



Rio Blanco, Colorado, Site

FACT SHEET

*This fact sheet provides information about the Rio Blanco, Colorado, Site.
This site is managed by the U.S. Department of Energy Office of Legacy Management.*

Site Description and History

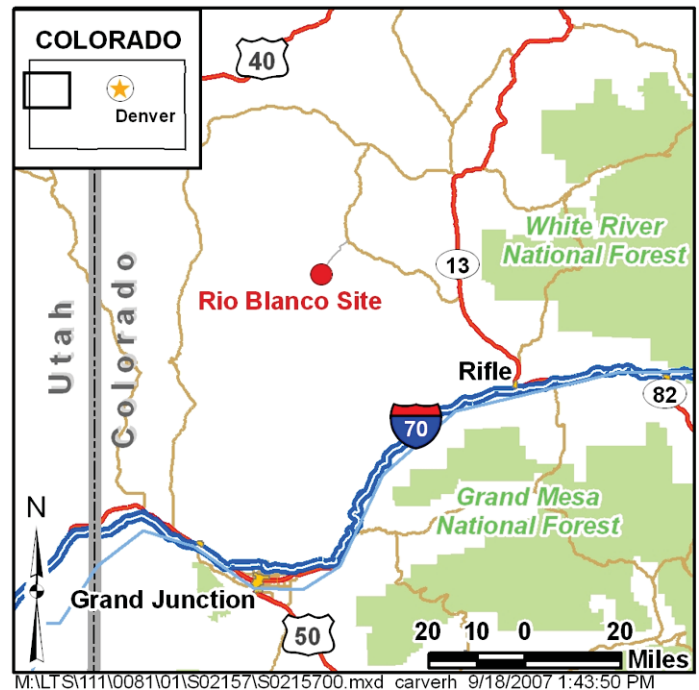
The Rio Blanco Site is located 6,600 feet above sea level in the Piceance Basin in northwestern Colorado, about 52 miles north-northeast of Grand Junction, Colorado.

On May 17, 1973, the U.S. Atomic Energy Commission (AEC), predecessor agency of the U.S. Department of Energy (DOE), detonated three 33-kiloton nuclear devices nearly simultaneously in a single emplacement well at depths of 5,838, 6,230, and 6,689 feet below the ground surface at the Rio Blanco Site. The tests were conducted in fine-grain, low-permeability sandstone lenses at the base of the Fort Union Formation and the upper portion of the Mesaverde Formation. This was the third and final natural-gas-reservoir stimulation test in the Plowshare Program, which was designed to develop peaceful uses for nuclear energy. The two previous tests were Project Gasbuggy in New Mexico and Project Rulison in Colorado. The AEC conducted the test in partnership with CER Geonuclear Corporation and Continental Oil Company (Conoco).

The purpose of the Rio Blanco test was to stimulate the flow of natural gas in low-permeability geologic formations. The detonations were designed to create three blast cavities, each with a diameter of about 150 feet. The explosions were expected to create a rubble chimney above each cavity, and the three chimneys were expected to join.

Each downhole explosive package had two major parts: the nuclear device assembly, which was encapsulated in a 30-foot-long canister, and a cooling system, which consisted of one 33-foot-long water tank and three absorber tanks, each about 36 feet long. A tracer gas emplaced with the explosive package would be used to verify that the rubble chimneys were connected. An armored coaxial cable connected all the downhole systems to control equipment on the surface.

The detonations initially stimulated gas flow from the upper chimney in above-average quantities, but the pressure dropped 40 percent during post-detonation tests. The natural gas produced was also radioactive. Tracer gases indicated a lack of post-detonation interconnection between the chimneys. The conclusion was that fracturing did not extend outward as far as



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predicted. Results of subsequent hydraulic fracturing and production tests in a test well installed outside the blast zone were also disappointing.

AEC began decommissioning the site in 1975, and surface cleanup and restoration were completed in 1976. One of the test wells was used for injection of contaminated liquid waste from test and decontamination operations. The emplacement well (surface ground zero) and test wells were plugged and decommissioned.

Surface Conditions

Fawn Creek is the only surface water in the site area. The creek flows intermittently but supports common wetland plant species. Fawn Creek is the only wetlands close to the Rio Blanco Site.

A corrective action investigation and risk assessment completed in 2002 at the Rio Blanco Site concluded that no gamma-emitting radionuclides in concentrations above background levels were present in site soil or ground water. Lead and petroleum hydrocarbons were detected in several soil samples collected more than

12 feet below ground surface. The risk assessment indicated that these contaminants do not present a significant risk to human health. The investigation report concluded that no corrective actions were required and that no surface-use restrictions should be placed on the site. The Colorado Department of Public Health and Environment concurred.

A permanent monument consisting of a brass plaque mounted in a concrete base was emplaced 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

No feasible technology exists for removing test-related radioactivity from the subsurface.

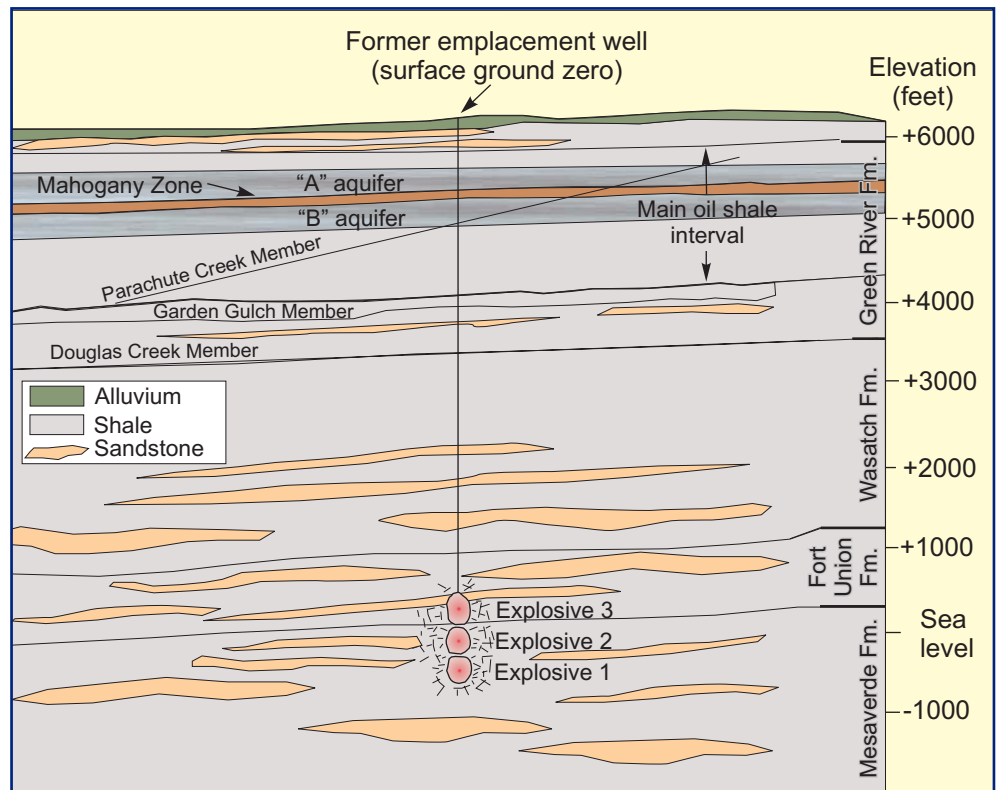
Because the detonations took place in low-permeability, low-transmissivity shale and claystone formations with sandstone lenses, test-related radionuclides are not expected to travel far from the source area. The only aquifers identified in the area are present in the surficial alluvium and the underlying Green River Formation. The base of the Green River Formation is about 3,000 feet above the depth of the detonations.

Land Use

The principal land uses in the area are livestock grazing and recreation; oil and gas leases exist for the area surrounding the Rio Blanco Site. The Green River Formation, which underlies the surficial alluvium in the region, contains rich layers of oil shale, a potentially valuable resource.

Institutional Controls

The current institutional controls at the site include no subsurface intrusion within a radius of 100 feet from the monument (surface ground zero) to a true vertical depth of 1,500 feet and no subsurface intrusion within a radius of 600 feet from the monument to a true vertical depth between 1,500 feet and 7,500 feet without permission of the U.S. Government.



Generalized Cross Section of the Rio Blanco, Colorado, Site

Long-Term Hydrologic Monitoring Program

Since 1972, the U.S. Environmental Protection Agency (EPA) has annually monitored ground water and surface water at and near the Rio Blanco Site as part of a long-term hydrologic monitoring program. EPA annually samples 15 locations on and around the site, including 4 springs, 4 surface sites, and 5 wells, 3 of which are located near surface ground zero. No radioactive materials attributable to the Rio Blanco test have been detected in water samples.

Regulatory Setting

In preparation for Project Rio Blanco, AEC withdrew 360 acres of land from the public domain in 1972. Public Land Order 7582 was issued in September 2003 to renew the withdrawal for 50 years. The federal government holds all surface and subsurface rights on 200 acres and only mineral rights on an adjacent 160 acres. DOE is responsible for the radioactive and other hazardous materials generated by DOE and predecessor agencies at the Rio Blanco Site.

Legacy Management Activities

On October 1, 2006, responsibility for the Rio Blanco Site transferred from the DOE Office of Environmental Management to the DOE Office of Legacy Management. The Office of Legacy Management 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, (5) enforcement of institutional controls at the site, and (6) responding to stakeholder inquiries.

Contacts

Documents related to the Rio Blanco Site are available on the DOE Office of Legacy Management website at http://www.lm.doe.gov/rio_blanco/Sites.aspx.

For more information about DOE Office of Legacy Management activities at the Rio Blanco Site, contact

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