



Plowshare/Vela Uniform/Weapons Related Program

This fact sheet provides information about the Plowshare/Vela Uniform/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.

Program Information and Background

The Plowshare/Vela Uniform/Weapons Related (PVW) program consists of multiple sites within the United States where the U.S. Atomic Energy Commission (AEC), a predecessor agency to the U.S. Department of Energy (DOE), considered, planned, or conducted experiments and underground nuclear and nonnuclear tests. AEC conducted these activities during the 1960s and 1970s under three distinct government programs — Plowshare, Vela Uniform, and Weapons Related. These programs had distinct purposes, and some of the sites had multiple tests that were conducted under different programs. DOE maintains responsibility for radioactive material at these sites under the authority of the Atomic Energy Act of 1954 as amended under Title 42 United States Code, Section 2011.

Plowshare Program

The Plowshare Program was a research and development project initiated by AEC in 1957, designed to explore the technical and economic feasibility of using nuclear explosives for peaceful purposes. It was named after the biblical phrase “beating swords into plowshares,” symbolizing a move toward peace. The program explored the use of nuclear detonations for civil works projects, such as constructing dams, harbors, canals, highways, and railroads, and for industrial applications aimed at enhancing ore, oil, and gas production. Sites used for Plowshare-related testing include:

- Bronco, Colorado, Site
- Chariot, Alaska, Site
- Gasbuggy, New Mexico, Site
- Gnome-Coach, New Mexico, Site
- Pre-Gondola and Trencher, Montana, Site
- Pre-Schooner II, Idaho, Site
- Rio Blanco, Colorado, Site
- Rulison, Colorado, Site
- Utah, Utah, Site
- Plowshare/Vela Uniform Records, Colorado, Sites

Vela Uniform

The Vela Uniform program was an element of Project Vela, conducted jointly by AEC and the U.S. Department of Defense (DOD) from 1963 to 1971. Its purpose was to develop the technology to detect and identify clandestine nuclear detonations, both underground and underwater. The program emerged from treaty negotiations aimed at ending nuclear weapons testing in the atmosphere, outer space, and underwater. The U.S. insisted there would have to be a proven verification method to reach this type of agreement. To achieve this, AEC and DOD conducted underground nuclear and nonnuclear tests. Seismic data gathered from these tests was analyzed to differentiate underground nuclear tests from other seismic events (such as earthquakes) and to identify underground nuclear test sites.

The sites used for Vela Uniform-related testing include:

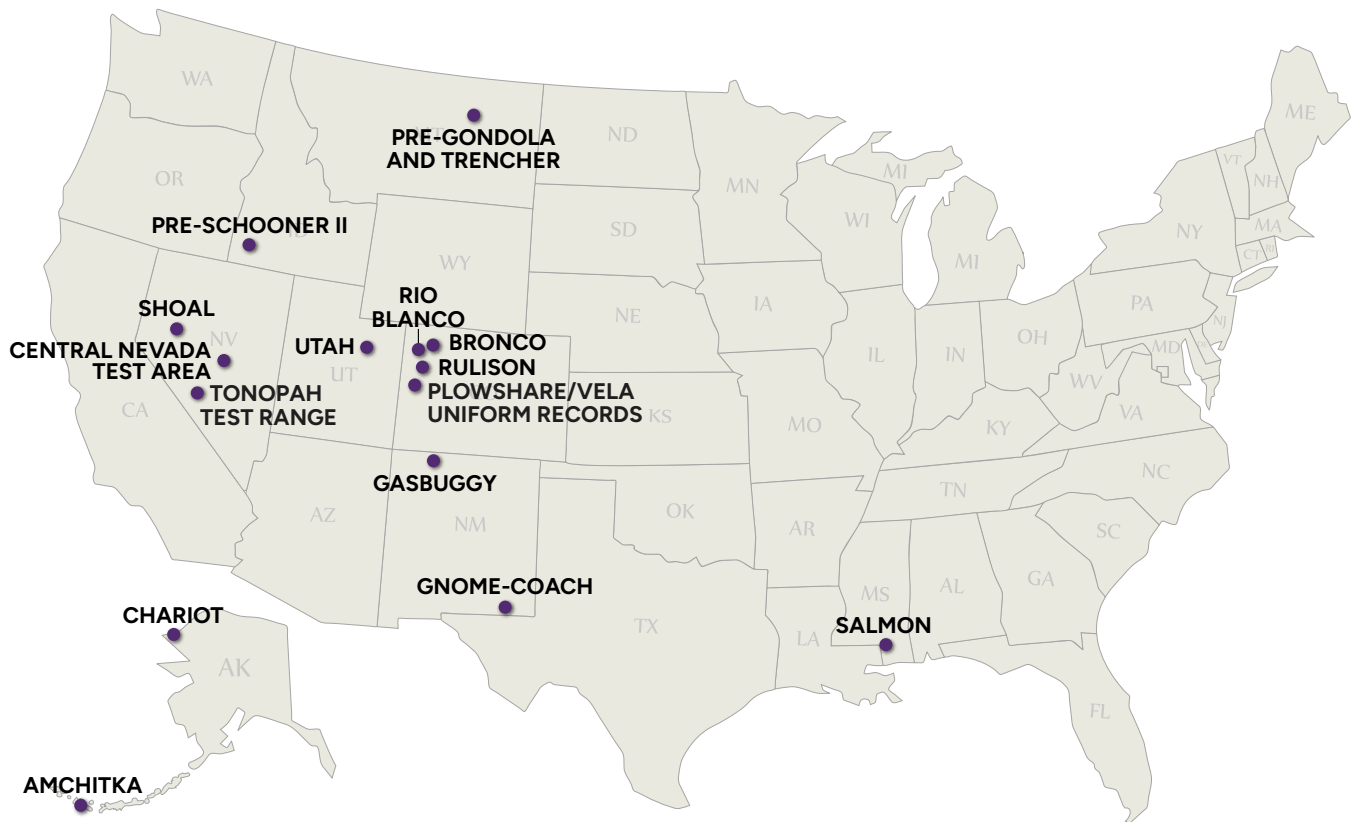
- Amchitka, Alaska, Site
- Salmon, Mississippi, Site
- Shoal, Nevada, Site
- Plowshare/Vela Uniform Records, Colorado, Site

Weapons Related

The Weapons Related program played a critical role in advancing nuclear technology by gathering data on nuclear devices. The tests under this program were either atmospheric or underground and were conducted to test nuclear devices intended for a specific weapons system. This was typically a joint effort, with AEC collaborating closely with DOD.

The sites used for Weapons Related testing included:

- Amchitka, Alaska, Site
- Central Nevada Test Area, Nevada
- Tonopah Test Range, Nevada, Site



Plowshare/Vela Uniform/Weapons Related sites.

Current Site Conditions

Operations at the PVW sites ended by the late 1970s. After testing ended, DOE completed surface cleanups in partnership with the states or other federal agencies. Site-specific Long-Term Surveillance and Maintenance Plans were then developed to monitor the sites where project-related contamination remains from underground nuclear tests.

LM implements various measures based on each site's specific needs. These may include environmental monitoring programs, site inspections, maintenance of institutional controls, review and reporting of environmental monitoring data, management of site records and data, and ensuring the site's long-term integrity.

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 nuclear test in U.S. history.
- **Central Nevada Test Area, Nevada:** Located in Nye County, Nevada. AEC planned for three underground nuclear tests, but only one test (Faultless) was conducted under the Weapons Related program. The purpose was to evaluate the suitability of the site for high-yield underground nuclear testing.
- **Chariot, Alaska, Site:** Located in northwest Alaska. The idea was to create a harbor using nuclear technology under the Plowshare Program. AEC didn't conduct any nuclear tests due to technical issues and stakeholder concerns, but the U.S. Geological Survey (USGS) conducted a five-day radioactive tracer test to evaluate the mobility of radionuclides in various media. The region is about 125 miles north of the Arctic Circle.
- **Gasbuggy, New Mexico, Site:** Located in Rio Arriba County, in northern New Mexico. One nuclear device was detonated underground in an attempt to stimulate the production of natural gas from the deeply buried, low-permeability formations below the site. The test was conducted in partnership with other federal agencies and private companies. Project Gasbuggy was the first of three natural gas stimulation projects conducted under the Plowshare Program.

- **Gnome-Coach, New Mexico, Site:** Located in Eddy County, New Mexico. AEC detonated a nuclear device in an underground salt deposit (the Salado Formation) for the purpose of collecting data to support other Plowshare projects. As part of the project, USGS conducted a groundwater tracer test using four radionuclides. This was the first underground nuclear test conducted as part of the Plowshare Program.
- **Rio Blanco, Colorado, Site:** Located in Rio Blanco County, Colorado. AEC detonated three nuclear devices underground almost simultaneously in a single borehole as part of the Plowshare Program. The objective of the project was to stimulate the flow and recovery of natural gas from the low-permeability geologic formations beneath the site. The project was conducted within the Piceance Basin, which is a geologic structure that contains significant hydrocarbon reserves.
- **Rulison, Colorado, Site:** Located in Garfield County, Colorado. The purpose of Project Rulison was to release commercially marketable quantities of natural gas from low-permeability geologic formations beneath the site. AEC, in partnership with private energy companies, conducted the underground nuclear test as part of the Plowshare Program. It was the deepest underground nuclear test in the continental United States.
- **Salmon, Mississippi, Site:** Located in Lamar County, Mississippi. AEC and DOD conducted Project Dribble, which consisted of 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), referred to as Project Miracle Play, in the detonation cavity created by the Salmon test.
- **Shoal, Nevada, Site:** Located in Churchill County, Nevada. The Project Shoal underground nuclear test was part of the Vela Uniform program, sponsored jointly by AEC and DOD. Conducted in a seismically active region, this detonation improved the country's ability to detect, identify, and locate underground nuclear detonations. In 2000, the surface of the Shoal site and surrounding area was reserved for the U.S. Navy.
- **Tonopah Test Range, Nevada, Site:** Located in Nye County, Nevada. AEC used the site to test ballistics and nonnuclear components of atomic weapons as part of the Weapons Related program. The Tonopah Test Range site consists of 40 areas used for testing and support activities. The range is within the boundaries of the Nevada Test and Training Range, which is managed by the U.S. Air Force.
- **Utah, Utah, Site:** Located in Uintah County, Utah. This project was begun under the Plowshare Program but was not carried out. The objective of the project was to assess the feasibility of increasing oil recovery by detonating an underground nuclear device. The Uinta Basin is a geologic structure that contains significant hydrocarbon reserves that are owned by the state. An existing lease allows for the exploration and production of oil and gas reserves.
- **Bronco, Colorado, Site:** Located in Rio Blanco County, Colorado. The objective of Project Bronco was to detonate an underground nuclear device to extract oil from the oil shales beneath the site as part of the Plowshare Program. AEC drilled three wells, intending to study the geology and hydrogeology of the site. The project was later canceled. Project Bronco was a joint operation between AEC, the U.S. Bureau of Mines, and CER Geonuclear Corporation, which represented 18 oil companies.
- **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 chemical explosives in various materials. Project Pre-Gondola and Project Trencher were separate projects within the Plowshare Program that were combined due to their shared use of nitromethane explosives.
- **Pre-Schooner II, Idaho, Site:** Located in Owyhee County, Idaho. The Pre-Schooner II project was part of the Plowshare Program. The nonnuclear experiment was conducted to learn about cratering in hard, dry rock and to inform future nuclear tests. This nonnuclear explosive test served as a precursor to the Schooner nuclear test at the National Nuclear Security Site (formally the Nevada Test Site) in 1968.
- **Plowshare and Vela Uniform Records, Colorado, Sites:** The 165 projects that comprise the records sites were all nonnuclear, and many of the projects did not progress beyond the proposal or planning phase. The projects were within the United States and were part of the Plowshare Program, Vela Uniform program, or both. LM maintains historic records for the projects in Grand Junction, Colorado, to support stakeholder inquiries.

Legacy Management Activities

The DOE Office of Legacy Management conducts long-term surveillance activities that include inspections, sampling, reporting, records management, and maintaining institutional controls that ensure access to any remaining contamination is controlled. These activities are conducted in accordance with the site-specific long-term surveillance plan for each site. Reports and environmental monitoring data are available on the Office of Legacy Management public website for each site.

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:

**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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