islands, which are thought to have resulted in health problems and birth defects for many years to come. The crew of a Japanese vessel was also affected by the fallout, with one crew member dying of radiation poisoning, which resulted in the deterioration of US-Japanese relations and prompted a proposal for a “standstill agreement” by Jawaharlal Nehru, the Indian Prime Minister of the time (Rowberry).

The nuclear tests conducted by the USSR, similarly, had detrimental effects to the health of the people living close to the tests sites. Between the years of 1949 and 1963, the USSR conducted more than 110 above-ground tests in the Semipalatinsk Nuclear Test site, with many more conducted underground until 1989, though they had less serious health effects compared to above-ground testing (Yan). According to the estimates of Kazakh health authorities, “up to 1.5 million people were exposed to fallout” resulting from nuclear testing in the area (Yan). The exposure after a test in August 1956, for example, resulted in the hospitalization of more than 600 people with radiation sickness, and although it is hard to measure the long term health effects, some studies link the elevated cancer risk and congenital cardiovascular diseases observed in the current inhabitants to radiation exposure (Yan).

The first treaty on establishing a limitation to nuclear tests was the Partial Test Ban Treaty, also known as Limited Test Ban Treaty or Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water. As indicated in its name, the treaty does not ban nuclear tests underground. The USSR and the US agreed to further limitations on testing by signing the Threshold Test Ban Treaty in 1974. An effort for a comprehensive ban on nuclear testing was made with the Comprehensive Test Ban Treaty being opened to signature in 1996, but it has not entered into force due to not receiving the ratification of 8 of the 44 nuclear-capable states.

Major Parties Involved and Their Views

Democratic People's Republic of Korea (DPRK or North Korea)

Although the DPRK had become a party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1985, in January 2003 it withdrew from the treaty. In 2006, the DPRK conducted its first successful nuclear test (Albert). One test each year was conducted in 2006, 2009, 2013, 2017, and two in 2016 (“The Nuclear Testing Tally”). Each nuclear test prompted sanctions against the DPRK by the United Nations Security Council, which were passed in Resolutions 1718, 1874, 2094, 2270, 2321, and 2375 (Albert).

Israel

Although Israel is commonly thought to possess nuclear weapons, it neither confirms nor denies that it has nuclear weapons, maintaining a policy of strategic ambiguity (“Nuclear Weapons: Who”). Israel has also never signed The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (Nuclear Threat Initiative). The state is also a prominent power in technology and armament (Nuclear Threat Initiative).

India

India conducted its first successful nuclear test in 1974. It conducted another test in 1998, which, less than a month later, was followed by a nuclear test by Pakistan. Due to the turbulent relationship between the two countries and the imminent threat of nuclear weaponry use, India and Pakistan remain important figures in this issue.

Timeline of Events

16 July 1945	<i>First ever nuclear weapon detonation, called the “Trinity Test” was conducted by the United States.</i>
6 August 1945	<i>The atomic bombing of Hiroshima conducted, with the initial blast resulting in about 70,000 deaths, and over 100,000 by the end of 1945, with many more due to long-term effects, including those caused by radioactive fallout (“The Atomic Bombing of Hiroshima”)</i>
9 August 1945	<i>The atomic bombing of Nagasaki conducted, with the initial blast resulting in about 40,000 deaths and an estimated 70,000 by January 1946 (“The Atomic Bombing of Nagasaki”)</i>
29 August 1949	<i>First nuclear weapon test conducted by the USSR takes place in the Semipalatinsk nuclear testing site</i>
1 November 1952	<i>The first hydrogen bomb test called “Ivy Mike” takes place in Marshall Islands</i>
1 March 1954	<i>Castle Bravo” test by the US results in “one of the most serious nuclear fallout incidents in history” (“1 March”)</i>

23 June 1961	<i>The Antarctic Treaty, which had been opened to signature on 1 December 1959, and the Article V of which bans nuclear detonations in Antarctica entered into force</i>
30 October 1961	<i>USSR conducts a nuclear test for “Tsar Bomba”, which remains to be the largest nuclear weapons test</i>
16-29 October 1962	<i>Cuban Missile Crisis occurred, which is considered to be “the closest point that the world had ever come to global nuclear war” (“Cuban Missile Crisis”)</i>
5 August 1963	<i>Partial Test Ban Treaty is opened for signature</i>
1 July 1968	<i>NPT opens for signature</i>
18 May 1974	<i>India successfully conducts its first nuclear test</i>
3 July 1974	<i>Threshold Test Ban Treaty was signed</i>
22 September 1979	<i>“Vela Incident” — a double flash is captured by Vela satellites deployed by the US. It is thought to be a nuclear test conducted by Israel and South Africa (Lange)</i>
24 September 1996	<i>Comprehensive Nuclear Test-Ban Treaty opened for signature (“Nuclear Weapons History”)</i>
28 May 1998	<i>First successful nuclear test by Pakistan</i>
9 October 2006	<i>First successful nuclear test by the DPRK.</i>

Treaties and Events

Partial Test Ban Treaty (PTBT)

The Partial Test Ban Treaty, also known as the Test Ban Treaty of 1963, Limited Test Ban Treaty, or the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, was significant in being the first treaty to limit the use of nuclear testing. Although there had been negotiations for a more comprehensive treaty on the abolition of nuclear tests, disagreements on verification measures made it difficult for parties to come to an agreement. This was more so the case for underground nuclear tests, for which the USA insisted on a mechanism for control and inspections, a matter on which the USA and the USSR could not reach an agreement. Consequently a more limited ban was established (“Treaty Banning”).

Threshold Test Ban Treaty (TTBT)

Threshold Test Ban Treaty, also known as Treaty Between The United States of America and The Union of Soviet Socialist Republics on the Limitation of Underground Nuclear Weapon Tests, was signed in 1974. It limited the yield of the nuclear tests to be conducted to 150 kilotons and established mechanisms for the exchange of data to be used in verification. The agreement was, at first, not ratified in the USA due to concerns about verification measures; however, in 1976 both parties agreed, nevertheless, to observe the treaty. Negotiations about additional verification measures started in 1987 and the treaty was ratified in 1990.

Comprehensive Test Ban Treaty (CTBT)

The Comprehensive Test Ban Treaty was opened to signature on 24 September 1996; however, for it to enter into force, it has to be ratified by 44 “nuclear capable” states listed in its Annex II. Eight of these states — namely the USA, UK, Russia, China, France, India, Pakistan, Israel, and North Korea — have not ratified it. CTBT bans nuclear explosions in all environments, including underground, and regardless of whether they are conducted for weapons technology development or for peaceful purposes (“Comprehensive Test”).

Evaluation of Previous Attempts to Resolve the Issue

Although CTBT was opened to signature in 1996, it has not entered into force due to non-ratification by 8 of the 44 nuclear-capable states. Among the main concerns leading to the non-ratification of the treaty are that it could reduce the effectiveness of the nuclear deterrence of the ratifying state, that—in the case of monitoring and verification measures not being effective—the complying state being at a disadvantage compared to another state that conducts tests the monitoring measures.

UNSC sanctions are also used with the aim of achieving denuclearization and to discourage Member States from conducting nuclear tests. Sanctions were imposed and strengthened following nuclear weapon and ballistic missile tests by the DPRK; however, they have not been effective in causing nuclear disarmament. While some consider the ineffectiveness of the sanctions to be due to the DPRK being able to evade them and the measures being weakened due to China’s and Russia’s unwillingness to impose stronger sanctions, some believe that it is unrealistic to expect sanctions to result in denuclearization, and that sanctions actually result in DPRK pursuing the development of nuclear weapons.

Possible Solutions

One solution could be organizing meetings among Member States that have not signed the CTBT, especially those that are listed in Annex II, whose ratification is needed for the treaty to enter into force. The meetings would allow Member States to discuss concerns such as the adequacy of verification measures.

Different approaches can be taken with regards to solutions including sanctions. While some Member States would argue for an increase in the measures for ensuring the implementation of sanctions, some

could support a relief in sanctions. Such proposals would have to take into account the stance of P5 members on the issue.

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