Gasbuggy, New Mexico, Site

This fact sheet provides information about the Gasbuggy, New Mexico, Site. This site is managed by the U.S. Department of Energy Office of Legacy Management.

Site Description 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 4,240 feet below ground surface in an attempt to stimulate production of natural gas from deeply buried, low-permeability, gas-bearing formations. This was the first natural-gas-reservoir stimulation experiment in the Plowshare Program, which was designed to develop peaceful uses for nuclear energy. AEC, U.S. Department of the Interior, and El Paso Natural Gas Company jointly sponsored Project Gasbuggy.

The blast created a cavity and a chimney of rubble above and within it. The purpose of the detonation was to stimulate flow of natural gas through the fractures created by the blast and use the chimney as a collection chamber. No radiation was released at the surface at the time of the blast. The molten rock in the cavity encapsulated most of the radionuclides from the detonation.

Project Gasbuggy stimulated gas production in greater quantities than in nearby conventional gas wells, but the natural gas was radioactive. Test results also indicated that the gas had a significantly lower heat value. Gas production tests and project evaluation activities were conducted from 1967 until 1976. Fracturing into the gas-bearing formation outward from the chimney (above the cavity) did not penetrate as extensively as expected.

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 cavity formed by the nuclear explosion; solid radioactive waste was removed to 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.

Subsurface Conditions

DOE does not plan to remove subsurface radioactive contamination in or around the test cavity because no feasible technology exists to do so. The DOE Office of Legacy
Management (LM) will conduct monitoring to ensure that
detonation-related contamination does not migrate offsite.

**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 controls subsurface activities 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 the section
of land where the Gasbuggy test was conducted and contractual
language providing 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 an Interagency Agreement
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 subsurface water development in the vicinity of Gasbuggy.
This agreement states that DOE can conduct monitoring to
assure continued protectiveness for the public 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. Since 2008, LM has conducted the hydrologic
monitoring. Following the annual sampling event in 2009,
hydrologic monitoring has been reduced to once every 5 years
since no Gasbuggy-related contamination has been detected at
the monitoring locations.

**Natural Gas Monitoring Program**
In 2009, DOE began monitoring natural gas, and water produced
with the natural gas, at active gas wells in the vicinity of the
Gasbuggy site. Contaminant transport by natural gas and water
produced along with the gas is considered a more credible
contaminant migration pathway than the relatively shallow
groundwater and surface waters that have been historically
monitored. To date no evidence of Gasbuggy-related
contamination has been detected at the active gas wells
being sampled.

**Regulatory Setting**
The federal government holds title to, and DOE is responsible
for, the radioactive and other hazardous materials generated
by DOE and predecessor agencies at the Gasbuggy site.
The DOE Office of Environmental Management has completed
environmental restoration of the surface and has applied for
clean 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, the responsibility for the Gasbuggy
site transferred from the DOE Office of Environmental
Management to LM. LM is responsible for (1) developing
and implementing a site-specific long-term surveillance and
maintenance plan, (2) accepting the transfer of records and real
property, (3) managing site records, (4) implementing and
managing existing agreements and programs with regulatory
agencies, and (5) responding to stakeholder inquiries.

**Contacts**
Documents related to the Gasbuggy site are available

For more information about LM activities at the
Gasbuggy site, contact:
U.S. Department of Energy Office of Legacy Management
2597 Legacy Way, Grand Junction, CO 81503
(970) 248-6070 (monitored continuously), or
(877) 695-5322 (toll-free)