



## BACKGROUND INFORMATION

# Comprehensive Test Ban Treaty (CTBT)

### Introduction

Article I of the Comprehensive Test Ban Treaty stipulates that “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”, and that they furthermore undertake to “refrain from causing, encouraging, or in any way participating in the carrying out of any nuclear weapon test explosion or any other nuclear explosion”.

### History of Test Ban Treaties

Long before the CTBT, several nuclear powers concluded the following treaties, which place restrictions on their nuclear testing activities:

1963 Limited Test Ban Treaty or Partial Test Ban Treaty (UK, USA, USSR)  
Bans tests under water, in the atmosphere and in outer space.  
Only underground tests are permitted.

1974 Threshold Test Ban Treaty (USA, USSR)  
Prohibits underground nuclear weapon tests with a yield exceeding 150 kt

1976 Peaceful Nuclear Explosions Treaty (USA, USSR)  
Prohibits non-military nuclear explosions with a yield exceeding 150 kt

The most important nuclear treaty is undoubtedly the 1970 **Non-Proliferation Treaty (NPT)**. According to this landmark treaty, non-nuclear weapon states (**NNWS**) pledge not to acquire nuclear weapons, while nuclear weapon states (**NWS**) pledge to work not only towards the cessation of the nuclear arms race but also towards the dismantling of their nuclear arsenals. At the same time, though, the NPT allows NNWS to use nuclear energy for peaceful purposes. It stipulates that International Atomic Energy Agency (IAEA) safeguards apply to this non-military use of nuclear power and that NWS may assist NNWS with the acquisition of the necessary technology.

Only four sovereign states are not parties to the NPT: India, Israel, North Korea and Pakistan.

1995: During the 1995 NPT Review Conference, state parties agreed that the treaty should remain in force indefinitely. A majority of non-nuclear weapon states declared that they would only agree to this provision on the condition that nuclear weapon states accept arms control measures.  
The five officially recognised nuclear weapon states finally accepted a series of measures, one of which was the Comprehensive Test Ban Treaty (CTBT).

1996: The CTBT was negotiated by the Conference on Disarmament and adopted by the UN General Assembly. The treaty was opened for signature on 24 September 1996.

## Importance and aims of the CTBT

Given that the NNWS already pledge in the NPT not to acquire nuclear weapons, the CTBT makes little difference in this regard.

However, one of the aims of the CTBT is to constrain further development of nuclear weapons in the five officially recognised nuclear powers. The CTBT further might reduce the importance given to nuclear weapons in military doctrines. (As for example, the development of "bunker buster" bombs is not in keeping with the spirit of the CTBT.)

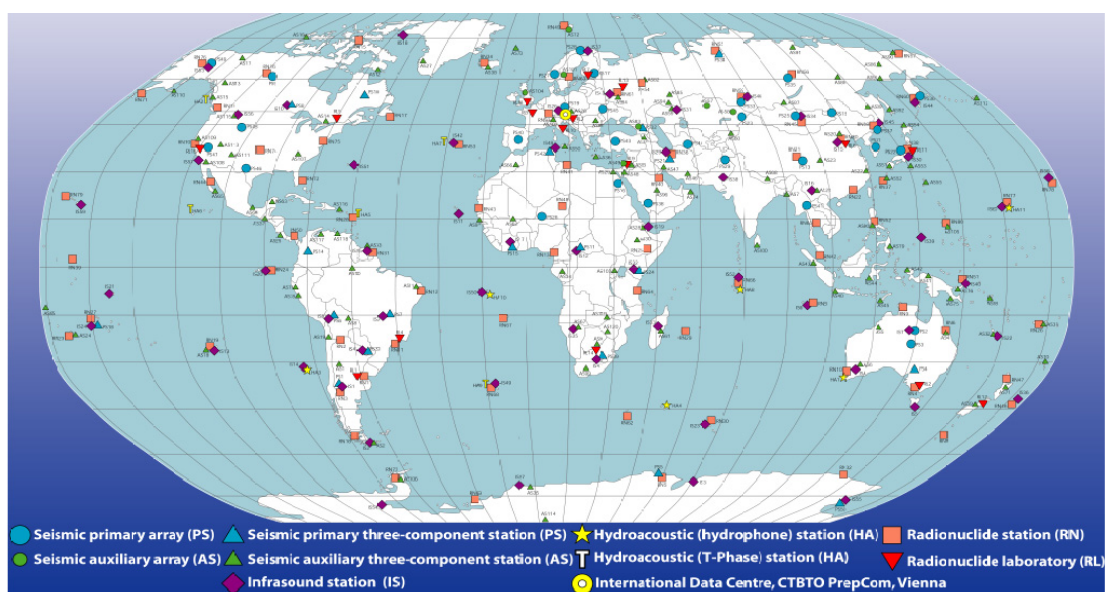
In contrast to the NPT, the CTBT only has one category of state parties. India, Pakistan and Israel – which actually have nuclear weapons but would be considered by the NPT as NNWS – could become state parties to the CTBT and thus be incorporated, albeit partially, in the non-proliferation regime.

## Entry into force

In the 12 years since the CTBT was opened for signature, 180 countries have become state parties to the treaty and it has also been ratified by 145 countries, including all of Europe (status October 2008). Nevertheless, the treaty has yet to enter into force. This will happen once it has been ratified by all 44 countries listed in the treaty (known as "Annex 2 States"). These countries have nuclear power or research reactors and feature on the corresponding IAEA lists of 1994 and 1995. Nine of these states have not yet done so. **China, Egypt, Indonesia, Iran, Israel and the United States** have signed but not yet ratified whereas: **India, North Korea and Pakistan** have not signed the treaty.

## Controls

The viability of any treaty relies on compliance verification. This is why the Vienna-based Preparatory Commission of the CTBTO is working on the development of an international monitoring system. This includes a network of 321 seismic, radionuclide, infrasound and hydroacoustic monitoring stations, as well as 16 radionuclide laboratories, which are responsible for measuring the effects of possible nuclear explosions and sending the data they collect to Vienna for analysis. All state parties to the CTBT are given access to these findings. The design of the monitoring network is such that it should be able to detect and locate an explosion of 1kT anywhere in the world. The system is 70% complete and has already proved its effectiveness by detecting a number of incidents.



Map of the international monitoring system  
(Image from <http://www.ctbto.org/>)

If a suspected nuclear explosion has occurred, "on-site inspections" can be conducted to clarify whether a nuclear explosion has been carried out in violation of the treaty and to identify the potential violator. To ensure the provision and quality of these inspections, the CTBTO acquires the necessary monitoring equipment, trains inspectors and organises training exercises. For example, in September 2008 a large-scale on-site inspection exercise was staged in Kazakhstan.

### **Spin-off effects, other applications**

Following the devastating tsunami of December 2004 in the Indian Ocean, it emerged that the data collected by the CTBTO could also be useful for tsunami early warning systems. Today, the CTBTO transmits a steady stream of seismic, hydroacoustic and infrasound data in real-time to five tsunami warning centres. In doing so, it makes a valuable contribution to improving the safety of people living in at-risk regions.

### **Switzerland and the CTBT**

Switzerland became a state party to the CTBT on 24 September 1996, ratifying it three years later, on 1 October 1999. The Arms Control and Disarmament Section of the Swiss Federal Department of Foreign Affairs (FDFA /DP) represents Switzerland in Vienna and coordinates national efforts which are linked to the CTBT, such as the seismic monitoring station in the Dischma valley outside Davos. This is run by the Swiss Seismological Service of the Federal Institute of Technology, Zurich (ETHZ).

In addition, the Climate and Environmental Physics Department in Bern University develops high-precision instruments and improves methods to measure the nuclide  $^{37}\text{Ar}$ . Given that the natural level of  $^{37}\text{Ar}$  is very low, any detected increase would be a strong indication that an underground nuclear explosion has taken place.

Experts from the SPIEZ LABORATORY are involved in "on-site inspections". Besides their active participation in radioactivity monitoring exercises, they also help develop "on-site inspection operational manuals" within the CTBTO Working Group B.

### **Links and references**

<http://www.ctbto.org/>

[http://www.seismo.ethz.ch/bsv/davos/brochure\\_D.pdf](http://www.seismo.ethz.ch/bsv/davos/brochure_D.pdf)

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