Fact Sheet

U.S. DEPARTMENT OF ENERGY | Legacy Management

Gasbuggy, New Mexico, Site

A Plowshare Site/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, New Mexico, Site is in northwestern New Mexico in Rio Arriba County, about 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 640-acre section of land.

In the early 1960s the U.S. Atomic Energy Commission (AEC), a predecessor agency of the U.S. Department of Energy (DOE), investigated and developed alternative sites or "Offsites" to the Nevada National Security Site (formerly known as the Nevada Test Site) for underground nuclear testing, including the Gasbuggy site. On Dec. 10, 1967, AEC detonated a 29-kiloton-yield nuclear device in an emplacement well (GB-E) at a depth of 4,227 feet. The purpose of the test was to stimulate natural gas production from the gas-bearing Pictured Cliffs Formation. The detonation created extremely high temperatures that melted and vaporized the surrounding rock, temporarily creating a cavity surrounded by fractured rock. Shortly after the detonation, the fractured rock collapsed into the cavity, creating a rubble-filled collapse chimney above the detonation point. As the cavity cooled, the melted rock solidified at the cavity bottom (now the lower part of the collapse chimney). Most of the high-melting-point radionuclides were trapped in this solidified rock, which is often called melt glass.

The purpose of the detonation was to trigger the flow of natural gas through the fractures created by the blast and use the collapse chimney as a collection area. This was the first natural-gas-reservoir stimulation experiment in the Plowshare Program, which was created 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 re-entry well (GB-ER) was drilled into the collapse chimney in order to conduct a series of natural gas production tests. Production testing began in July 1968 and ended in October 1969 after producing 213 million cubic feet of natural gas over five tests. The tests resulted in more gas production than in nearby conventional gas wells, but the gas had measurable amounts of radioactivity. Personnel evaluated the results of the natural gas production testing and found that the gas had a significantly lower heat value and that there were fewer fractures in the gas-bearing formation than they expected.

In 1976, it was decided that no further testing would be conducted and the site was subsequently remediated.

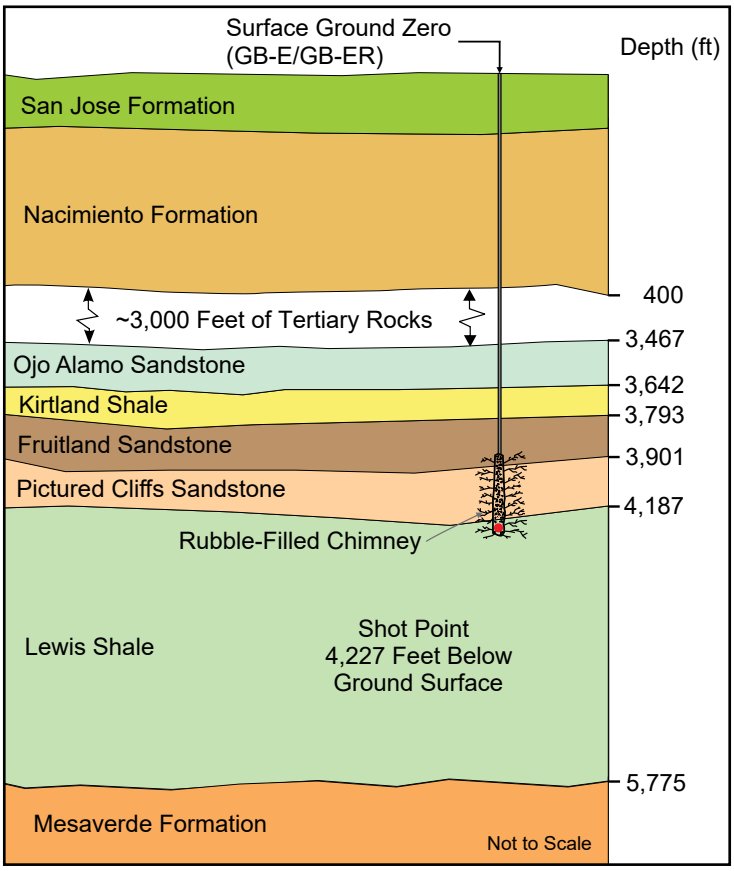
Structures and equipment used for the test were decontaminated, if necessary, and removed from the site. Liquid radioactive waste was injected into the lower part of the collapse chimney. Solid radioactive waste was removed and transported to the Nevada National Security Site for disposal, and the test wells were plugged. Soil sampling was performed in 1978, 1986, 2000, and 2002. Cultural resources surveys, endangered and sensitive species surveys, and floodplain surveys were performed in 1993. Final surface remediation involved the removal of 5,562 yards of contaminated soil from mud pits and was completed in September 2004.

Surface Conditions

No other corrective actions are required following the successful remediation of surface and shallow subsurface.

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

Gasbuggy, New Mexico, interpretive site.



Cross section of the Gasbuggy, New Mexico, Site.

Subsurface Conditions

Subsurface contamination is still in the detonation zone near the GB-E borehole. DOE has conducted numerical modeling studies to evaluate if nearby natural gas wells could be affected by the detonation zone. Results show that contamination from the underground nuclear test is limited to the detonation zone and not expected to migrate to any of the nearby gas wells. DOE regularly samples the producing natural gas wells near the site and has not found Gasbuggy test-related radionuclides.

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.

Institutional Controls

DOE maintains institutional controls to a depth of about 4,500 feet below the surface, within the southwest quarter of section 36, township 29 north, range 4 west, of the New Mexico Principal Meridian. DOE took control of the site through a 1967 Public Land Order withdrawing section 36 and through the contract with El Paso Natural Gas, in which they granted AEC all preexisting oil and gas leasing rights in the 160-acre quarter section where the test was conducted. Current subsurface restrictions, as described on the site monument, include no subsurface penetrations within a 100-foot radius of surface ground zero to a depth of 1,500 feet or within a 600-foot radius of surface ground zero to a 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.

DOE has a Memorandum of Understanding with the U.S. Forest Service and the U.S. Bureau of Land Management outlining the roles and responsibilities of each agency for notification and monitoring of natural gas and water development near Gasbuggy. This agreement states that DOE can monitor to ensure the site features remain protective of people and the environment.

Long-Term Hydrologic Monitoring Program

Starting in 1972, the U.S. Environmental Protection Agency (EPA) monitored groundwater and surface water near the Gasbuggy site annually as part of the Long-Term Hydrologic Monitoring Program. EPA personnel collected samples from several springs, ponds, surface water drainages, ranch wells, and livestock watering wells near the Gasbuggy site. The sampling locations were in the National Forest, on the Jicarilla Apache Reservation, and on private property. DOE took responsibility for the hydrological monitoring program in 2008. Since the program's beginning, laboratory analysis of

samples has shown no detectable levels of radionuclides related to the underground nuclear test. As a result, DOE discontinued the groundwater and surface water monitoring program in 2015.

Natural Gas Monitoring Program

In 2009, DOE began monitoring natural gas and water produced with natural gas at active gas wells near the Gasbuggy site. In 2015, DOE, the U.S. Forest Service, and the U.S. Bureau of Land Management evaluated and modified the sampling approach to be based on production levels and well proximity. To date, Gasbuggy-related contaminants have not been identified at the sampled gas wells.

Regulatory Setting

DOE has responsibility for radioactive material at the Gasbuggy site under authority of the Atomic Energy Act of 1954, as amended under Title 42 *United States Code*, Section 2011. The DOE Office of Environmental Management (EM) has completed environmental restoration of the surface. The DOE Office of Legacy Management (LM) 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 Oct. 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 and management of 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:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Email:
public.affairs@lm.doe.gov

DOE Office of Legacy Management
(970) 248-6070

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