

Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project at Gunnison, Colorado

This fact sheet provides information about the UMTRA Ground Water Project site located at Gunnison, Colorado. The U.S. Department of Energy Grand Junction Office in Grand Junction, Colorado, manages the UMTRA Ground Water Project.

Background

Uranium ore was mined in significant quantities in the United States for more than 40 years. Initially, the ore was mined and milled by private companies for Federal Government use in national defense programs. After the 1950s, uranium was also needed as fuel for nuclear power plants to produce electricity.

Most of the uranium was extracted from the ore through the milling process and sandlike material called "tailings" remained. The tailings contain low concentrations of naturally occurring uranium that radioactively decays into radium that decays to radon, a radioactive gas. In addition, the tailings contain trace metals associated with the ore and residual chemicals that remained from the milling process. Over time, seepage from the tailings pile resulted in contaminated ground water beneath the uranium-processing site.

Scientists, community leaders, and public officials became more aware of the potential health risks associated with long-term exposure to uranium mill tailings during the 1970s. Public concern about potential human health and environmental effects of uranium mill tailings led the U.S. Congress to pass the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), which required the cleanup of inactive uranium-ore processing sites.

In 1983, the U.S. Environmental Protection Agency (EPA) developed regulations to protect the public and the environment from potential radiological and non-radiological hazards at abandoned uranium-ore processing sites. The U.S. Department of Energy (DOE) is responsible for cleaning up the sites and for bringing ground-water contamination at the former processing sites into compliance with EPA standards.

As a second phase of the Uranium Mill Tailings Remedial Action (UMTRA) Project, DOE established the UMTRA Ground Water Project to ensure that the ground-water compliance standards are achieved. In 1992, DOE prepared the *Programmatic Environmental Impact Statement* (PEIS) with full participation by affected Native American tribes, States, relevant Federal agencies, and other stakeholders. The PEIS presents

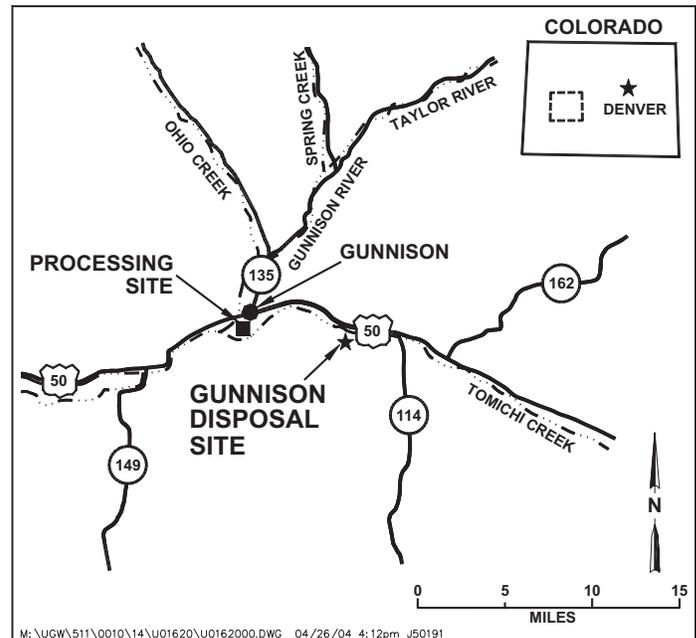


Figure 1. Location of Gunnison UMTRA Ground Water Project Site

analyses of different alternatives that would meet the EPA standards and the potential adverse environmental impacts associated with each alternative. The final PEIS was issued in December 1996 after 19 public scoping meetings (including 1 meeting in Gunnison), a 120-day public comment period, and 9 public hearings (including 1 hearing in Gunnison). DOE published the *Record of Decision* for the former millsites in April 1997. Responsibility for the UMTRA Ground Water Project was assigned to the DOE Grand Junction Office (GJO) in 1996.

Site Description and History

The Gunnison UMTRA Ground Water Project site is a former uranium-ore processing site located on a 61.5-acre tract of land between the Gunnison River and Tomichi Creek, just southwest of the Gunnison city limits (see Figure 1). The site is bordered on the north and east by Gold Basin Road (County Road 38) and the Gunnison County Airport. The original northern portion of the site was deeded to Gunnison County for airport expansion and is currently behind the airport fence. An

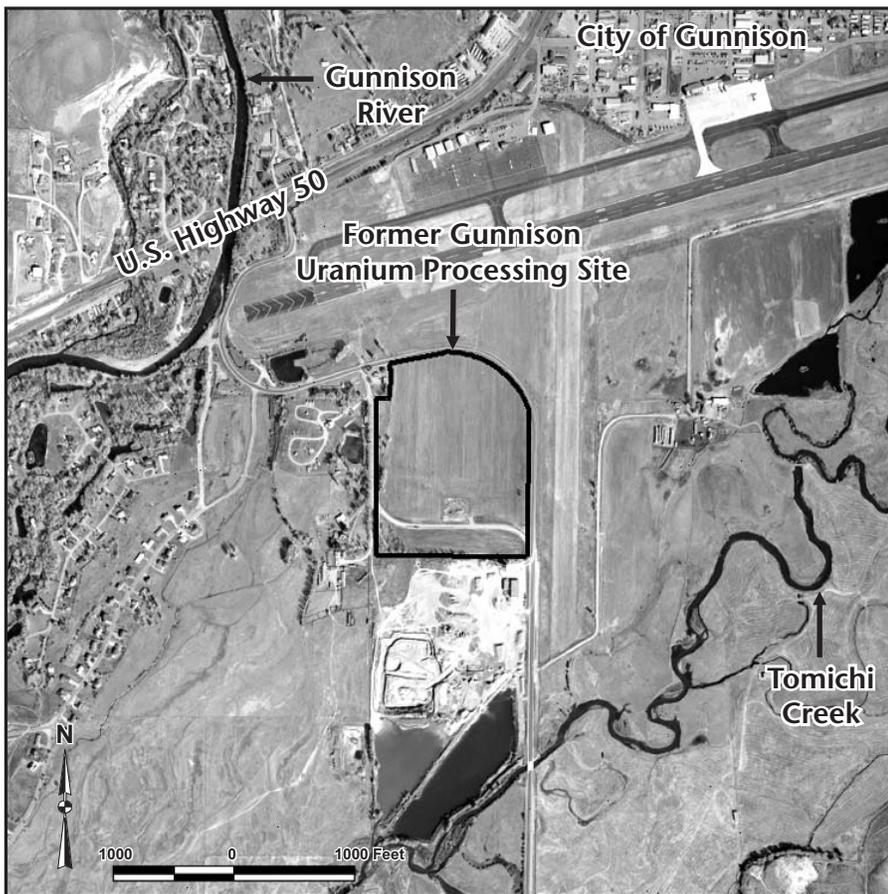


Figure 2. Aerial Photograph of the Gunnison Area

active gravel-mining operation, owned by Valco, Inc., bounds the site to the south and southwest. Commercial and residential properties lie directly west of the site.

Uranium ore from the Cochetopa Pass area was processed at the Gunnison mill from 1958 through 1962. During its 4-year lifetime, the mill processed approximately 540,000 dry tons of ore that averaged 0.14 percent uranium oxide. From 1992 to 1995, the tailings and other contaminated materials were removed from the millsite and stabilized in a disposal cell 6 miles east of Gunnison. Prior to surface remediation, ownership of the site was transferred to the State of Colorado and was deeded to Gunnison County in December 1999.

Ground water beneath and downgradient from the site occurs in the alluvial aquifer with an average depth to the water table of 5 feet. The alluvium is composed of poorly sorted sediments ranging from clay-sized material through sand and gravel, with cobbles and occasional boulders. The alluvium is more than 100 feet thick in the vicinity of the site. In general, ground water flows to the southwest. The shallow ground water beneath the site was contaminated by seepage from past operations and the tailings piles at the site.

Constituents of concern in the ground water are uranium and manganese. This means that the EPA maximum concentration limits or risk-based levels (also known as ground-water standards) have been exceeded for these constituents. Uranium concentrations exceed the ground-water standard in a plume that extends to approximately 1,000 feet south of the site boundary. Uranium concentrations that are above those found in background water samples but below the EPA acceptable limits extend in a plume approximately 7,000 feet to the south and southwest of the site boundary. The zone of contamination becomes more dilute and migrates deeper into the aquifer as it progresses southward, therefore there are no effects on shallow wells or surface water.

A water distribution system was partially funded by DOE and installed in 1994 to supply drinking water to all areas potentially impacted by uranium processing activities. Most of the residences are hooked up to the water system. Expansion of the existing water distribution is being negotiated with Gunnison County in exchange for

effective and enforceable institutional controls in the vicinity of the processing site.

Compliance Strategy

DOE-GJO ground-water investigations for the Gunnison processing site are complete. The compliance strategy is natural flushing in conjunction with institutional controls and continued ground-water and surface-water monitoring. Ground-water sampling and analysis indicate that contaminant concentrations are decreasing over time. Ground-water modeling results (i.e., computer simulations) predict that contaminant levels at the Gunnison site will naturally decrease to acceptable levels within the 100-year time frame allowed under the law.

Institutional Controls

Institutional controls are “checks and balances” that effectively protect public health and the environment. Typically, institutional controls depend on some legal order such as zoning ordinances and laws to ensure that protection is effective. The U.S. Environmental Protection Agency (EPA) standards permit the use of institutional controls at sites where “passive remediation” can occur through natural flushing of the

aquifer within 100 years. Institutional controls may also be used to protect public health or the environment if at any time during the cleanup process the U.S. Department of Energy (DOE) finds them necessary and appropriate.

For the UMTRA Ground Water Project, institutional controls would reduce exposure to or reduce health risks by (1) preventing inappropriate intrusion into contaminated ground water or (2) restricting access to or use of contaminated ground water for unacceptable purposes (domestic-household use).

The EPA standards require that institutional controls

- Have a high degree of permanence.
- Protect public health and the environment.
- Satisfy beneficial uses of ground water.
- Are enforceable by administrative or judicial branches of government entities.
- Can be effectively maintained and verified.

EPA recognizes that a combination of controls may be needed to protect public health and safety. Key to identifying, implementing, and enforcing institutional controls is participation by local and state governments in the development process. While DOE is responsible for compliance with the EPA standards at UMTRA Ground Water Project sites, its authority to implement and enforce institutional controls is limited. This is particularly true where ground-water contamination from uranium processing may have moved beyond the millsite to areas that are not within the DOE jurisdiction.

The need for, and the duration of, institutional controls depends on the compliance strategy selected for a site, the type and level of risk to humans and the environment, and existing site conditions. Movement of contaminated ground water may require restrictions for an extended period of time. As risks decrease over time, so should the need for institutional controls. Therefore, to ensure protection of human health and the environment and to satisfy requirements for beneficial uses of the water, it is important that the effectiveness of institutional controls be verified and modified as necessary.

DOE is working with Gunnison County to establish administrative restrictions to prevent access to contaminated ground water. Because drilling wells for domestic usage will be restricted, DOE has committed funds to extend the Dos Rios water system into areas where site-related ground water contamination exists.

Through Gunnison County's ordinance process, input will be solicited from landowners and local entities. The final institutional controls selected for the Gunnison site will need to be approved by the U.S. Nuclear Regulatory Commission.

Long-Term Surveillance and Maintenance

Once the compliance strategy has been finalized, it is the responsibility of DOE to ensure that the selected compliance strategy continues to be protective of human health and the environment. Ground water sites become part of the Long-Term Surveillance and Maintenance (LTSM) Program administered by the DOE Grand Junction Office. The LTSM Program manages the site according to a Long-Term Surveillance Plan prepared specifically for the Gunnison site; activities will include ground water monitoring.

Documents Available

- *UMTRA Ground Water Project, Final Site Observation Work Plan for the Gunnison, Colorado, UMTRA Project Site, March 2001*
- *UMTRA Ground Water Project, Environmental Assessment of Ground Water Compliance at the Gunnison, Colorado, UMTRA Project Site, July 2002*
- *Finding of No Significant Impact, August 2002*

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