

Nuclear Weapons Primer

WHAT IS A NUCLEAR WEAPON?

Broadly defined, a nuclear weapon is an explosive device that converts matter into energy. There are two types of nuclear weapons: atomic bombs and hydrogen bombs. Atomic weapons are detonated by splitting atoms of plutonium or highly enriched uranium, which releases an enormous amount of energy. A hydrogen bomb, also referred to as a “thermonuclear” or “fusion” device, uses an atomic explosion to merge two hydrogen atoms into helium. Hydrogen bombs are more powerful than atomic bombs. Both have the ability to inflict massive and instantaneous death and destruction, as well as illness and devastation of the environment.

WHEN HAVE NUCLEAR WEAPONS BEEN USED?

The United States dropped two atomic bombs on Japan in 1945 during World War II. On August 6, “Little Boy,” a uranium bomb, was dropped on Hiroshima, killing at least 70,000 people and injuring at least 70,000 more. It produced an explosion equivalent to approximately 12,500 to 15,000 tons of TNT. On August 9, “Fat Man,” a plutonium bomb, was dropped on Nagasaki, killing at least 40,000 and injuring at least 60,000.

WHICH NATIONS POSSESS NUCLEAR WEAPONS?

Eight nations—Britain, China, France, India, Pakistan, Russia, the United States and North Korea—have declared that they have nuclear weapons. Israel is widely believed to possess them but has not declared possession. A number of additional countries may be attempting to develop or otherwise acquire nuclear weapons.

HOW MANY NUCLEAR WEAPONS ARE THERE IN THE WORLD TODAY?

There are approximately 17,300 nuclear weapons in the world. Not all countries have official figures documenting current stockpiles. The Federation of American Scientists estimates that the total number of warheads as of the end of 2012 were as follows: Russia – 8,500; United States – 7,700; France – 290; China – 240; United Kingdom – 225; Pakistan – 90-110; India – 80-100; and North Korea – less than 10.

WHAT IS THE PURPOSE OF NUCLEAR WEAPONS?

Nuclear powers stockpile nuclear weapons to deter other nations from attacking them with chemical, biological, nuclear, or conventional weapons. All of the nuclear weapon states (except China and India) and the NATO alliance maintain the option to use nuclear weapons first in the context of their deterrence strategies. Deterrence, in essence, is a scare tactic. Some experts believe that a nation can effectively prevent another from attacking by threatening to respond severely enough to offset any benefit that could be gained from such an attack. Other experts find this line of thinking alarming and believe that the concept of deterrence provokes nations to pursue more self-protection by acquiring their own nuclear weapons. They fear this could increase the likelihood of future nuclear disaster.

WHAT EFFORTS HAVE BEEN MADE TO LIMIT OR REDUCE NUCLEAR WEAPONS?

Some of the key efforts are described below, along with their level of success or defeat.

Non-Proliferation Treaty (NPT) Obliges non-nuclear weapon states to refrain from acquiring nuclear weapons. Obliges nuclear weapon states to work toward eventual nuclear disarmament. Entered into force in March 1970. The NPT was extended indefinitely in 1995 upon a series of commitments by the nuclear weapon states (including the U.S.), which included the completion of the Comprehensive Test Ban Treaty by the end of 1996. Status: As of May 2003, 189 states are party to the NPT. India, Israel, Pakistan and South Sudan are current non-signatories. North Korea withdrew its signature in 2003. Many non-nuclear weapon states are concerned that the nuclear weapon states have not met their disarmament obligations quickly enough, a condition that threatens to undermine the treaty.

Strategic Arms Limitation Talks (SALT) SALT I: This pact included an interim agreement between the U.S. and the U.S.S.R. on offensive forces that set ceilings on intercontinental and other ballistic missiles in an effort to find a point at which the two nations were relatively evenly matched. It was set to last for five years and was signed by U.S. President Richard Nixon and Leonid Brezhnev, general secretary of the Soviet Communist Party. Status: SALT I was ratified by the U.S. and entered into force on October 3, 1972.

Anti-Ballistic Missile Treaty (ABM Treaty): Part of SALT I. Prohibited nationwide missile defense and limited each side to a single ABM deployment area. Had the effect of restraining competition in offensive nuclear weapons development. Status: Signed in 1972, the U.S. unilaterally withdrew in 2002.

SALT II: Capped the number of strategic offensive nuclear missiles, limited the number of multiple-warhead missiles, froze the number of permitted delivery systems. Status: Signed in 1979 by U.S. President Jimmy Carter and the Soviet Union's Leonid Brezhnev. Although the agreement was never ratified, it was adhered to by both parties until 1986 when the US withdrew on claims that the USSR violated the treaty.

Strategic Arms Reductions Talks (START) Began during U.S. President Ronald Reagan's administration.

START I Treaty: START established limits on deployed strategic nuclear weapons, which are more restrictive than the SALT treaties, since START I set limits below then existing deployed weapons levels and provided for on-site inspections. Status: U.S. ratified in 1992. Treaty entered into force in 1994. Called for reduction of forces down to 6,000 deployed strategic warheads for each party (U.S. and Russia). Both sides complied and have dismantled warheads.

START II Treaty: Banned multiple independently targetable reentry vehicles (MIRVs) on intercontinental ballistic missiles (ICBMs). Limited each side to 3,000 to 3,500 deployed strategic nuclear weapons. Status: Ratified by the US in 1996. Ratified by Russia in 2000, who then withdrew in 2002 in response to US withdrawal from the ABM Treaty.

New START Treaty: Limits each country to 1,500 deployable nuclear weapons on 800 deployed and non-deployed long range missile launchers, 700 of which can be deployed (could be more weapons as one loaded launcher can carry more than one weapon). Status: Signed April 8, 2010 by the U.S. and Russia. Ratified by the U.S. in 2010 and by Russia in 2011.

Strategic Offensive Reductions Treaty (SORT): Limits the number of strategic nuclear warheads to 1700-2200 for each country. Status: Ratified by both countries and entered into force in 2003. New START superseded this treaty in 2011.

Intermediate-Range Nuclear Forces Treaty (INF Treaty) Eliminated ground-launched ballistic and cruise missiles with ranges between 500 and 5,500 kilometers. A total of 2,692 missiles were eliminated by mid-1991. Status: Signed by Ronald Reagan and Mikhail Gorbachev, president of the Central Committee of the Soviet Communist Party in 1987. Ratified by both the U.S. and U.S.S.R. in 1988. Belarus, Kazakhstan and Ukraine are also now active participants in the treaty.

Comprehensive Test Ban Treaty (CTBT) Bans all explosive nuclear tests. Signed September 1996. The CTBT requires that the 44 nations that are members of the Conference on Disarmament (where it was negotiated) and also possess nuclear reactors or research facilities ratify the treaty before it enters into force. Status: As of May 2013, 183 nations, including the U.S., signed the treaty, and 159 nations have ratified the treaty, including 36 of the 44 nations referred to above. The U.S. Senate in October 1999 voted 51 to 48 against ratification.

ARE NUCLEAR WEAPONS STILL IN PRODUCTION AND BEING TESTED?

There are a variety of locations and methods for testing or simulating the testing of nuclear weapons. These include atmospheric, outer space, and underwater testing (all banned in 1963), underground testing (all Non-Proliferation Treaty nuclear weapon states have a self-imposed moratorium), sub-critical testing (currently conducted), and computer modeling. Sub-critical testing involves going through the motions of assembling nuclear weapons to ensure that they work, but stopping short of setting off an explosion. Russia and the U.S. conduct sub-critical tests.

The 1996 Comprehensive Test Ban Treaty bans all explosive nuclear tests, but has not yet entered into force. In May 1998, India and Pakistan each conducted a series of underground nuclear tests. The Democratic People's Republic of Korea, who withdrew from the NPT in 2003, also conducted underground nuclear tests in 2006, 2009 and February 2013. All of the NPT nuclear weapons states have refrained from conducting explosive nuclear tests pending entry into force of the CTBT.

WHAT DO NUCLEAR WEAPONS COST THE UNITED STATES?

By 1998, U.S. taxpayers had paid an estimated \$5.5 trillion (total cost) for the U.S. nuclear weapons program based on a comprehensive study (Atomic Audit, Brookings Institution, 1998). In 2012, it was estimated that the government was set to spend \$640 billion over the decade on nuclear weapons and related programs, making the current total cost much higher (Ploughshares Fund Working Paper, 2012).

This primer does not include the important contribution of popular protest movements.

We gratefully acknowledge the Lawyers Alliance for World Security/Committee for National Security, the Center for Defense Information, and Peace Action for their assistance with compiling the information contained in this document.

Updated: May 2013 by the Intercommunity Peace and Justice Center.