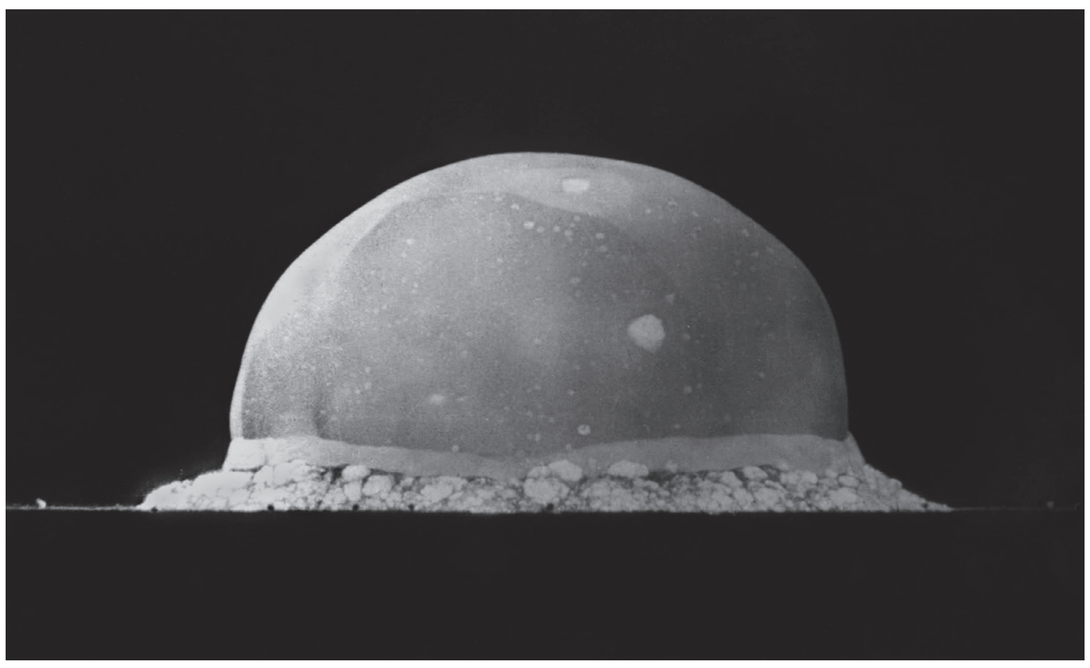
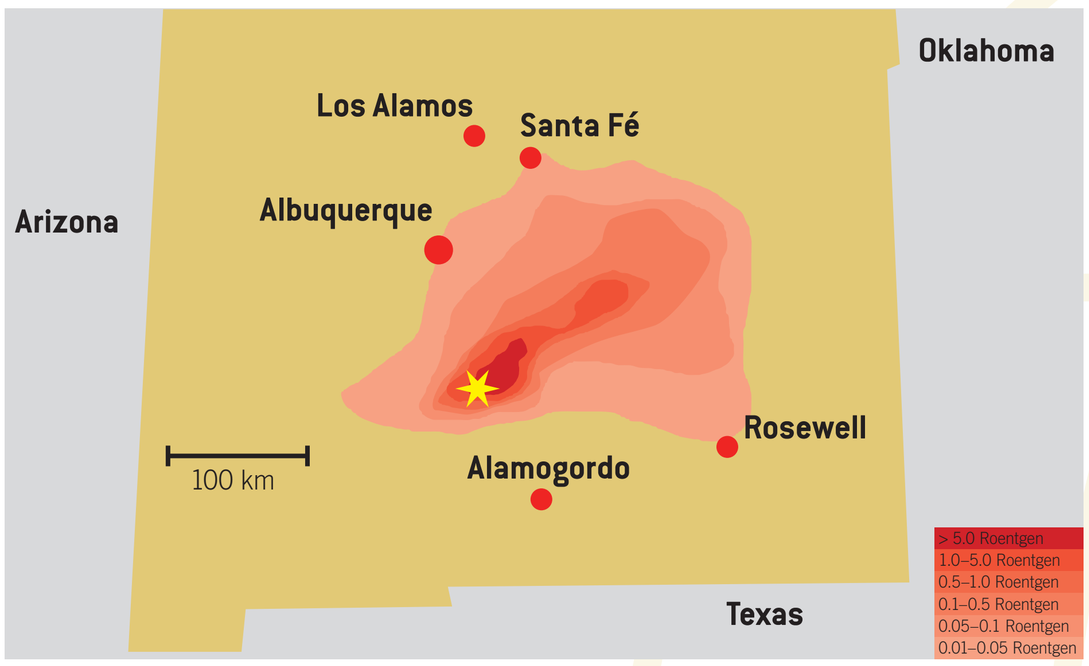
Alamogordo, USA

Nuclear weapon test site

The world's first nuclear explosion took place near Alamogordo on July 16, 1945. This detonation marked the beginning of the "nuclear age," epitomized by weapons of inhumane destructive power. Since the first detonation in Alamogordo, more than 2,000 nuclear test explosions have led to the radioactive contamination of the entire Earth.



The Trinity explosion on July 16, 1945 in the desert near Alamogordo, New Mexico, 16 milliseconds after detonation. Photo credit: Berlyn Brixner / public domain



The distribution of radioactive fallout after the Trinity test in Roentgen (1 Roentgen corresponds to a tissue dose of about 10 mSv in dry air).

The Trinity test site today. Photo: © Joshua Muse

History

Alamogordo is a small town in southern New Mexico. Located in the nearby Jornada del Muerto desert, the U.S. Army's White Sands Missile Range was the site of the world's first nuclear explosion. The so-called "Trinity" Test was carried out as part of the Manhattan Project, a nuclear weapon research operation begun in 1939. The project took place simultaneously in several locations: the weapons were developed in Los Alamos, New Mexico; uranium-235 was enriched at Oak Ridge, Tennessee; and plutonium-239 was produced at Hanford, Washington. The desert near Alamogordo, New Mexico was chosen as the test site.

On July 14, 1945, the world's first nuclear bomb, a plutonium implosion device code-named "The Gadget" was installed on top of a 30 m tower. The construction was equivalent to the one used for the "Fat Man" bomb, which was dropped on Nagasaki only a few weeks later. Scientists and military officers observed the test from a distance of 10–32 km.

On July 16, 1945 at 5:29:45 am the "Gadget" was detonated, with an explosive power equivalent to 20 kilotons of TNT, causing a bright flash of light, a mushroom cloud that grew to a height of about 12 km, and a shock wave that was felt 250 km away from Ground Zero.[1] "Now I am become death, the destroyer of worlds" were the famous words of J.R. Oppenheimer upon seeing the explosion. Trinity was the first of more than 2,000 nuclear tests, which contaminated the world's atmosphere with radioactive particles known as nuclear fallout.

Health and environmental effects

The explosion of the bomb, containing about 6 kg of plutonium, caused a radioactive plume which drifted northeast at a speed of about 16 km/h, spreading radioactive white powdery fallout over an area of about 160 x 50 km, reaching as far as Albuquerque or Santa Fé.[1] Because the Trinity Test was treated as a military secret, citizens were not warned beforehand, nor were they evacuated after the test.

After the detonation, five field teams measured radiation levels in the area. Exposure rates in residential areas were recorded with up to 20 Roentgen per hour, which roughly corresponds to 175 mSv/h – more than 600,000 times the natural background radiation (0.00027 mSv/h) or the equivalent of about 8,700 chest x-rays per hour.[1,2] In addition to this external radiation, about 4.8 kg of plutonium was found in soil, plants and animals in the area. Plutonium poses a serious danger to health because of its toxicity as a heavy metal and internal irradiation from alpha particles at cell-level after ingestion or inhalation.[2,3]

In 2010, the Los Alamos Document Retrieval and Assessment Project (LAHDRA) of the U.S. Centers for Disease Control and Prevention published their final report on radioactive exposure. They found that people were exposed to levels of up to 1,000 mSv in the first two weeks after the blast (10,000 times natural background radiation) and were also exposed to internal radiation through ingestion of contaminated fluids and food. There is, however, a lack of studies evaluating the internal doses of residents.

Moreover the U.S. government never undertook an epidemiological study to assess the link between nuclear fallout and cancer rates in the affected regions. Nevertheless, community organizations report a rise in the incidence of cancer and autoimmune diseases in families living in the affected areas.[1,4]

Outlook

While the U.S. government offered monetary compensation to people whose health had been affected by nuclear detonations at the Nevada test site, people affected by the tests near Alamogordo did not receive official recognition as "Downwinders" and were never given any compensation. Organizations such as the Tularosa Basin Downwinders Consortium are attempting to raise awareness of increased rates of cancer and autoimmune diseases in the region around the Trinity test site and are working for the affected population to be included in federal compensation programs.[4,5] The Downwinders of Alamogordo are also casualties of nuclear weapons – they are also Hibakusha.

References

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