

United States Nuclear Tests

July 1945 Through September 1992

Chronologically (370KB)	Alphabetically (259KB)	Glossary
Total Tests by Calendar Year, Location, Purpose, and Type		

This document lists chronologically and alphabetically by name all nuclear tests and simultaneous detonations conducted by the United States from July 1945 through September 1992. Several tests conducted during Operation Dominic involved missile launches from Johnston Atoll. Several of these missile launches were aborted, resulting in the destruction of the missile and nuclear device either on the pad or in the air.

On August 5, 1963, the United States and the former Soviet Union signed the Limited Test Ban Treaty which effectively banned testing of nuclear weapons in the atmosphere, the oceans, and space. In 1974 and 1976, the United States and former Soviet Union also signed the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty, respectively, restricting all nuclear test explosions to yields no greater than 150 kilotons.

On December 7, 1993 and June 27, 1994, the Secretary of Energy declassified information related to previously unannounced nuclear weapons tests; simultaneous detonations associated with nuclear weapons tests; yields of an additional 77 atmospheric tests; and yields of 20 underground nuclear weapons tests that released radioactivity detected off the Nevada Test Site.

Data on United States tests were obtained from, and verified by, the Department of Energy's three weapons laboratories -- Los Alamos National Laboratory, Los Alamos, New Mexico; Lawrence Livermore National Laboratory, Livermore, California; and Sandia National Laboratories, Albuquerque, New Mexico; and the Defense Nuclear Agency. Additionally, data were obtained from public announcements issued by the Atomic Energy Commission and its successors, the Energy Research and Development Administration, and the Department of Energy, respectively.

Test Dates

Time and date for all tests listed in this document were converted from local time to Greenwich Civil Time (GCT). The test date listed is the GCT date for the test.

Test Series

Each series of tests is given a name such as *Operation Crossroads*. United States nuclear tests were conducted on an intermittent basis from June 1946 to October 1958.

On October 31, 1958, the United States entered into a unilateral testing moratorium announced by President Eisenhower with the understanding that the former Soviet Union also would refrain from conducting tests. The Soviet Union resumed testing in September 1961 with a series of the largest tests ever conducted.

On September 15, 1961, the United States resumed testing at the NTS on a year-round basis with Operation Nougat. From that time to the present, tests have been grouped for fiscal and reporting purposes according to the fiscal year in which they took place. For example, fiscal year 1963 tests -- which began July 1, 1962 and extended through June 30, 1963 -- were in the Operation Storax series.

Between April and November of 1962, the United States conducted Operation Dominic, which included the Department of Defense (DoD) Operation Fishbowl high-altitude tests in the Pacific. The DoD also conducted four weapons effects tests at the NTS in July 1962 as Operation Sunbeam.

In 1976, the federal government changed the fiscal year to begin on October 1 and end on September 30. Accordingly, the fiscal year 1976 series, Operation Anvil, did not end on June 30, but was extended through September 30, 1976 -- a period of 15 months.

On October 2, 1992, the United States entered into another unilateral moratorium on nuclear weapons testing announced by President Bush. President Clinton extended this moratorium in July 1993, and again in March 1994 until September 1995.

Test Yields

The nomenclature for test yields varied according to information policy governing specific years. In some cases, no yield information has been released; in a few cases, the terms "very slight" and "slight" were used without amplification. Except for tests where specific yields or relative specific yields such as "about 2 kt," "several Mt," "less than 0.1 kt," etc., were announced, test yields are given in these terms:

1945 through 1963

Low (less than 20 kt)
Intermediate (20 to 200 kt)
Submegaton (less than 1 Mt, but more than 200 kt)
Low Megaton (from 1 to several Mt)
Megaton Range

March 1976

During a series of high-yield tests conducted during this month, two ranges were added, and the 200 to 1,000 kt range was dropped.

200 to 500 kt
500 to 1,000 kt

1964 through February 1976

Less than 20 kt
20 to 200 kt
200 to 1,000 kt

Since March 1976

On March 31, 1976, the former Soviet Union and the United States agreed to limit the maximum yield of underground tests to 150 kt. The yield ranges now reported are:

Less than 20 kt
Less than 150 kt
20 to 150 kt

Test Locations

The first test of a nuclear weapon was in the atmosphere on July 16, 1945, in a remote part of New Mexico on what was then the Alamogordo Bombing Range, and is now the White Sands Missile Range. The site is 55 miles northwest of Alamogordo, New Mexico. At various times between June 1946 and November 1962, atmospheric and underground tests were conducted by the United States in the Marshall Islands, Christmas Island, Johnston Atoll in the Pacific Ocean, and over the South Atlantic Ocean. Between January 1951 and July 1962, atmospheric and underground nuclear tests were conducted at the NTS.

Since July 1962, all nuclear tests conducted in the United States have been underground, and most of them have been at the NTS. Some tests were conducted on the Nellis Air Force Range (NAFR); in central and northwestern Nevada; in Colorado, New Mexico, and Mississippi; and on Amchitka, one of the Aleutian Islands off the coast of Alaska.

Test Types and Purposes

The definition of terms used in this document appears in the *Glossary*. *Type* refers to the method of deployment of the nuclear device at time of detonation such as *tower, tunnel, airdrop*, etc. *Purpose* indicates whether the test was part of the weapons development program, a DoD effects test, a joint United States-United Kingdom (US-UK) test, or was part of some special program that involved the use of nuclear devices. In the *Summary*, the sum of all tests conducted underground (*tunnel, shaft, and crater events*) appears as *Total Underground*. With the exception of five underwater tests, the remaining tests appear as *Total Atmospheric*.

Detection of Radioactivity from Nevada Test Site Events

Unless otherwise noted, all nuclear tests at the NTS or the Nellis Air Force Range (NAFR) to September 15, 1961 produced radioactivity detected off site.

* Unless otherwise noted, no test at the NTS or the NAFR on or after September 15, 1961 had a release of radioactivity that was detected off site. The release of radioactivity from a test can occur:

Accidentally as a result of a containment failure.

Accidentally or deliberately as a result of post-event operations.

Deliberately as a result of post-event controlled purging of gases from a tunnel.

All releases resulting from a containment failure, even if not detected off site, are reported. Radiation releases resulting from tunnel purging or normal operations are not reported in this document unless detected off site, since they are carefully monitored. These releases are listed in DOE/NV-317, Radiological Effluents Released from U.S. Continental Tests.

Purposes of U.S. Tests

Past tests have been described as being for one of seven purposes (see page viii). With the declassification of all previous simultaneous detonations, purpose is now attributed to each detonation. Weapons related tests were conducted to gather data on nuclear devices; weapons effects tests were conducted, usually by the DoD, to determine the effects of nuclear detonations on military offensive and defensive systems; and tests conducted for the United Kingdom (UK) are shown as "Joint US-UK."

*See *Glossary* for definition of off site.

Glossary

Airburst	The explosion of a nuclear weapon at such a height that the expanding fireball does not touch the earth's surface prior to the time the fireball reaches its maximum luminosity. The airburst reported in this document resulted from the detonation of a device fired from a 280mm cannon.
Airdrop	A nuclear device dropped from an aircraft and exploded in the atmosphere.
Atmospheric	A test conducted aboveground or above water; i.e., in the open air.
Balloon	A nuclear device suspended from a balloon and exploded in the atmosphere.
Barge	A nuclear device exploded from a barge moored in the lagoon at Enewetak or Bikini.
Crater	A nuclear device placed shallow enough underground to produce a throw-out of earth when exploded.
Detonation	A single nuclear device explosion; one or more comprise a test.
Joint US-UK	A nuclear test conducted jointly by the United States and the United Kingdom under a cooperative agreement in effect between the two countries since August 4, 1958.
kt	A kiloton. The energy of a nuclear explosion that is equivalent the explosive power of 1,000 tons of TNT.
Mt	A megaton. The energy of a nuclear explosion that is equivalent to the explosive power of one million tons of TNT.
NTS	The Nevada Test Site, a 1,350-square-mile area in southern Nevada in Nye County and about 65 miles northwest of Las Vegas.
Off Site	Off site is any place outside the Test Range Complex.
On Site	A notation that <i>radioactivity was detected on site only</i> is made for any test from which there was an unplanned release of radioactivity into the atmosphere that was not detectable beyond the boundaries of the Test Range Complex.
Plowshare	Application of nuclear explosives to develop peaceful uses for atomic energy. The program is no longer active.
Rocket	A nuclear device launched by rocket and exploded in the atmosphere.

Roman Candle	Event conducted underground in an unstemmed hole to minimize, but not eliminate, the release of radioactivity to the atmosphere. Because incandescent gases were released, this was sometimes referred to as a "Roman candle" effect.
Safety Experiment	Experiment designed to confirm a nuclear explosion will not occur in case of an accidental detonation of the explosive associated with the device.
Seismic Calibration	A nuclear test to evaluate seismic effects of an underground explosion.
Shaft	A nuclear device exploded at the bottom of a drilled or mined vertical hole. Some safety tests were set off at the bottom of unstemmed drilled holes, producing a "Roman candle" effect.
Storage-Transportation	Detonations of combinations of high explosives and nuclear materials designed to study distribution of nuclear materials during accidents in several transportation and storage configurations.
Surface	A nuclear device placed on or close to the earth's surface.
Test	A test is defined in the Threshold Test Ban Treaty as either a single underground nuclear explosion conducted at a test site, or two or more underground nuclear explosions conducted within an area delineated by a circle having a diameter of two kilometers and conducted within a total period of time not to exceed 0.1 second.
Test Range Complex	An area that includes both the Nevada Test Site and the adjacent Government-controlled Nellis Air Force Range.
Ton	The yield of a nuclear device is a measure of the amount of energy released when it explodes. It is stated in terms of the quantity of TNT that would produce the same amount of explosive energy. A ton is equivalent to one ton of TNT.
Thermonuclear Device	A "hydrogen bomb."
Tower	A nuclear device mounted at the top of a steel or wooden tower and exploded in the atmosphere.
Tunnel	A nuclear device exploded at the end of a long horizontal drift mined into a mountain or mesa in a way that places the burst point deep within the earth.
Underground	Underground nuclear test conducted in a tunnel or at the bottom of a drilled hole or shaft. Some underground nuclear tests were not designed to contain all radioactivity; e.g., cratering tests or safety experiments.
Underwater	A nuclear test conducted underwater.

Vela Uniform	Department of Defense (DoD) program designed to improve the capability to detect, identify, and locate underground nuclear explosions.
Verification Event	An event on which the Russian government exercised its right to verify under the terms of the Threshold Test Ban Treaty.
Weapons Effects	A nuclear test to evaluate the civil or military effects of a nuclear detonation on various targets, such as military hardware.
Weapons Related	A nuclear detonation conducted for the purpose of testing a nuclear device intended for a specific type of weapon system.
Yield	The total effective energy released in a nuclear explosion. It is usually expressed in terms of equivalent tonnage of TNT required to produce the same energy release in an explosion.

United States Nuclear Tests

Total Tests by Calendar Year			Total Tests by Location			Total Tests by Type					
US	US-UK		US	US-UK		US	US-UK				
CY 1945	1	0	CY 1969	46	0	Pacific	4	0	Tunnel	67	0
CY 1946	2	0	CY 1970	39	0	Johnston Island	12	0	Shaft	739	24
CY 1947	0	0	CY 1971	24	0	Enewetak	43	0	Crater	<u>9</u>	<u>0</u>
CY 1948	3	0	CY 1972	27	0	Bikini	23	0	Total Underground	815	24
CY 1949	0	0	CY 1973	24	0	Christmas Island	<u>24</u>	<u>0</u>	Airburst	1	0
CY 1950	0	0	CY 1974	22	1	Total Pacific	106	0	Airdrop	52	0
CY 1951	16	0	CY 1975	22	0				Balloon	25	0
CY 1952	10	0	CY 1976	20	1	Total S. Atlantic	3	0	Barge	36	0
CY 1953	11	0	CY 1977	20	0				Rocket	12	0
CY 1954	6	0	CY 1978	19	2	Underground	804	24	Surface	28	0
CY 1955	18	0	CY 1979	15	1	Atmospheric	<u>100</u>	<u>0</u>	Tower	<u>56</u>	<u>0</u>
CY 1956	18	0	CY 1980	14	3	Total NTS	904	24	Total Atmospheric	210	0
CY 1957	32	0	CY 1981	16	1						
CY 1958	77	0	CY 1982	18	1	Central Nevada	1	0	Total Underwater	5	0
CY 1959	0	0	CY 1983	18	1	Amchitka, Alaska	3	0			
CY 1960	0	0	CY 1984	18	2	Alamogordo, New Mexico	1	0	Total Tests	1,030	24
CY 1961	10	0	CY 1985	17	1	Carlsbad, New Mexico	1	0	Total Detonations by Purpose		
CY 1962	96	2	CY 1986	14	1	Hattiesburg, Mississippi	2	0	Detonations		
CY 1963	47	0	CY 1987	14	1	Farmington, New Mexico	1	0	Joint US-UK		24
CY 1964	45	2	CY 1988	15	0	Grand Valley, Colorado	1	0	Plowshare		35
CY 1965	38	1	CY 1989	11	1	Rifle, Colorado	1	0	Safety Experiment		88
CY 1966	48	0	CY 1990	8	1	Fallon, Nevada	1	0	Storage-Transportation		4
CY 1967	42	0	CY 1991	7	1	Nellis Air Force Range	<u>5</u>	<u>0</u>	Vela Uniform		7
CY 1968	56	0	CY 1992	6	0	Total Other	17	0	Weapons Effects		100
Total Tests				1,030	24	Total Tests	1,030	24	Weapons Related		891

*NOTE: Totals **do not** include two combat uses of nuclear weapons, which are not considered "tests." The first combat detonation was a 15 kt weapon airdropped 08/05/45 at Hiroshima, Japan. The second was a 21 kt weapon airdropped 08/09/45 at Nagasaki, Japan.*

