U.S. DEPARTMENT OF ENERGY | Legacy Management

Fact Sheet

UMTRCA Title I

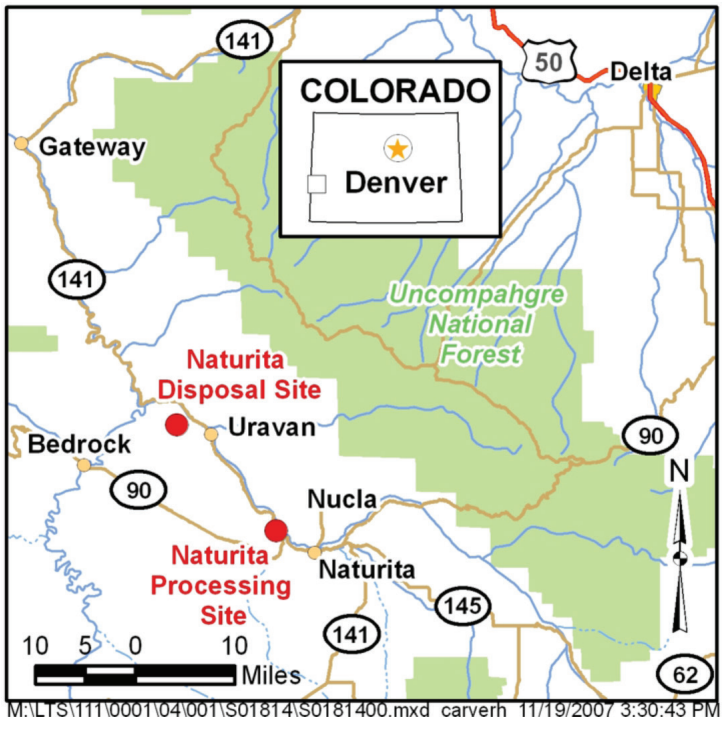
Naturita, Colorado, Processing and Disposal Sites

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

Site Description and History

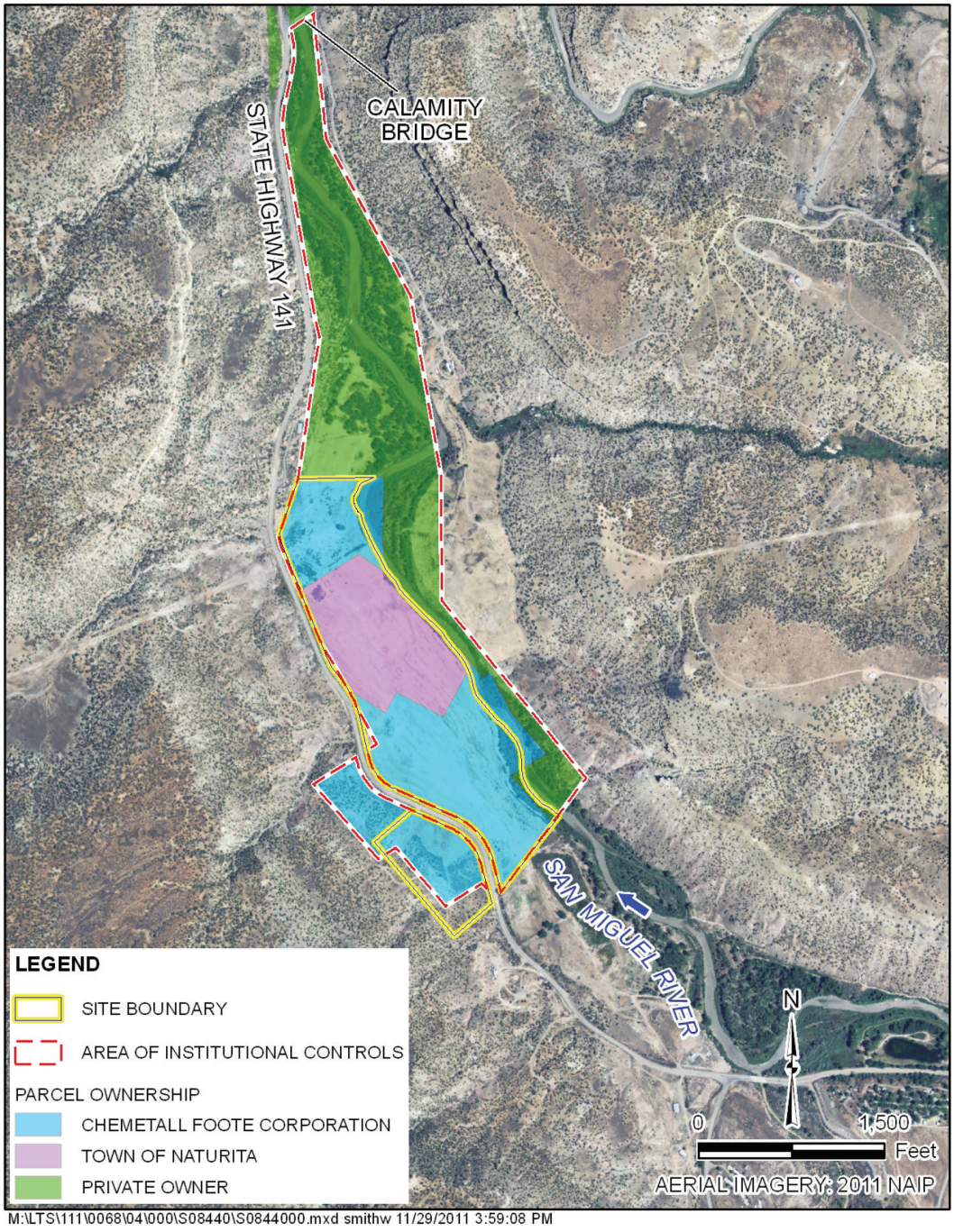
The Naturita processing site is a former uranium- and vanadium-ore processing facility in western Colorado, about 2 miles northwest of the city of Naturita in Montrose County, Colorado. The site occupies approximately 79 acres of land that is bounded by the San Miguel River on the east and State Highway 141 on the west. The City of Naturita currently owns the central portion of the site, and Rockwood Lithium GmbH owns the northern and southern parts of the site. The mill operated intermittently between the 1930s and 1958, during which time it processed approximately 704,000 tons of ore. Before 1942, the mill processed only vanadium ore; in 1942, the operations were altered to include recovery of uranium for the Manhattan Engineer District project (the Manhattan Project). From 1961 to 1963, Vanadium Corporation of America operated a uranium upgrader at the site. These past milling operations produced a pile of radioactive tailings, a predominantly sandy material that covered about 24 acres of the site. An additional 126 acres of soil around the tailings pile were contaminated from ore storage and windblown tailings. Groundwater beneath the site became contaminated as constituents in the tailings pile leached into the underlying soil. Between 1977 and 1979, Ranchers Exploration and Development Corporation bought the 24-acre tailings pile and moved the material offsite for reprocessing to extract additional uranium and vanadium.

From 1993 to 1997, the U.S. Department of Energy (DOE) removed 800,000 cubic yards of contaminated soil and other contaminated materials from the site and stabilized them in an engineered disposal cell near the former townsite of Uravan, Colorado, 15 miles northwest of Naturita. Umetco Minerals Corporation owned the disposal cell site until 1997, when ownership was transferred to DOE.



Locations of the Naturita, Colorado, Processing and Disposal Sites

Contamination was left in place at the Naturita processing site in five areas totaling 11 acres on the site and in another 11 acres on an adjacent downgradient property. More than 1 acre of contaminated soil on the site was left in place because the radium-226 concentrations still exceeded the standard even though soil had been excavated to 1 foot below the water table. Contaminated areas on the site and on the downgradient property were left in place because removing the material would produce excessive environmental harm and increased risk to workers who would have to



Naturita Site Institutional Control Boundary

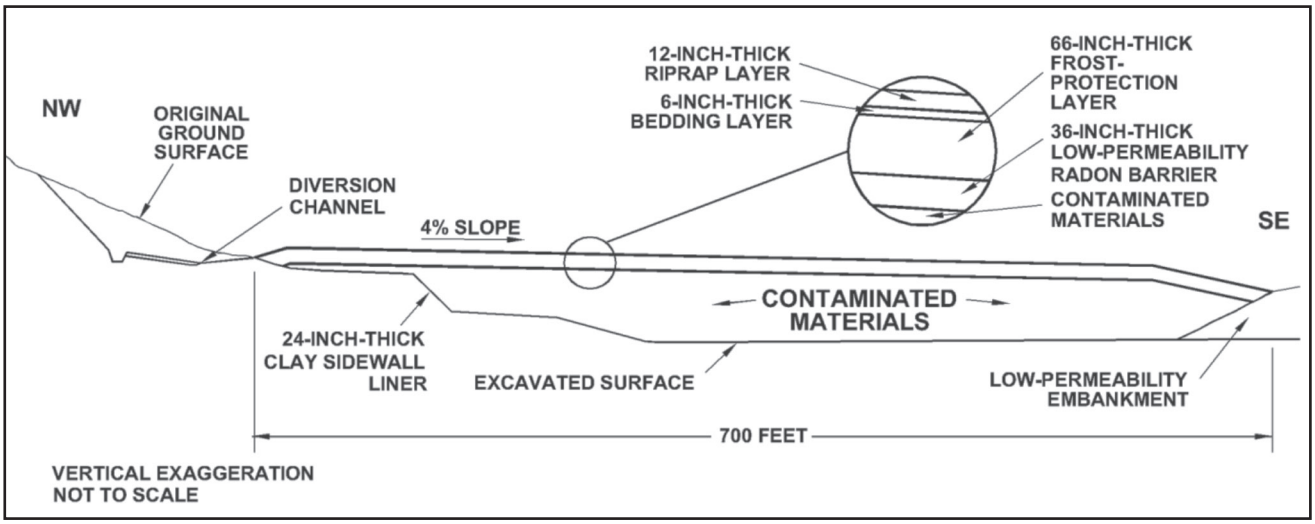
remove it compared to the low radiological hazard. These areas are along the steep slopes of State Highway 141, near high- voltage power poles, and in wetland areas adjacent to the San Miguel River.

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 at the processing sites. The radioactive materials were encapsulated in U.S. Nuclear Regulatory Commission–approved disposal cells. The U.S. Nuclear Regulatory Commission general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Naturita disposal site was included under the general license in August 1999.

Processing Site

Pore fluids from the tailings pile have leached into the underlying soil and have contaminated the shallow alluvial aquifer beneath the site. Uranium and vanadium are the primary constituents of concern in groundwater. Uranium concentrations exceeding the 40 CFR 192 maximum concentration limit in groundwater continue past the northern



Northwest-Southeast Cross Section of the Naturita Disposal Cell

boundary of the site and onto an adjacent private property. No maximum concentration limit has been established in 40 CFR 192 for vanadium; however, concentrations in groundwater exceed the EPA Region III risk-based concentration. Because vanadium has low mobility in groundwater, elevated vanadium concentrations are generally confined to the area of the former tailings pile.

The only permanent surface water feature at the Naturita processing site is the San Miguel River. Groundwater discharges to the river. Even at low river flow, contaminant concentrations in groundwater discharging to the river are diluted by a factor of 4,000 or more and have no measurable effect on river water quality. Mill-related contamination has not been detected in samples from the river.

Compliance Strategy

The DOE compliance strategy at the Naturita processing site is no further remediation in conjunction with the application of alternate concentration limits for uranium and vanadium. Institutional controls and annual groundwater and surface water monitoring continue. Groundwater modeling has indicated that concentrations of uranium and vanadium will not decrease to acceptable levels through natural flushing in the 100-year time frame allowed in 40 CFR 192.

Provisions in 40 CFR 192 allow for the use of alternate concentration limits in lieu of maximum concentration limits if it can be shown that "the constituent will not pose a substantial present or potential hazard to human health and the environment as long as the alternate concentration limit is not exceeded…" The maximum concentration limit in 40 CFR 192 for uranium is 0.044 milligram per liter (mg/L), and the EPA Region III risk-based limit for vanadium is 0.33 mg/L. DOE's proposed alternate concentration limits are 3 mg/L for uranium and 6 mg/L for vanadium. These values are the approximate maximum concentrations detected in groundwater samples in 2002.

A screening-level risk assessment for the Naturita processing site indicates that the only risk to human health from uranium and vanadium would be through direct ingestion of alluvial groundwater. The assessment suggests that institutional controls are needed to prevent the use of alluvial groundwater as drinking water. The alternate concentration limits are considered protective of the environment because concentrations decrease significantly as groundwater discharges to and mixes with surface water of the San Miguel River.

Institutional Controls

Rockwood Lithium GmbH, the City of Naturita, and the owner of the adjacent downgradient property all own land affected by groundwater contamination. The downgradient property is the only offsite property affected. Institutional controls have been placed on groundwater that is currently contaminated or may be potentially affected in the future. Colorado Senate Bill 01-145, passed in July 2001, contains provisions for creating perpetual environmental covenants that place restrictions on land use, including drilling and pumping of groundwater from the land, where remedial actions have been completed and contamination has been left in place. The covenant is between the property owner and the State of Colorado. These covenants are legally enforceable restrictions on land use and, therefore, meet the definition of institutional controls under UMTRCA. The Colorado Department of Public Health and Environment (CDPHE) completed environmental covenants with the City of Naturita and the owner of the downgradient property in April 2004 and July 2002, respectively. CDPHE established environmental covenants with Chemetall Foote (the predecessor to Rockwood Lithium GmbH) in 2011.

Disposal Site

The Naturita disposal cell, also known as the Upper Burbank disposal cell, is located on a 27-acre tract of land near the former townsite of Uravan. The cell was closed in 1999, after 971,762 dry tons of contaminated soil and building debris were encapsulated. The estimated total activity of the contaminated materials in the cell is 79 curies of radium-226. The cell has produced no soil or groundwater contamination.

Disposal Cell Design

The Naturita disposal cell measures about 650 feet by 700 feet and occupies 10 acres of the 27-acre site. A posted wire fence surrounds the cell. The cell is in the north end of a pit where Umetco quarried sandstone for use as erosion-protection material on its disposal cell. The Naturita cell is bounded on three sides by sandstone bedrock and on the fourth side by a low-permeability embankment. Umetco constructed the cell in the south end of the quarry to encapsulate raffinate crystals (a crystalline precipitate of raffinate, the solution remaining after removal of uranium and vanadium by solvent extraction) that resulted from uranium-ore processing at the former Uravan mill.

Before contaminated materials were placed in the Naturita cell, clay was scraped from the sandstone floor of the quarry. The walls of the excavation were cleared of sandstone rubble and sloped away from the floor. The sides of the excavation were lined with 24 inches of clay. The cover of the Naturita cell is a multicomponent system designed to encapsulate and contain the contaminated materials. The cell cover consists of (1) a low-permeability radon barrier (the first layer placed over the compacted materials), (2) a frost-protection layer of compacted soil, (3) a bedding layer of coarse sand and fine gravel, and (4) a rock (riprap) erosion-protection layer. A riprap apron was placed around the perimeter of the cell to provide added protection at the base of the cell and to channel runoff water away from the cell. A rock-lined interceptor ditch adjacent to the northwest upslope portion of the cell diverts surface flow around and away from the cell. Disturbed areas were graded to promote positive drainage and were seeded 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 Naturita 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 and performs site maintenance as necessary. The U.S. Nuclear Regulatory Commission agreed with DOE in April 2014 that groundwater monitoring at the disposal site was no longer required. The Long-Term Surveillance Plan is currently under revision to reflect the cessation of groundwater monitoring.

In accordance with 40 CFR 192.32, 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 Naturita disposal site will last indefinitely.

Contacts

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

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

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