



## Naturita, Colorado | Disposal and Processing Sites AN UMTRCA TITLE I SITE

This fact sheet provides information about the **Naturita site**. Long-term stewardship responsibilities for this site are managed by the **U.S. Department of Energy Office of Legacy Management** under **Title I** of the **Uranium Mill Tailings Radiation Control Act of 1978**.

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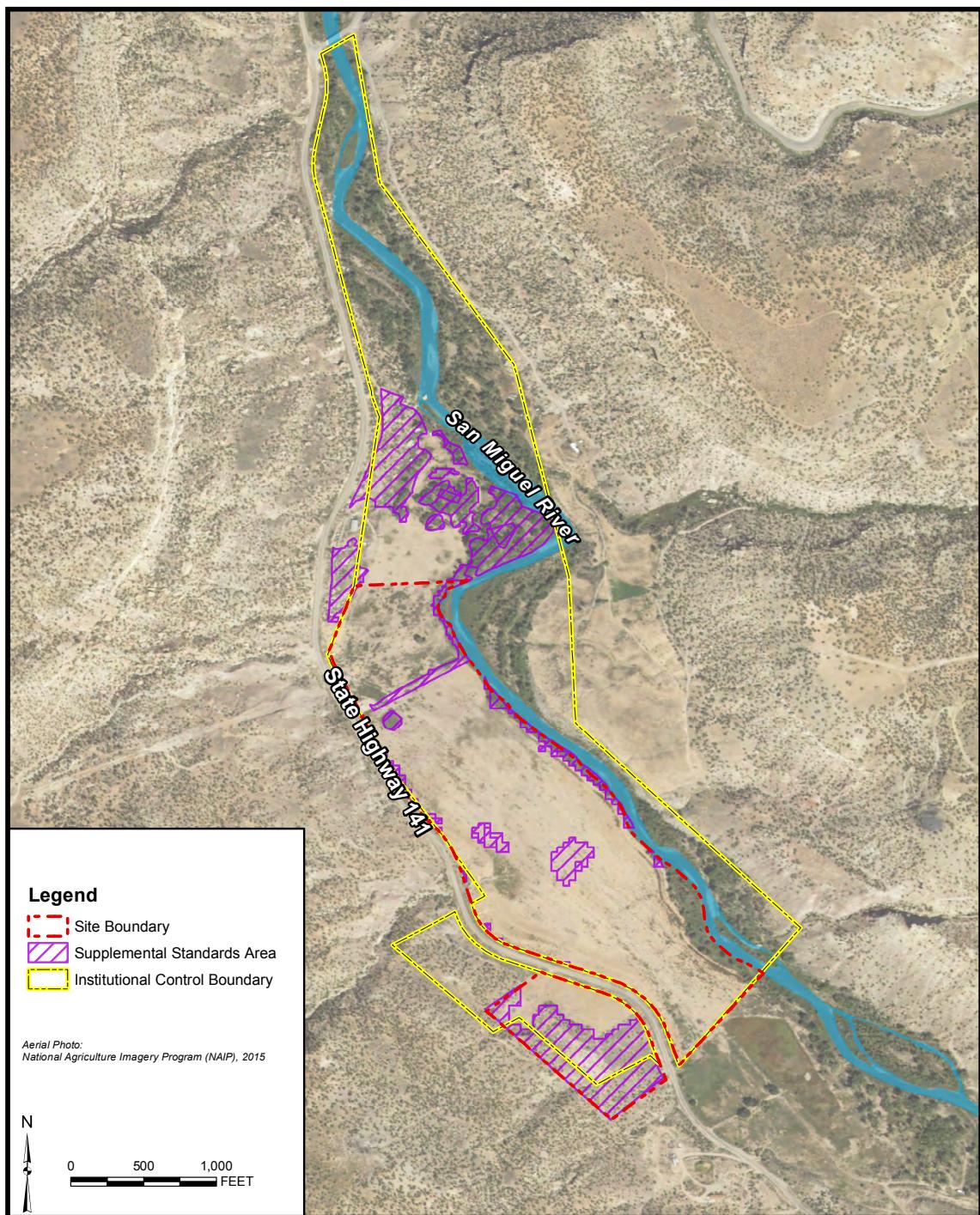
### Site Information and History

The Naturita processing site is a former uranium and vanadium ore mill in western Colorado, about 2 miles northwest of the city of Naturita in Montrose County, Colorado. The processing 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 mill operated intermittently between 1939 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 U.S. Army Corps of Engineers Manhattan Engineer District (also known as the Manhattan Project). A uranium upgrader was operated on-site from 1961 to 1963. These past milling operations produced a pile of radioactive tailings, a predominantly sandy material, that covered about 24 acres of the processing site. An additional 126 acres of soil on the processing site and adjacent properties was contaminated from ore storage and windblown tailings. The tailings pile was purchased in 1976 and moved off-site by 1979 for reprocessing to extract additional uranium and vanadium.

The U.S. Department of Energy (DOE) began remediation of the processing site in January 1993. Between 1993 and 1997, DOE removed approximately 793,000 cubic yards

of contaminated soil and building debris from the processing site and adjacent properties and stabilized them in an engineered disposal cell at the Naturita disposal site. Contamination was left in place at the processing site in five supplemental standard areas\* (supplemental standards are cleanup standards the U.S. Environmental Protection Agency [EPA] allows that are protective of human health and the environment and may be applied in lieu of prescriptive levels) totaling 11 acres and in another 11 acres on an adjacent, downgradient private property. More than 1 acre of contaminated soil was left in place at a supplemental standards area because the radium-226 concentrations still exceeded the standard even though soil had been excavated to 1 foot below the water table. Other supplemental standard areas were left in place because removing the material would produce excessive environmental harm and increased risk to workers.

The Naturita disposal site is located 15 miles northwest of the city of Naturita, Colorado, and totals 27 acres. The disposal cell located within the site was closed in 1998 after contaminated soil and building debris from the processing site and adjacent properties were encapsulated. The estimated total activity of the contaminated materials in



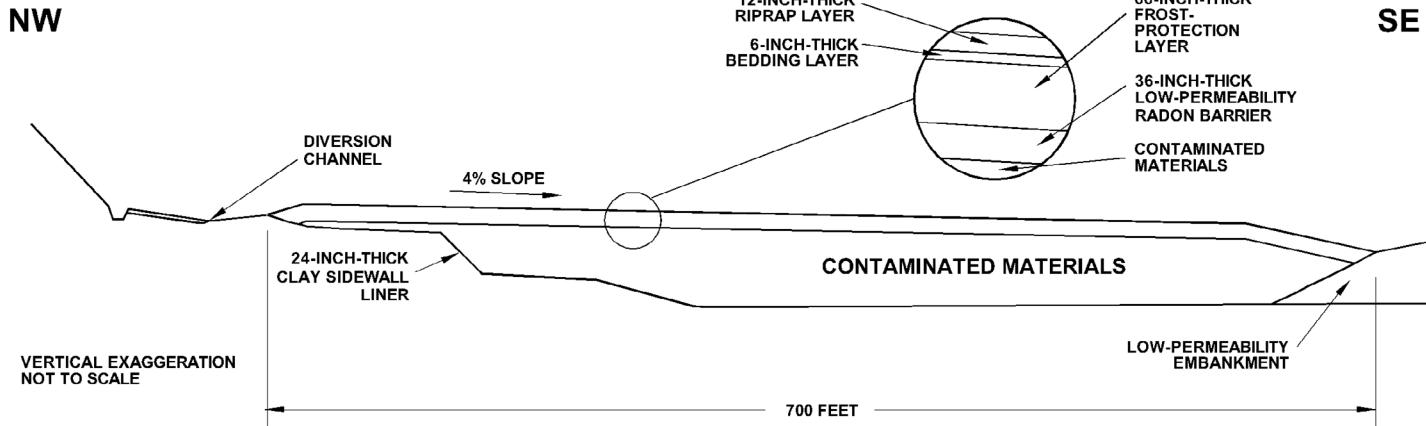
Naturita Processing Site — supplemental standards areas and institutional control boundary.

the disposal cell is 79 curies of radium-226. The disposal cell has produced no soil or groundwater contamination.

## Processing Site

Pore fluids from the tailings pile leached into the underlying soil and have contaminated the shallow alluvial aquifer beneath the processing site. Uranium and vanadium are the primary constituents of concern in groundwater. Uranium

concentrations exceeding the Title 40 Code of Federal Regulations (CFR), Part 192 maximum concentration limit in groundwater (0.044 milligrams per liter [mg/L]) continue past the northern boundary of the processing site and onto the adjacent private property. No maximum concentration limit has been established in 40 CFR 192 for vanadium. However, concentrations in groundwater exceed the EPA



Northwest-southeast cross section of the Naturita Disposal Cell.

Region III risk-based concentration (0.033 mg/L). Because vanadium has low mobility in groundwater, elevated vanadium concentrations are generally confined to the area of the former tailings pile. 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.

The only permanent surface water feature at the processing site is the San Miguel River, which is sampled annually. 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 proposed DOE compliance strategy at the processing site is no further remediation in conjunction with the application of alternate concentration limits (ACLs) for uranium and vanadium, institutional controls, and continued monitoring. An ACL may be adopted within specified areas when an established maximum concentration limit is unattainable or when no drinking water standard exists. However, the ACL must not pose a present or potential future hazard to human health or the environment. DOE is currently revising the Groundwater Compliance Action Plan.

### Institutional Controls

A screening-level risk assessment for the processing site indicates that the only risk to human health from uranium and vanadium would be through direct ingestion of alluvial groundwater. Institutional controls, in the form of environmental covenants, have been put in place to prevent the use of alluvial groundwater as drinking water. The environmental covenants are legally enforceable restrictions on land use between the state of Colorado and individual property owners. The environmental covenants cover the portion of the processing site and adjacent properties affected by contaminated groundwater and restrict construction and soil excavation in supplemental standards areas.

### Disposal Site

The disposal site contains the disposal cell and additional erosion protection features. The disposal cell is a northwest-pointed pentagon, measuring approximately 560 feet by 670 feet and covering 9 acres. The disposal cell is bounded on three sides by sandstone bedrock and on the fourth side by a low-permeability embankment. 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. The disposal cell cover is a multicomponent system designed to encapsulate and contain the contaminated materials. The disposal cell cover consists of (1) a low-

permeability radon barrier (the first layer placed over the contaminated materials), (2) a frost-protection layer of compacted soil, (3) a bedding layer of coarse sand and fine gravel, and (4) a riprap (erosion-protection) layer. A riprap apron was placed around the perimeter of the disposal cell to provide added protection at the base of the disposal cell and to channel runoff water away from the disposal cell. A rock-lined diversion channel adjacent to the northwest upslope portion of the disposal cell diverts surface flow around and away from the disposal cell. Disturbed areas were graded to promote positive drainage and were seeded with native grasses.

## 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 EPA in 40 CFR 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 (NRC)-approved disposal cells. The NRC 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.

## Legacy Management Activities

The DOE Office of Legacy Management (LM) is responsible for long-term surveillance and maintenance of the processing and disposal sites. At the processing site, LM samples groundwater and the San Miguel River annually and monitors the effectiveness of institutional controls, ensuring continued protection of human health and the environment. 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.

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## 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 **Naturita, Colorado, Disposal and Processing Sites** are available on the LM website at [www.energy.gov/lm/naturita-colorado-disposal-and-processing-sites](http://www.energy.gov/lm/naturita-colorado-disposal-and-processing-sites).

For more information about LM activities at the **Naturita, Colorado, Disposal and Processing Sites** contact:

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-  [www.energy.gov/lm/naturita-colorado-disposal-and-processing-sites](http://www.energy.gov/lm/naturita-colorado-disposal-and-processing-sites)
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