Fact Sheet

U.S. DEPARTMENT OF ENERGY | Legacy Management



Gasbuggy, New Mexico, Site

A Nevada Offsite

This fact sheet provides information about the **Gasbuggy Site**. Long-Term stewardship responsibilities for this site are managed by the **U.S. Department of Energy Office of Legacy Management**.

Site Information and History

The Gasbuggy site is located in northwestern New Mexico in Rio Arriba County, approximately 55 miles east of the city of Farmington, and 12 miles southwest of Dulce, New Mexico, in the Carson National Forest. The Gasbuggy site consists of one section of land totaling 640 acres.

On December 10, 1967, the U.S. Atomic Energy Commission (AEC), a predecessor agency of the U.S. Department of Energy (DOE), detonated a 29-kiloton-yield nuclear device in the emplacement well (GB-E) at a depth of 4,227 feet in an attempt to stimulate production of natural gas from the overlying gas-bearing Pictured Cliffs Formation. The detonation produced extremely high temperatures that vaporized a volume of rock, temporarily creating a cavity surrounded by a fractured area extending outward from the detonation point. Shortly after the detonation, the overlying fractured rock collapsed into the void space, creating a rubble-filled collapse chimney that extends above the detonation point. As the former cavity cooled, the melted and vaporized rock collected and solidified at the bottom of the former cavity (now the lower part of the collapse chimney). Most of the high-melting-point radionuclides were trapped in this solidified melt rock, which is often referred to as melt glass due to its (glassy) texture.

The purpose of the detonation was to stimulate flow of natural gas through the fractures created by the blast and use the collapse chimney as a collection chamber. This was the first natural gas reservoir stimulation experiment in the Plowshare Program, which was designed to develop peaceful uses for nuclear energy. AEC, the U.S. Department of the Interior, and the El Paso Natural Gas Company jointly sponsored Project Gasbuggy.

A reentry well (GB-ER) was drilled into the collapse chimney created by the detonation, and contaminated gas in the detonation zone (former cavity and collapse chimney) was produced and flared through a series of production tests. Production testing began in July 1968 and ended in October 1969 after producing 213 million cubic feet of natural gas during five tests. The test stimulated gas production in greater quantities than in nearby conventional gas wells, but the natural gas still had measurable amounts of radioactive constituents. Results of the natural gas production testing were evaluated, and it was determined that the gas had a significantly lower heat value and that fracturing into the gas-bearing formation outward from the chimney (above the cavity) did not penetrate as extensively as expected. In 1976, it was decided that no further testing would be conducted at the site.

AEC decommissioned and demobilized the site in 1978. Structures and equipment used for the test were decontaminated, if necessary, and removed. Liquid radioactive waste was injected into the former cavity, now the lower part of the collapse chimney. Solid radioactive waste was removed and transported to the Nevada National Security Site (formerly known as the Nevada Test Site), and test wells were decommissioned and plugged. Soil sampling was performed in 1978, 1986, 2000, and 2002. Cultural resources, endangered and sensitive species, and floodplain and wetland surveys were performed in 1993. Final surface remediation was completed in 2004.

Surface Conditions

Remediation of the surface resulted in the removal of 5,562 cubic yards of contaminated soil from mud pits and

was completed in September 2004. No further corrective actions are required for the surface and shallow subsurface.

A permanent monument consisting of a brass plaque mounted in a concrete base was placed at surface ground zero at the site. Wording on the plaque describes the historical significance of the project and restrictions on subsurface excavation.



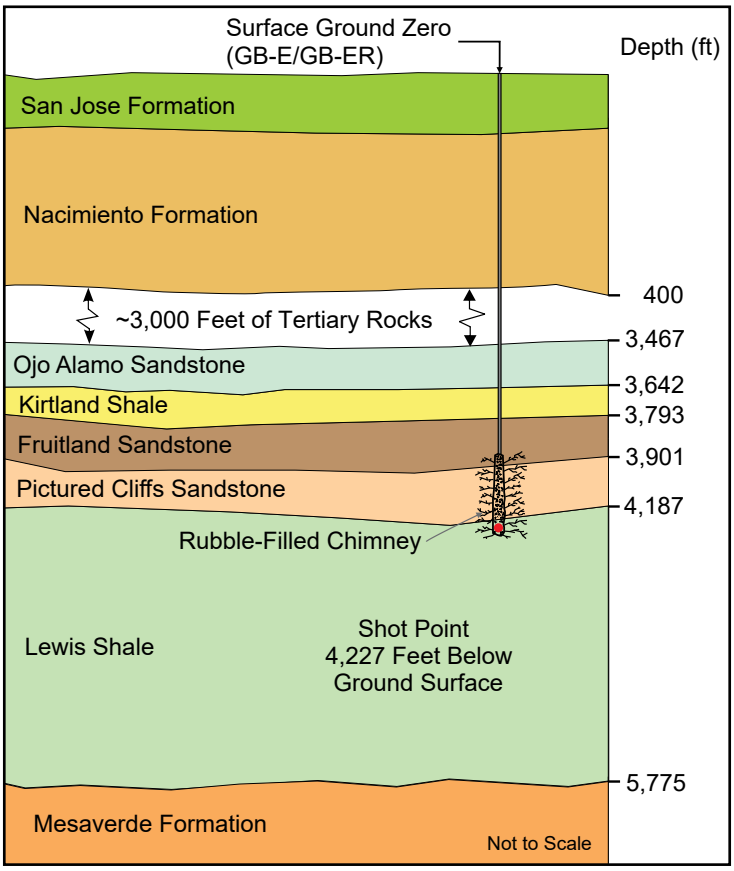
Gasbuggy, New Mexico, Interpretive Site.

Subsurface Conditions

Subsurface contamination remains in the detonation zone near the GB-E emplacement borehole. Numerical modeling studies have been conducted to assess the impacts that nearby producing natural gas wells may have on the detonation zone. Results of modeling effort indicate that contamination associated with the underground nuclear test is limited to the detonation zone and not expected to migrate to any of the near by gas wells. The producing natural gas wells near the site are routinely sampled and the sample results continue to show that no Gasbuggy test-related radionuclides have been detected.

Land Use

The site is located in the Carson National Forest. Prior to Project Gasbuggy, the land was open range and was used for livestock grazing and recreation. The Secretary of Agriculture, through the U.S. Forest Service, has jurisdiction over Carson National Forest. There are no surface use restrictions for the site, and the Forest Service has returned the land to its pre-Gasbuggy uses with the addition of historical markers describing the Gasbuggy test and a small parking area at Surface Ground Zero.



Cross Section of the Gasbuggy, New Mexico, Site.

Institutional Controls

DOE maintains institutional controls to a depth of approximately 4,700 feet below ground surface, within the southwest quarter of section 36, township 29 north, range 4 west, of the New Mexico Principal Meridian. DOE's control was obtained through a combination of a 1967 Public Land Order withdrawing section 36 where the Gasbuggy test was conducted and terms of the contract with El Paso Natural Gas in which they granted the AEC with all pre-existing oil and gas leasing rights within the 160-acre quarter section where the test was conducted. Current subsurface restrictions are stated on the monument placed at the site. In summary, the inscription states no subsurface intrusion within the radius of 100 feet from Surface Ground Zero to a true vertical depth of 1,500 feet, and no subsurface intrusion within a radius of 600 feet from Surface Ground Zero to a true vertical depth between 1,500 feet and 4,500 feet without permission of the U.S. government.

No institutional controls are required for the surface of the Gasbuggy site. Additionally, DOE has executed a Memorandum of Understanding with the U.S. Forest Service and the U.S. Bureau of Land Management outlining the respective roles and responsibilities of each agency regarding notification and monitoring of natural gas and water development in the vicinity of Gasbuggy. This agreement states that DOE can conduct monitoring to assure continued protectiveness of human health and the environment.

Long-Term Hydrologic Monitoring Program

Starting in 1972, the U.S. Environmental Protection Agency monitored groundwater and surface water near the Gasbuggy site annually as part of the Long-Term Hydrologic Monitoring Program. Samples were collected from several springs, ponds, surface water drainages, ranch wells, and livestock watering wells near the Gasbuggy site. The sampling locations were on the National Forest, Jicarilla Apache Reservation, and private property. LM assumed responsibility for the hydrological monitoring program in 2008. Since the program's inception, analytical results using conventional analytical methods have detected no radionuclides related to the underground nuclear test at any of the sampled locations. As a result, the monitoring program was discontinued in 2015. LM is now focused on the sampling of natural gas wells near the site.

Natural Gas Monitoring Program

In 2009, DOE began monitoring natural gas, and water produced with natural gas at active gas wells in the vicinity of the Gasbuggy site. In 2015, DOE, U.S. Forest Service, and U.S. Bureau of Land Management evaluated and modified the sampling approach to be based on cumulative production, and well proximity. To date, no evidence of Gasbuggy-related contamination has been detected at the gas wells sampled.

Regulatory Setting

DOE is responsible for Gasbuggy-related contamination. The DOE Office of Environmental Management (EM) has completed environmental restoration of the surface and has applied for closure status for the surface through the New Mexico Voluntary Remediation Program, administered by the New Mexico Environment Department.

Legacy Management Activities

On October 1, 2006, responsibility for the Gasbuggy site transferred from EM to LM. LM is responsible for long-term surveillance and maintenance, which includes accepting the transfer of records and managing site records.

CONTACT INFORMATION

IN CASE OF AN EMERGENCY AT THE SITE, CONTACT 911

LM TOLL-FREE EMERGENCY HOTLINE: (877) 695-5322

Site-specific documents related to the **Gasbuggy, New Mexico, Site**, are available on the LM website at **www.energy.gov/lm/gasbuggy-new-mexico-site**

For more information about LM activities at the **Gasbuggy, New Mexico, Site**, contact:

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