Fact Sheet

U.S. DEPARTMENT of ENERGY | Office of Legacy Management

Plowshare, Vela Uniform, and Weapons Related

This fact sheet provides information about the Plowshare, Vela Uniform, and Weapons Related program. The 15 sites are managed by the U.S. Department of Energy Office of Legacy Management. The Office of Legacy Management is responsible for long-term surveillance and maintenance.

Site Information and Background

The Plowshare/Vela Uniform/Weapons Related program currently consists of 15 sites in eight states where the U.S. Atomic Energy Commission (AEC), a predecessor agency to the U.S. Department of Energy (DOE), planned or conducted Weapons Related experiments and underground nuclear and non nuclear tests for various purposes within the United States. The tests, experiments, and other support activities took place during the 1960s and 1970s. AEC conducted these activities under three distinct programs — Plowshare, Vela Uniform, and Weapons Related — and all had different purposes.

Plowshare

The Plowshare Program was a research and development project started in 1957. The program was designed to explore the technical and economic feasibility of using nuclear explosives for peaceful purposes. The program's name is a biblical reference to "beating swords into plowshares." Scientists proposed using nuclear detonations for civil works projects and industrial applications. Proposed civil works projects included building dams, harbors, canals, highways, and railroads. Proposed industrial applications usually involved increasing production of ore, oil, and gas.

Nine sites were used for Plowshare-related testing: the Bronco, Colorado, Site; the Chariot, Alaska, Site; the Gasbuggy, New Mexico, Site; the Gnome-Coach, New Mexico, Site; the Pre-Gondola and Trencher, Montana, Site; the Pre-Schooner II, Idaho, Site; the Rio Blanco, Colorado, Site; the Rulison, Colorado, Site; and the Utah, Utah, Site. AEC and partner organizations conducted underground nuclear tests at the Gasbuggy, Rulison, and Rio Blanco sites to find out if it was feasible to use nuclear devices to stimulate natural gas production. AEC conducted an underground nuclear test at the Gnome-Coach site to understand the underground environment created when a nuclear device is detonated in a thick salt deposit. AEC didn't use nuclear devices at the Pre-Schooner II and Pre-Gondola and Trencher sites, but it conducted chemical high-explosive experiments to gain important information about the cratering, excavation, and fracturing of hard rock formations. AEC identified the Chariot site as a potential location to excavate a harbor using a series of nuclear explosions, but it canceled work at the site because of strong public opposition. AEC didn't conduct any nuclear tests at the site and didn't bring any nuclear devices there.

Vela Uniform

The Vela Uniform Program was an element of Project Vela, conducted jointly between AEC and the U.S. Department of Defense (DOD) from 1963 to 1971. Its purpose was to develop the technological ability to detect and identify underground and underwater nuclear detonations. The program was the result of treaty negotiations that discussed ending nuclear weapons testing in the atmosphere, outer space, and underwater. The U.S. maintained that, to reach this type of agreement, there would have to be a proven method of verifying nuclear tests. Three sites were used for Vela Uniform related testing: the Amchitka, Alaska, Site; the Salmon, Mississippi, Site; and the Shoal, Nevada, Site. AEC and DOD conducted underground nuclear tests at each of these sites. Seismic data from these tests was evaluated to develop ways to differentiate underground nuclear tests from other seismic events (such as earthquakes) and to locate the underground nuclear test sites. The program also conducted experiments using conventional high explosives.

The Plowshare/Vela Uniform Records sites, Nevada, are 165 projects that were conducted or planned under the Plowshare and Vela Uniform Programs. The DOE Office of Legacy Management (LM) continues to evaluate these projects. They are listed as being in Nevada because that is where many of the records are maintained.

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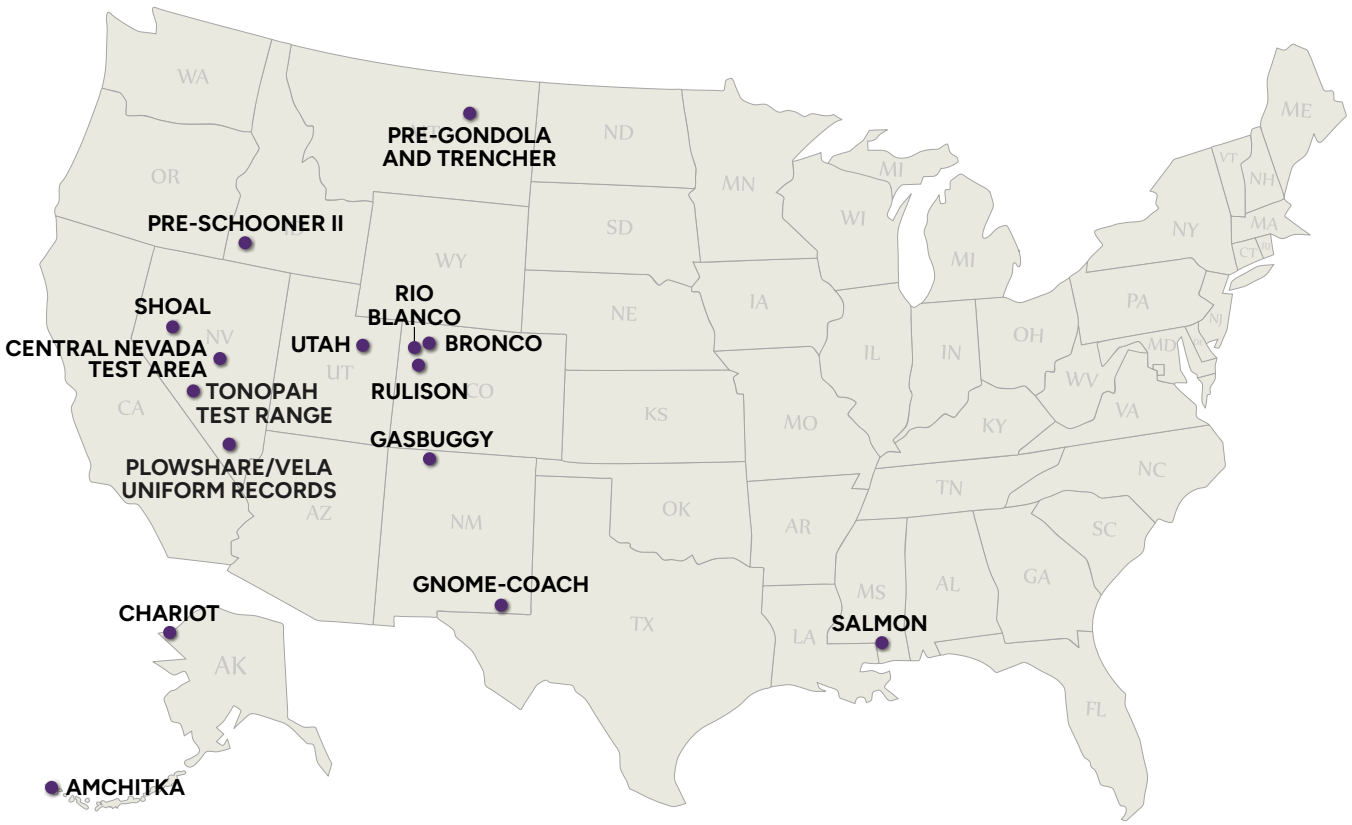

Plowshare, Vela Uniform, and Weapons Related sites.

Weapons Related

The purpose of the Weapons Related tests was to gather data on nuclear devices. They were either atmospheric or underground nuclear tests that were conducted to test nuclear devices intended for a specific type of weapons system. AEC usually conducted these activities jointly with DOD. Of the 15 sites, three sites were used for Weapons Related testing. They were the Amchitka, Alaska, Site; the Central Nevada Test Area, Nevada; and the Tonopah Test Range (TTR), Nevada, Site. The Amchitka and Central Nevada Test Area sites were used to collect information on nuclear devices through underground nuclear tests and to understand effects on the environment and structures. The Tonopah Test Range site was used to test ballistics and non nuclear features of atomic weapons.

Operations at all the Plowshare, Vela Uniform, and Weapons Related sites ended by the late 1970s. After testing was complete, surface facilities were decontaminated and decommissioned according to standards in place at the time. DOE created the Environmental Management program in 1989 to evaluate and mitigate the risks and hazards posed by the legacy of nuclear weapons production and testing. This led to reevaluating sites that were not remediated through formal regulatory programs.

Plowshare, Vela Uniform, and Weapons Related sites used for underground or aboveground nuclear testing are monitored and maintained long-term according to the regulatory requirements of the state they are located in. DOE has completed surface cleanups and established site-specific environmental sampling programs to monitor subsurface contamination from the nuclear tests. This includes establishing institutional controls for the sites, which are the documents and physical features that prevent people from accessing residual contamination and ensure the sites protect people and the environment for the long term.

LM took responsibility for the Chariot site in 2005 and for the eight sites where underground nuclear tests were conducted in 2008. The five sites not used for nuclear testing were transferred to LM in 2019, and responsibility for Tonopah Test Range was transferred in 2020. Based on the needs of each site, LM may implement environmental monitoring programs, inspect the site, maintain institutional controls, review and report environmental monitoring data, manage site records and data, and maintain the site's integrity.

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Plowshare/Vela Uniform/Weapons Related Site Descriptions

- Amchitka, Alaska, Site: Located on Amchitka Island, Alaska, at the western end of the Aleutian Island chain. Three underground nuclear tests were conducted; two were Weapons Related (Milrow and Cannikin) and one (Long Shot) was under the Vela Uniform program. Cannikin was the largest underground test in U.S. history.
- Central Nevada Test Area, Nevada: Located in Nye County, Nevada. AEC planned three underground Weapons Related nuclear tests, but only conducted one test to evaluate the suitability of the site for high-yield underground nuclear testing.
- Chariot, Alaska, Site: Located in northwest Alaska. AEC didn't conduct any nuclear tests due to technical issues and stakeholder concerns, but carried out several bioenvironmental tests. AEC and the U.S. Geological Survey (USGS) jointly conducted a five-day radioactive tracer test.
- Gasbuggy, New Mexico, Site: Located in Rio Arriba County, New Mexico. AEC detonated one nuclear device underground as part of the Plowshare Program in an attempt to stimulate production of natural gas from the deeply buried, low-permeability formations below the site.
- Gnome-Coach, New Mexico, Site: Located in Eddy County, New Mexico. AEC detonated one nuclear device in an underground salt formation as part of the Plowshare Program to collect data for the peaceful application of nuclear energy and to collect seismic measurements. Separate from the underground nuclear test, USGS conducted a groundwater tracer test using four dissolved radionuclides.
- Rio Blanco, Colorado, Site: Located in Rio Blanco County, Colorado. AEC detonated three underground nuclear devices almost simultaneously in a single borehole as part of the Plowshare Program to study the potential for recovering natural gas from the low-permeability geologic formations beneath the site.
- Rulison, Colorado, Site: Located in Garfield County, Colorado. AEC conducted one underground nuclear test as part of the Plowshare Program in an attempt to release commercially marketable quantities of natural gas from low-permeability geologic formations beneath the site.
- Salmon, Mississippi, Site: Located in Lamar County, Mississippi. AEC and DOD conducted two underground nuclear tests (Salmon and Sterling) under the Vela Uniform program to study seismic signals from detonations in a salt medium (the Tatum Salt Dome). DOD later conducted two methane-oxygen explosions (Diode Tube and Humid Water) in the detonation cavity created by the Salmon test.
- Shoal, Nevada, Site: Located in Churchill County, Nevada. AEC and DOD performed one underground nuclear test under the Vela Uniform program in a seismically active region to improve the country's ability to detect, identify, and locate underground nuclear detonations.
- Tonopah Test Range, Nevada, Site: Located in Nye County, Nevada. AEC used the site to test ballistics and non nuclear features of atomic weapons. These activities required many support facilities. The support facilities and testing operations often contributed to contamination at the test sites. The TTR includes 40 units that require long-term surveillance and maintenance, with 11 units requiring post-closure monitoring.
- Utah, Utah, Site: Located in Uintah County, Utah. The purpose of this Plowshare project was to determine the feasibility and efficiency of oil production by creating permeability with a nuclear explosion. This project was canceled.
- Bronco, Colorado, Site: Located in Rio Blanco County, Colorado. AEC drilled three wells, intending to study the effect of nuclear technology on oil shale stimulation and recovery. Project Bronco, which is part of the Plowshare Program, was canceled.
- Pre-Gondola and Trencher, Montana, Site: Located in Valley County, Montana. This phased series of chemical experiments investigated the behavior and cratering characteristics of large-scale explosives in various materials for construction applications. The site is part of the Plowshare Program.
- Pre-Schooner II, Idaho, Site: Located in Owyhee County, Idaho. AEC conducted a non nuclear experiment at the site to learn about cratering in hard, dry rock and to inform future nuclear tests. The site is part of the Plowshare Program.
- Plowshare and Vela Uniform Records, Nevada, Site: Located in Las Vegas, Nevada. This includes 165 projects that were conducted within the United States, have been determined not to threaten human health or the environment, and do not require ongoing long-term surveillance and maintenance. These sites were completed under the Plowshare and Vela Uniform programs, and LM maintains the records and conducts stakeholder engagement.

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Regulatory Setting

In most instances, LM has established agreements with state agencies to support long-term surveillance and maintenance activities at the Plowshare, Vela Uniform, and Weapons Related sites that had underground or aboveground nuclear testing.

- The Alaska sites (Amchitka and Chariot) are managed in consultation with the Alaska Department of Environmental Conservation, following its Contaminated Sites Voluntary Cleanup Program for the surface cleanups.
- The surface and subsurface of the three sites in Nevada (Central Nevada Test Area, Shoal, and the Tonopah Test Range) are managed under the Federal Facility Agreement and Consent Order, which is administered by the Nevada Division of Environmental Protection.
- Two Colorado sites (Rio Blanco and Rulison) are managed in partnership with the Colorado Energy and Carbon Management Commission.
- The surface at the site in New Mexico (Gnome-Coach) is managed under the Voluntary Remediation Program of the New Mexico Environment Department. LM remains responsible for monitoring project-related subsurface contamination.
- Ownership of the Salmon site was transferred to the state of Mississippi, which operates the area as a demonstration forest. LM collaborates with the Mississippi Department of Health regarding operations and management of the Salmon site.
- Four sites, located in Utah (Utah), Colorado (Bronco), Idaho (Pre-Schooner II), and Montana (Pre-Gondola and Trencher), currently do not have active sampling or cleanup activities, but the Utah and Bronco sites have had wells recently abandoned in accordance with state guidelines. LM remains responsible for managing residual project-related contamination.

Legacy Management Activities

Surface remediation has been completed at all Plowshare, Vela Uniform, and Weapons Related sites used for underground or aboveground nuclear testing. DOE has established environmental monitoring programs to make sure people and the environment are protected from any residual contamination that remains at these sites. Long-term surveillance activities include site inspections, sampling, reporting the environmental sampling data, and maintaining institutional controls to make sure access to any contamination is controlled. Surface cleanups and long-term management of the sites have involved state agencies, stakeholder organizations, elected officials, and members of the public. Reports and other site records inform state agencies and stakeholders about LM activities at the Plowshare, Vela Uniform, and Weapons Related sites.

Contact Information

In case of an emergency at the site contact 911.

LM toll-free emergency hotline: **(877) 695-5322**

Information about LM is available at **www.energy.gov/lm**

For more information about LM activities, contact:

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