

# Nevada Test Site, USA

## Nuclear weapons test site

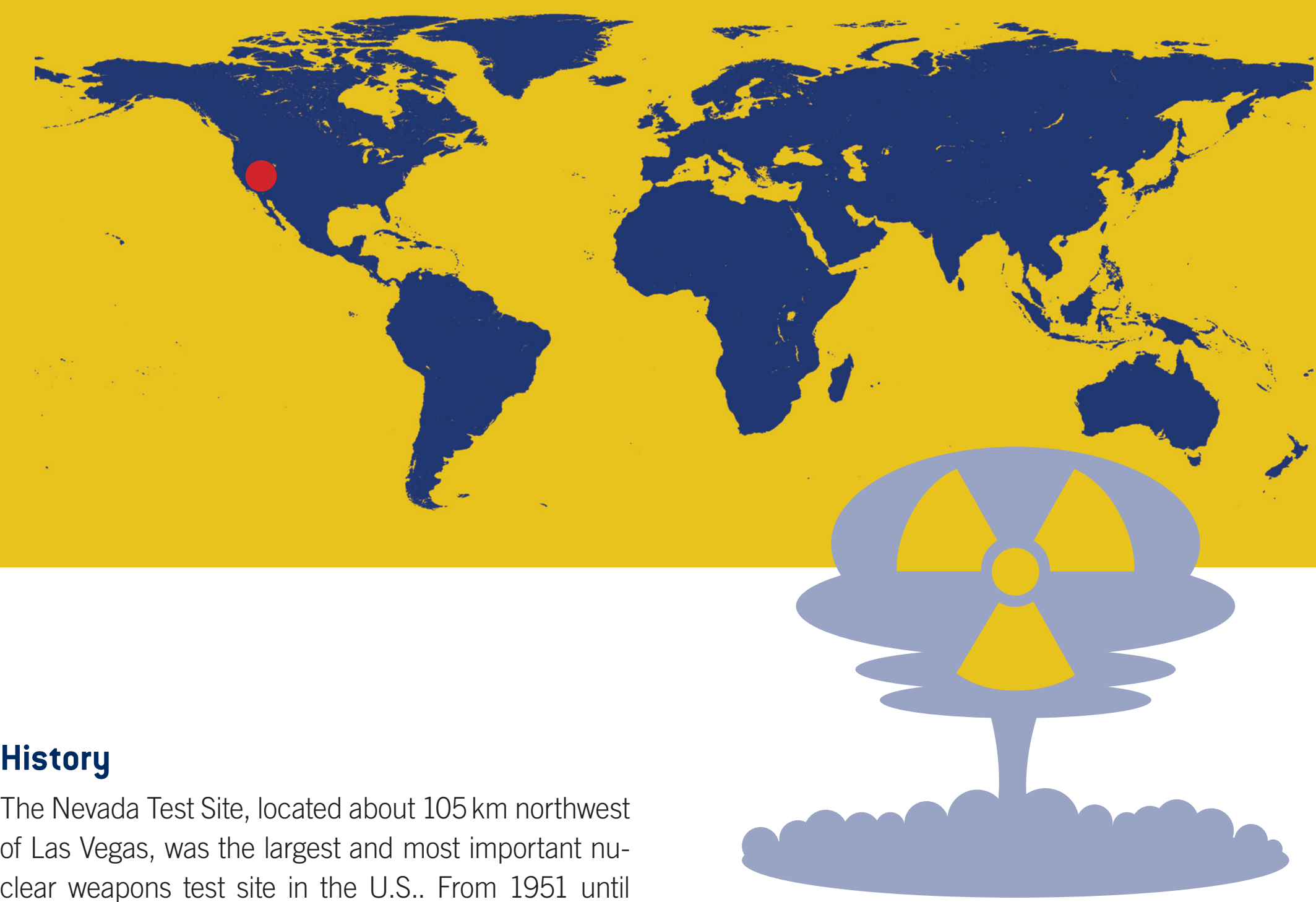
More than 1,000 nuclear detonations at the Nevada Test Site between 1951 and 1992 dispersed massive amounts of radioactive particles across the Earth, leading to widespread contamination and exposing the world’s entire population to dangerous radioisotopes.



December 18, 1970: The underground detonation of the 10 kiloton “Baneberry” bomb caused a giant radioactive cloud, exposed the test site personnel to about 247 PBq of radioactive particles and caused nuclear fallout in the states of California, Idaho, Oregon and Washington. Photo: © U.S. Department of Energy



1992: Protests against nuclear weapons tests at the Nevada Test Site. Nuclear warheads were detonated underground until that year. Photo credit: Peter Drekmeyer (Mark Bult), creativecommons.org/licenses/by-nc-nd/2.0



### History

The Nevada Test Site, located about 105 km northwest of Las Vegas, was the largest and most important nuclear weapons test site in the U.S.. From 1951 until 1992, a total of 1,021 nuclear tests were conducted on the 3,500 km<sup>2</sup> site: 100 above and 921 below ground. These tests released an estimated 222,000 Peta-Becquerel (Peta = quadrillion) of radioactive material into the atmosphere.<sup>1,2</sup>

According to declassified documents of the Federal Civil Defense Administration, many of the tests were conducted specifically in order to determine the effects of nuclear fallout on the American public.<sup>3</sup> As scientists found radioactive strontium in deciduous teeth of children in the U.S. and as rates of childhood leukemia and other cancers increased, public pressure began to grow to stop nuclear weapons testing. In 1963, President Kennedy signed the Limited Test Ban Treaty, which put an end to atmospheric tests at the Nevada site.<sup>1,4</sup> Underground nuclear testing continued until 1992, however, and accidents continued to occur frequently: on December 18, 1970, for example, the underground “Baneberry” test of a 10-kiloton bomb released a plume of radioactive dust, which caused radioactive fallout to rain down on the test site personnel for many hours. An estimated total of 247 PBq of radioactive material was released, including 3 PBq of iodine-131.<sup>5,6</sup> The radioactive plume continued to deposit fallout over northeast California, northern Nevada, southern Idaho and some eastern sections of Oregon and Washington.

### Health and environmental effects

In the 1950s, people living close to the test site were encouraged to watch the nuclear tests from their porches. Many of the so-called Downwinders report setting their alarm-clocks so that they would not miss the early-morning detonations. Many were given radiation badges by the Atomic Energy Commission, so that their exposure dose could be recorded for field studies on the effects of nuclear fallout.<sup>7-9</sup> Due to prevailing wind currents, the inhabitants of Utah were among those most affected by radioactive fallout. Radioactive particles such as iodine-131 can enter the body through contaminated air, food or drink and can lead to cancer once incorporated. Children in the small

town of St. George, Utah may have received thyroid doses of up to 1.2–4.4 Sievert.<sup>1,10</sup> Subsequent epidemiological studies have shown a significant rise in the incidence of leukemia and thyroid cancer in the populations living downwind from the nuclear testing site.<sup>1</sup>

According to the National Cancer Institute, the U.S. population was exposed to a total dose of 4,000,000 Person-Sievert of iodine-131 through the nuclear weapon tests in Nevada – about 500 times the total radiation dose of Chernobyl (7,300 PSv). A study published in 1999 estimated that the expected cases of thyroid cancer due to the Nevada nuclear weapons tests amount to 10,000–75,000.<sup>11</sup> Another report, published in 2006, found that 1,800 radiation-related leukemia deaths could be expected in the U.S. as a result of the Nevada nuclear weapons tests.<sup>1</sup> Despite these alarming findings, no routine thyroid cancer screenings are undertaken in the affected regions.

### Outlook

Until today, the Nevada Test Site remains contaminated with an estimated 11,100 PBq of radioactive material in the soil and 4,440 PBq in groundwater.<sup>2</sup> The U.S. has not yet ratified the Comprehensive Test Ban Treaty of 1996. In 1990, the Radiation Exposure Compensation Act was passed in order to compensate Downwinders for diseases that could be traced back to radiation exposure. Due to bureaucratic hurdles and a lack of large-scale scientific research, many of the casualties of nuclear weapons testing are finding it difficult to actually receive compensation. The Hibakusha of Nevada feel left alone with the legacy of nuclear testing.

### References

- 1 Simon et al. “Fallout from nuclear weapons tests and cancer risks.” American Scientist 2006, 94: 48-57. [www.americanscientist.org/issues/feature/2006/1/fallout-from-nuclear-weapons-tests-and-cancer-risks](http://www.americanscientist.org/issues/feature/2006/1/fallout-from-nuclear-weapons-tests-and-cancer-risks)
- 2 Walker et al. “Long-term stewardship at the Nevada Test Site.” Nevada Division of Environmental Protection, 1998. <http://ndep.nv.gov/boff/steward.htm>
- 3 Cook N. “Nuclear Weapons collateral damage exaggerations: implications for civil defense.” Joint Commission Report, Vol. VI, Document NP-3041, 1951. <http://nige.files.wordpress.com/2010/12/dirkwood-report-summary6.pdf>
- 4 Mangano A. “Elevated in vivo strontium-90 from nuclear weapons test fallout among cancer decedents.” Int.J.Health Serv.Vol 41:1,2011. [www.ncbi.nlm.nih.gov/pubmed/21319726](http://www.ncbi.nlm.nih.gov/pubmed/21319726)
- 5 Rollins EM et al. “Dose Reconstruction Project: Technical Basis Document for the Nevada Test Site – Occupational Internal Dose.” The National Institute for Occupational Safety and Health (NIOSH), 30.09.04. [www.cdc.gov/niosh/ocas/pdfs/arch/nts5a.pdf](http://www.cdc.gov/niosh/ocas/pdfs/arch/nts5a.pdf)
- 6 “Estimated exposure and thyroid doses received by the American people from Iodine-131 fallout following Nevada atmospheric nuclear bomb tests.” Website of the National Cancer Institute. [www.cancer.gov/131/fallout](http://www.cancer.gov/131/fallout)
- 7 Gripman A. “Fallout of Empire.” Arizona Daily Sun, April 5, 2012. [http://news.azdailysun.com/fl\\_aglive/fl\\_agstafflive\\_story.cfm?storyID=230136](http://news.azdailysun.com/fl_aglive/fl_agstafflive_story.cfm?storyID=230136)
- 8 White J. “Downwinders: the people of Parowan.” Philm Productions, 2007. [www.philmproductions.com/documentary.html](http://www.philmproductions.com/documentary.html)
- 9 Seegmiller JB. “Nuclear Testing and the Downwinders.” Utah History To Go-Website. [http://historytogo.utah.gov/utah\\_chapters/utah\\_today/nucleartestingandthedownwinders.html](http://historytogo.utah.gov/utah_chapters/utah_today/nucleartestingandthedownwinders.html)
- 10 Knapp HA. “Iodine-131 in Fresh Milk and Human Thyroids Following a Single Deposition of Nuclear Test Fall-Out.” Nature 202, 534-537,1964. [www.nature.com/nature/journal/v202/n4932/abs/202534a0.html](http://www.nature.com/nature/journal/v202/n4932/abs/202534a0.html)
- 11 “Exposure of the American people to Iodine-131 from Nevada nuclear-bomb tests – Review of the National Cancer Institute Report and Public Health Implications.” Institute of Medicine; National Research Council. National Academy Press, 1999. [www.nap.edu/catalog.php?record\\_id=6283](http://www.nap.edu/catalog.php?record_id=6283)

