UMTRCA Title I

Gunnison, Colorado, Processing and Disposal Sites

This fact sheet provides information about the Uranium Mill Tailings Radiation Control Act of 1978 Title I processing site and disposal site at Gunnison, Colorado. These sites are managed by the U.S. Department of Energy Office of Legacy Management.

Site Description and History

The Gunnison, Colorado, Processing Site is a former uranium-ore processing site on a 61.5-acre tract of land adjacent to the Gunnison County airport, one-half mile southwest of the city of Gunnison, Colorado. The former mill processed approximately 540,000 tons of uranium ore between 1958 and 1962 and provided uranium for national defense programs. Radioactive mill tailings, a predominantly sandy material, covered approximately 39 acres at the mill site. Uranium-ore processing activities resulted in contaminated groundwater beneath the site. The State of Colorado acquired ownership of the Gunnison processing site in 1990; ownership of the site has since been transferred to Gunnison County.

From 1992 to 1995, tailings and other contaminated materials were removed from the Gunnison processing site and local contaminated vicinity properties. Supplemental standards were applied to thorium-230 that was left in place on the processing site. Contaminated materials that were removed were transported to and stabilized in a disposal cell 6 miles east of Gunnison. The U.S. Department of Energy (DOE) completed construction of the disposal cell in 1995. The disposal cell occupies 29 acres of a 115-acre site that was transferred from the Bureau of Land Management to DOE.

Regulatory Setting

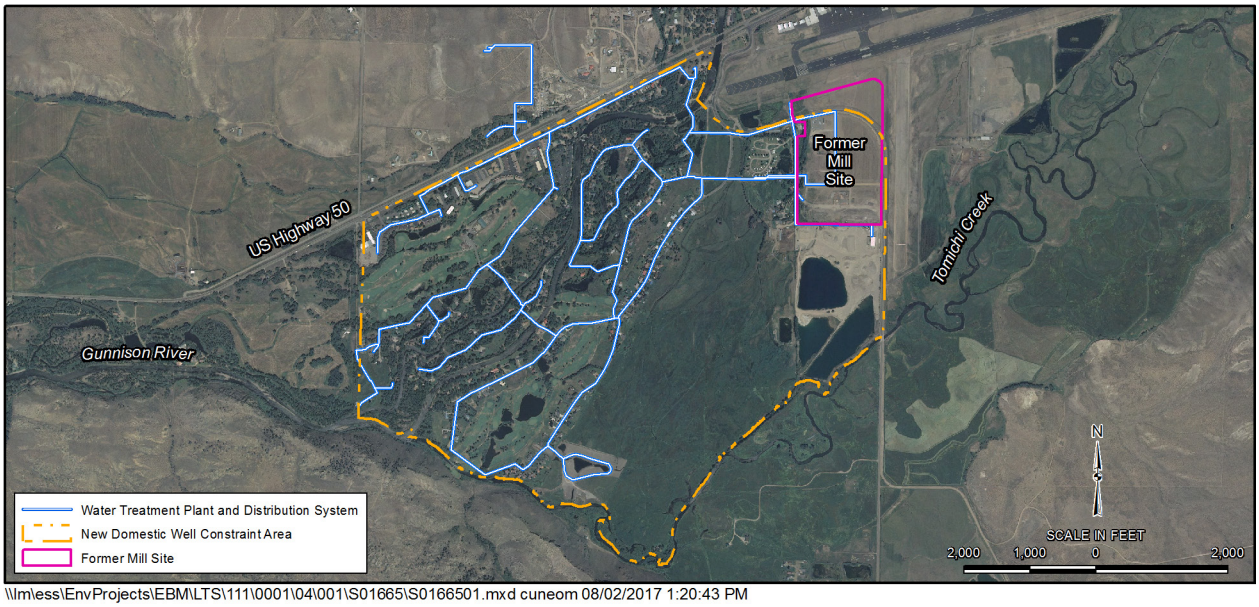
Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978 (Public Law 95-604), and DOE remediated 22 inactive uranium-ore processing sites under the Uranium Mill Tailings Remedial Action Project in accordance with standards promulgated by the U.S. Environmental Protection Agency (EPA) in Title 40 *Code of Federal Regulations* (CFR), Part 192. Subpart B of 40 CFR 192 regulated cleanup of contaminated groundwater

Location of the Gunnison, Colorado, Sites

at the processing sites. The radioactive materials were encapsulated in U.S. Nuclear Regulatory Commission (NRC)–approved disposal cells. The NRC general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Gunnison disposal site was included under the general license in 1997.

Processing Site

Past ore-processing operations and leachate from the tailings piles at the site contaminated the shallow groundwater



Institutional Control Boundary and Water Distribution System in the Gunnison Processing Site Area

beneath the site. Uranium is the primary constituent of concern in groundwater; uranium concentrations exceed the EPA groundwater standard in a plume that extends about 4,000 feet downgradient from the site. Uranium concentrations below the standard but above background levels have been identified in groundwater samples collected approximately 7,000 feet downgradient from the site.

Compliance Strategy

The current compliance strategy for groundwater remediation at the Gunnison processing site is natural flushing in conjunction with continued monitoring and institutional controls to prevent harmful exposure. Groundwater modeling predicted that uranium concentrations in groundwater beneath the Gunnison processing site will decrease naturally to acceptable levels within the 100-year time frame allowed by law; however, observed uranium concentration changes have not conformed to the groundwater model predictions, and it is unlikely that acceptable concentrations will be reached within the 100-year natural flushing time frame.

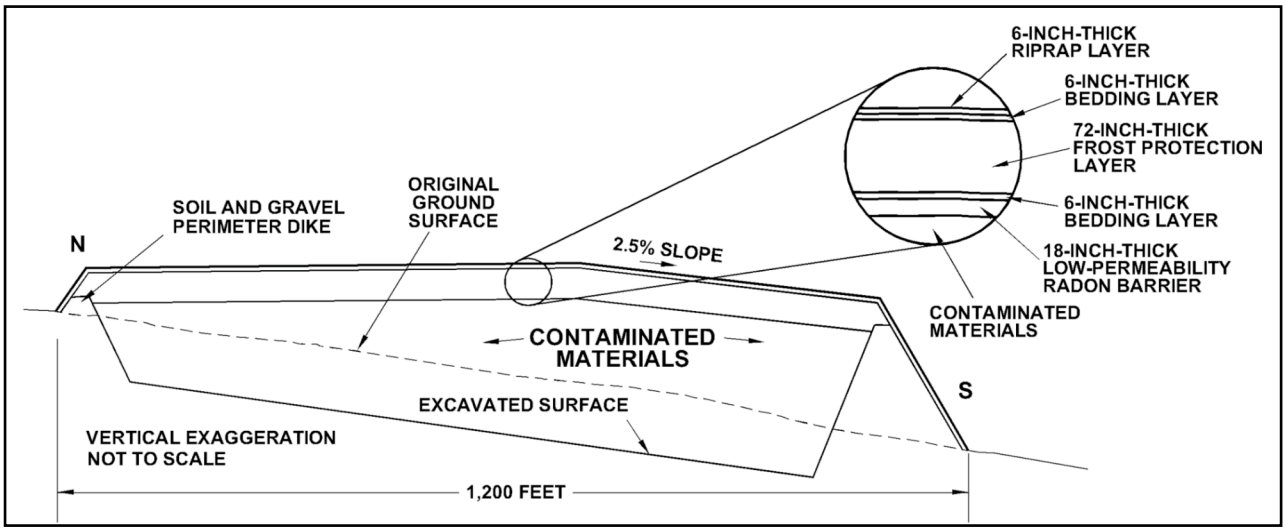
The current Groundwater Compliance Action Plan (GCAP) received concurrence for the natural flushing groundwater compliance strategy from NRC. An accepted alternative compliance strategy for sites where natural flushing is an inadequate remedy is the use of alternate concentration limits. Consequently, an update to the GCAP that proposes this strategy was submitted to NRC in May of 2017. DOE will continue to monitor groundwater and surface water on an annual basis as specified in the current GCAP until the new compliance strategy and associated monitoring program is approved.

Institutional Controls

At the Gunnison processing site, institutional controls are restrictions that protect human health and the environment by limiting access to contaminated groundwater. DOE encouraged public participation in the creation of institutional controls and held numerous meetings with citizens and representatives of the city and county to provide information and discuss the extent of the controls.

Institutional control within the former processing site boundary consists of a restriction that was placed in the deed when the former mill site was conveyed by quitclaim deed from the State of Colorado to Gunnison County. The county agrees not to use groundwater from the site for any purpose and not to construct wells or any means of exposing groundwater at the surface unless it receives prior written approval from the Colorado Department of Public Health and Environment (CDPHE) and DOE. In addition, the county agrees to obtain approval from CDPHE and DOE prior to any excavation or construction activities on the former mill site to ensure that the thorium-230 supplemental standards areas are accounted for and properly managed.

Because uranium contamination in the groundwater extends beyond the former processing site boundary, an offsite institutional control is also necessary. In November 2004, the county approved a resolution establishing the New Domestic Well Constraint Area. The purpose of the resolution was to ensure that contaminated water is not made available for domestic use. The resolution prohibits installation of new wells within the institutional control boundary. A water treatment plant, storage tank, and distribution system were partially funded by DOE and installed in 1994 to supply drinking water to all residences within the constraint area boundary. In 2004, DOE entered into a cooperative agreement with Gunnison County, approved by NRC, in which DOE (along with CDPHE) agreed to fund an extension of the domestic water supply system to account for potential future growth within the institutional control boundary (see figure above). Most domestic wells within the institutional control boundary are connected to the water system; domestic wells that are not connected to the water system are monitored to verify that uranium concentrations remain low and below the EPA groundwater standard.



North-South Cross Section of Gunnison Disposal Cell

Disposal Site

Excavation for the disposal cell began in 1992, and construction was completed in 1995. The disposal cell contains 1.14 million dry tons (approximately 740,000 cubic yards) of contaminated material, with a total activity of 175 curies of radium-226.

Tertiary Period gravels constitute the uppermost regional aquifer beneath the disposal site. Groundwater at the disposal site has not been contaminated by the disposal cell.

Disposal Cell Design

The pentagonal disposal cell measures approximately 1,200 feet by 1,140 feet, including the toe apron. The disposal cell is constructed partially below grade and rises to a maximum height of 50 feet above the surrounding ground surface. A posted wire fence surrounds the perimeter of the cell.

The cover of the disposal cell is a multicomponent system designed to encapsulate and protect the contaminated materials. The disposal cell cover comprises (1) a low-permeability radon barrier (first layer placed over compacted tailings) of compacted clayey soil amended with bentonite, (2) a bedding layer of sand and gravel placed as a capillary break, (3) a frost-protection layer of compacted soil, (4) another bedding layer of coarse sand and fine gravel that promotes drainage, and (5) a rock (riprap) erosion-protection layer.

A riprap apron surrounding the perimeter of the disposal cell provides erosion protection at the toe of the cell and channels runoff away from the cell. A rock-lined interceptor ditch drains the upslope portion of the disposal site to divert surface flow away from the cell. Disturbed areas were reseeded with native grasses.

Legacy Management Activities

The DOE Office of Legacy Management (LM) is responsible for ensuring that the selected groundwater compliance strategy at the Gunnison processing site continues to be protective of human health and the environment. LM will also monitor the effectiveness of institutional controls.

LM manages the disposal site according to a site-specific Long-Term Surveillance Plan to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site to evaluate the condition of surface features, performs site maintenance as necessary, and monitors groundwater every 5 years to verify the continued integrity of the disposal cell.

In accordance with 40 CFR 192.02(a), the disposal cell is designed to be effective for 1,000 years to the extent reasonably achievable and, in any case, for at least 200 years. However, the general license has no expiration date, and LM's responsibility for the safety and integrity of the Gunnison disposal site will last indefinitely.

Contacts

Site-specific documents related to the Gunnison processing and disposal sites are available on the LM website at https://www.lm.doe.gov/Gunnison/Disposal/Sites.aspx (disposal site), and https://www.lm.doe.gov/Gunnison/Processing/Sites.aspx (processing site).

For more information about LM activities at the Gunnison processing and disposal sites, contact:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way, Grand Junction, CO 81503

(970) 248-6070 (monitored continuously)
(877) 695-5322 (toll-free)