

## TIMELINE OF NUCLEAR EXPLOSIONS

### **July 1945**

#### Trinity Tests (New Mexico)

In 1945 in the New Mexico desert, American scientists conducted "**Trinity**," the first nuclear weapons test, marking the beginning of the atomic age. It was conducted by the United States Army at 5:29 a.m. as part of the Manhattan Project. The test was conducted in the Jornada del Muerto desert on what was then the USAAF Alamogordo Bombing and Gunnery Range (now part of White Sands Missile Range). The code name "**Trinity**" was assigned by J. Robert Oppenheimer, the director of the Los Alamos Laboratory, inspired by the poetry of John Donne. The test was of an implosion-design plutonium device, of the same design as the "**Fat Man**" bomb later detonated over Nagasaki, Japan.

### **August 1945**

#### Hiroshima & Nagasaki Attacks

On August 6, 1945, towards the end of World War II, the "**Little Boy**" was detonated over the Japanese city of Hiroshima. Exploding with a yield equivalent to 12,500 tonnes of TNT, the blast and thermal wave of the bomb destroyed nearly 50,000 buildings (including the headquarters of the 2nd General Army and Fifth Division) and killed approximately 75,000 people, among them 20,000 Japanese soldiers and 20,000 Koreans. Detonation of the "**Fat Man**" device exploded over the Japanese city of Nagasaki three days later on 9 August 1945, destroying 60% of the city and killing approximately 35,000 people, among them 23,200-28,200 Japanese civilian munitions workers and 150 Japanese soldiers. This was the first instance of nuclear weapons being used in warfare. Subsequently, the world's nuclear weapons stockpiles grew.

### **July 1946**

#### Bikini Atoll Nuclear Tests

The United States was engaged in a Cold War Nuclear arms race with the Soviet Union to build bigger and better bombs from 1947 until 1991. Operation Crossroads was a series of nuclear weapon tests conducted by the United States at Bikini Atoll in the Pacific Ocean in the summer of 1946. Consisting of 23 nuclear devices detonated by the United States between 1946 and 1958 at seven test sites on the reef itself, on the sea, in the air and underwater, the purpose of these tests was to measure the effect of nuclear weapons on naval ships.

The first test, "**Able**", was dropped from an aircraft and detonated 520 ft (160 m) above the target fleet. Filled with animals, German naval ships were staged around test site as "target ships." The second, "**Baker**", was suspended under a barge. It was the first underwater explosion and produced a large Wilson cloud and contaminated all of the target ships. Chemist Glenn T. Seaborg, the longest-serving chairman of the Atomic Energy Commission, called the second test "the world's first nuclear disaster."

The test weapons produced a combined fission yield of 42.2 Mt of explosive power. To prepare the atoll for the nuclear tests, Bikini's native residents were evicted from their homes and resettled on smaller, uninhabited islands where they were unable to sustain themselves.

### **1951**

#### Frenchman Flat Tests (Nevada)

The first atmospheric nuclear test at the Nevada Test Site took place in Area 5 of Frenchman Flat on January 27, 1951. The one-kiloton device called "**Able**" was dropped from an Air Force B-50 bomber. A total of 14 atmospheric tests took place on Area 5 of Frenchman Flat between 1951 and 1962.

The majority of the tests conducted on Frenchman Flat were weapons-related tests. The largest detonation was the 37-kiloton "**Priscilla**" device, which was detonated on June 24, 1957, while suspended from a balloon. Industrial buildings, above-ground and below-ground community shelters, a railroad bridge, and a bank vault were exposed to

several nuclear detonations from varying distances. Frenchman Flat was selected for its flat terrain, which permitted good photography of the detonations and resulting fireballs.

## 1952

### Eniwetok/Enewetak Atoll Tests

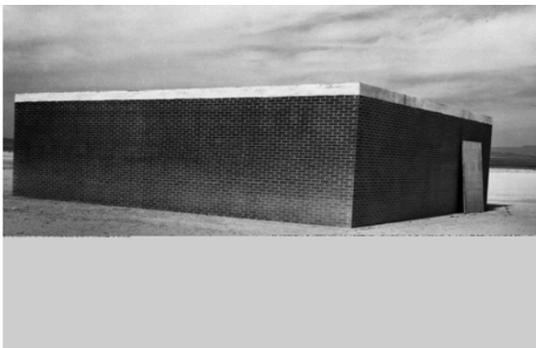
(Marshall Islands, North Pacific Ocean near Bikini Atoll)

On Nov. 1, 1952, the United States conducted its first nuclear test of a fusion device, or “hydrogen bomb,” at Eniwetok in the Marshall Islands. Code-named Ivy Mike, it was part of Operation Ivy; it vaporized the islet of Elugelab. This test included B-17 Flying Fortress drones to fly through the radioactive cloud to test onboard samples. B-17 mother ships controlled the drones while flying within visual distance of them. In all 16 to 20 B-17s took part in this operation, of which half were controlling aircraft and half were drones. To examine the explosion clouds of the nuclear bombs in 1957/58 several rockets were launched. One USAF airman was lost at sea during the tests.

A radiological survey of Eniwetok was conducted from 1972 to 1973. In 1977, the United States military began decontamination of Eniwetok and other islands. During the three-year, \$100 million cleanup process, the military mixed more than 111,000 cubic yards (85,000 m<sup>3</sup>) of contaminated soil and debris from the islands with Portland cement and buried it in an atomic blast crater on the northern end of the atoll's Runit Island. The material was placed in the 30-foot (9.1 m) deep, 350-foot (110 m) wide crater created by the May 5, 1958, “**Cactus**” nuclear weapons test. A dome composed of 358 concrete panels, each 18 inches (46 cm) thick, was constructed over the material. The final cost of the cleanup project was \$239 million. The United States government declared the southern and western islands in the atoll safe for habitation in 1980, and residents of Eniwetok returned that same year.

## 1953

Operation Upshot-Knothole was a series of blasts testing many different above ground and below ground structures including: mines, garage/shelters, parked aircraft, pig pens, industrial buildings, and “windowless modular structures.”



*Windowless modular structure before the Priscilla test.*

For the 1953 Upshot-Knothole series “**Encore**” and “**Grable**” tests, the soil was stabilized to minimize dust clouds and to improve motion picture photography.

