Fact Sheet

U.S. DEPARTMENT OF ENERGY | Legacy Management

Rio Blanco, Colorado, Site

A Plowshare Site/Offsite

This fact sheet provides information about the **Rio Blanco, Colorado, 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 Rio Blanco, Colorado, Site is located in the Piceance Basin of northwestern Colorado at an elevation of 6,600 feet and about 52 miles north-northeast of the city of Grand Junction. The Piceance Basin is a geologic structure that contains significant hydrocarbon reserves.

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). On May 17, 1973, the U.S. Atomic Energy Commission, in partnership with CER Geonuclear Corporation and Continental Oil Company (Conoco), detonated three nuclear devices nearly simultaneously for the purpose of stimulating the flow of natural gas in low-permeability geologic formations below the Rio Blanco site.

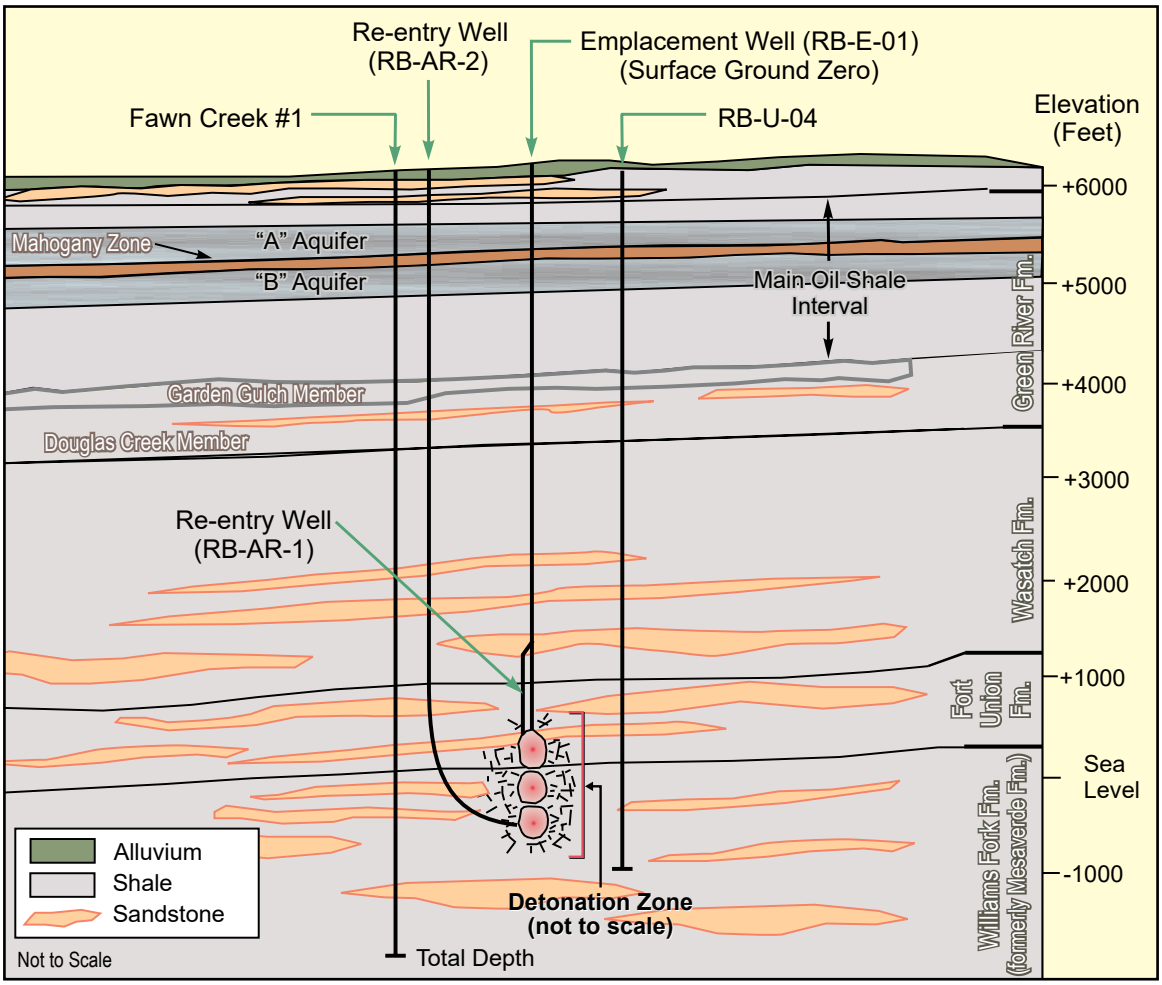
This was the third and final natural gas reservoir stimulation test in the Plowshare Program, which was designed to find peaceful ways to use nuclear energy. The two previous tests were Project Gasbuggy in New Mexico and Project Rulison in Colorado.

The detonations took place at depths of 5,840; 6,230; and 6,690 feet in a single emplacement well and fractured the gas-bearing sandstones at the base of the Fort Union Formation and the upper part of the Williams Fork Formation. They produced extremely high temperatures that vaporized the surrounding rock, temporarily creating a cavity at each depth. The fractured rock above each cavity collapsed shortly after the detonation, filling the cavity with rubble and forming a collapse chimney above each detonation point. It was expected that the collapse chimneys would be connected, allowing for improved gas production from the fractured rock surrounding each one.

Two re-entry wells were drilled into separate collapse chimneys and tested to figure out how successful the test was at improving natural gas production. The first re-entry well (RB-AR-1) was drilled into the upper chimney. The well produced 97.7 million cubic feet of natural gas over 28 days of testing in November 1973 and February 1974. The second re-entry well (RB-AR-2) was drilled into the lower chimney and tested to figure out if the detonations created a continuous chimney. The well produced 27 million cubic feet of natural gas over seven days of testing in December 1974. The gas produced during the production tests was flared to the atmosphere, and samples of the gas and water were analyzed to find out how radioactivity levels changed during testing. The U.S. Environmental Protection Agency (EPA) National Environmental Respiratory Center and the Colorado Department of Public Health and the Environment (CDPHE) monitored all releases during drilling and testing to protect workers at the site, the public, and the environment. As expected, the radioactivity levels decreased throughout the testing as gas from the chimney region was produced, burned, and replenished with uncontaminated gas from the surrounding formation. The testing found that the chimneys were not connected and that fracturing from the three detonations did not extend outward as far as predicted.

Surface Conditions

AEC began decommissioning and cleaning up the site in May 1976. Personnel removed structures used during the test and injected liquid waste from the test and site decommissioning into the Fawn Creek Government Well #1. The emplacement well (RB-E-01), wells RB-AR-1, RB-AR-2, and RB-U-04, and other



Generalized cross section of the Rio Blanco, Colorado, Site.

wells not planned for long-term monitoring were plugged and abandoned during the cleanup that was completed in November 1976. The Fawn Creek #1 well was closed in 1977, and then plugged and abandoned in June 1986.

DOE completed a corrective-action investigation and risk assessment in 2002. The final investigation report concluded that no corrective actions were needed and that no surface-use restrictions should be placed on the site. The Colorado Department of Public Health and Environment reviewed and approved the report in 2003.

Subsurface Conditions

The detonations took place in the upper Williams Fork and lower Fort Union Formations. These formations are not very permeable, so test-related radionuclides are not expected to travel far from the source area. The only aquifers in the area are in the surficial alluvium and the underlying Green River Formation. The base of the Green River Formation is about 3,000 feet above the depth of the detonations.

Long-Term Hydrologic Monitoring Program

EPA monitored groundwater and surface water annually at and near the Rio Blanco site from 1976 until 2008 as part of its Long-Term Hydrologic Monitoring Program. In 2006, the site was transferred to the DOE Office of Legacy Management (LM) for long-term care. In 2020 LM refined the monitoring program, focusing on wells located on-site. Annual monitoring continues at the site. No radioactive contamination from the underground nuclear test has been found in any samples since monitoring began in 1976. The results of the annual monitoring are available online at https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Rio_Blanco.

Land Use and Institutional Controls

The main land uses in the area are livestock grazing and recreation; oil and gas leases are in place for the area surrounding the site.

AEC withdrew 360 acres of land from the public domain in 1972. In September 2003, Public Land Order 7582 renewed the withdrawal for 50 years. This Public Land Order withdraws 200 acres of public land from surface entry and mining, and also withdraws 160 acres of reserved federal mineral interests

from mining — all subject to valid and existing rights. The U.S. Bureau of Land Management has jurisdiction over the surface management of the 200 acres, and the remaining 160 acres are privately owned. Written permission from DOE is required before a mineral lease or interests can be exercised within the 360-acre withdrawal that include parts of sections 10, 11, 14, and 15, Township 3 South, Range 98 West of the 6th Principal Meridian.

A monument at the emplacement location provides details of the underground nuclear test and states that no excavation, drilling, or removal of subsurface material to a depth of 1500 feet is allowed within 100 feet of the location and that no excavation, drilling, or removal of subsurface materials between the depths of 1500 feet and 7500 feet is allowed within a 600-foot radius.

Regulatory Setting

DOE is responsible for protectiveness of the environmental remedy and project-related contaminants at the Rio Blanco site. Long-term surveillance is a collaborative effort involving CDPHE and the Colorado Energy and Carbon Management Commission. LM is responsible for long-term management of the site.

Legacy Management Activities

LM monitors the Rio Blanco site to make sure conditions at the site remain protective of human health and the environment. Surveillance and monitoring activities include annual site visits and sampling of the groundwater wells at the site. Results from these activities are documented in the annual monitoring reports for the site.

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 **Rio Blanco, Colorado, Site**, are available on the LM website at **www.energy.gov/lm/rio-blanco-colorado-site**

For more information about LM activities at the **Rio Blanco, Colorado, 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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