



Tuba City, Arizona, Disposal Site

An UMTRCA Title I site

This fact sheet provides information about the **Tuba City site**. This site is 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**.

with the 40 CFR 192 regulatory standard. The U.S. Nuclear Regulatory Commission general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Tuba City disposal cell was included under the general license in 1996.

Site Information and History

The Tuba City, Arizona, Disposal Site is within the Navajo Nation and close to the Hopi Reservation, approximately 5 miles east of Tuba City and 85 miles northeast of Flagstaff, Arizona. The Rare Metals Corporation and its successor, El Paso Natural Gas Company, operated a uranium mill at the site between 1956 and 1966. During its 10 years of operations, the Tuba City mill processed about 800,000 tons of uranium ore. The milling operations created low-level radioactive mill tailings, a predominantly sandy material. The tailings were conveyed in a slurry from the mill to evaporation ponds at the site. These ponds covered an area of 33.5 acres, and windblown tailings affected an additional 250 acres northeast of the mill site. The U.S. Department of Energy (DOE) began surface remedial action at the Tuba City site in 1988. All uranium mill tailings from the onsite piles, debris from demolished mill buildings, and windblown tailings were moved and stabilized in an engineered disposal cell onsite. DOE completed site cleanup in 1990.

Regulatory Setting

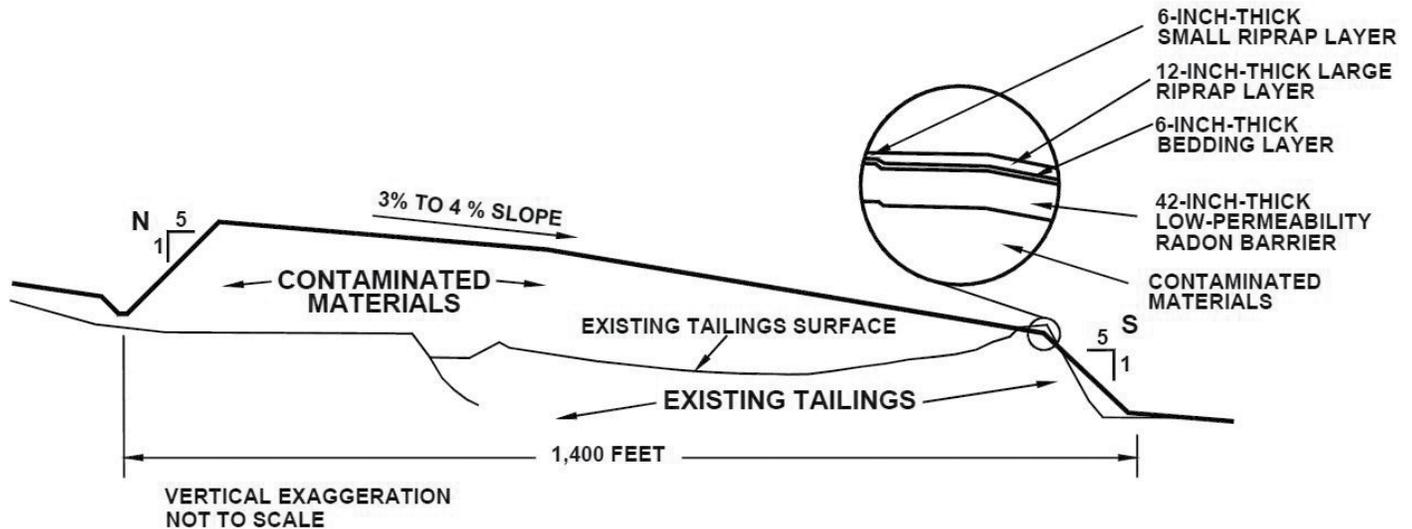
Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978 (Public Law 95-604), and DOE remediated 22 inactive uranium-ore processing sites under the Uranium Mill Tailings Remedial Action Project in accordance with standards promulgated by the U.S. Environmental Protection Agency 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 covered in disposal cells for control of radon emissions in compliance

Disposal Site

The disposal site is approximately 6,000 feet northwest of and 300 to 400 feet in elevation above Moenkopi Wash, an intermittent stream that drains to the southwest into the Little Colorado River. The disposal site lies at an elevation of approximately 5,100 feet above sea level on the middle of three alluvial terraces associated with ancestral flows in Moenkopi Wash. Thin surficial deposits of unconsolidated dune sand and alluvial gravels overlie the Navajo aquifer, which is the main aquifer near the Tuba City site and is regionally vast within sedimentary deposits comprising the Navajo Sandstone Formation. The saturated thickness of the aquifer near the disposal cell is about 500 feet, although within 2,000 feet south of the disposal cell the aquifer thins rapidly because of topography and regional groundwater discharge at Moenkopi Wash. Depth to groundwater ranges from about 60 to 75 feet below land surface.

Land near the site is used for grazing; adjacent land is used for dry and irrigated farming and residential purposes. There is no known domestic, industrial, or agricultural use of groundwater from the contaminated region of the aquifer. Nearby residences receive water from the Navajo Tribal Utility Authority; this water comes from a well completed in the bedrock aquifer approximately 1.5 miles northwest (hydraulically upgradient) of the site.

Surface water associated with the Tuba City site is located approximately 6,000 feet south of the site, where seeps are present along cliff bands that border Moenkopi Wash. Water from Moenkopi Wash is used for stock watering and agricultural diversions by the Navajo and Hopi residents near



North-South Cross Section of the Tuba City Disposal Cell

the site. Early site characterization efforts and ongoing annual monitoring have found no contamination in the seeps in this area.

Historical milling operations contaminated groundwater in the Navajo aquifer. The primary source of contamination is water that drained from the unlined evaporation ponds and infiltrated into the subsurface. Mill-related contamination in the uppermost part of the aquifer has been detected 2,500 feet south of the original mill tailings impoundment location. Groundwater contaminants with concentrations that exceed their standards in 40 CFR 192 are molybdenum, nitrate, selenium, and uranium. High levels of sulfate are also present in the groundwater. Although sulfate is not regulated in 40 CFR 192, its concentration in groundwater is high enough to cause a potential health risk, and a restoration goal was established for comparison to monitoring results.

Compliance Strategy

The compliance strategy for contaminated groundwater underlying the site is active remediation. The objective of this strategy is to remove nitrate and uranium (the primary site contaminants) and other site-related contaminants from the aquifer to meet 40 CFR 192 standards and other water quality restoration goals that are documented in the Groundwater Compliance Action Plan (GCAP).

The active remediation system consists of groundwater extraction wells located within the contaminated area of the aquifer. Extracted water is conveyed to an onsite treatment plant where it is pretreated through a water softener, then distilled. A double-lined solar evaporation pond receives the concentrated liquid waste from distillation and regeneration waste from the softener. Treated (distilled) water is returned to the aquifer through an infiltration trench located upgradient of the contaminant plume.

The treatment plant is currently in a “safe standby” condition. Active remediation continues on an interim basis, through conveyance of extracted groundwater directly to the solar evaporation pond. In this process, clean water evaporates to the atmosphere and contaminants are safely accumulated in the pond in dissolved form.

A network of 104 groundwater monitoring wells (surrounding the extraction wells) is used to track water quality and water level trends. Monitoring well sampling and analyses are performed twice annually. Extraction well sampling and analyses are performed monthly.

Direct evaporation, as well as other treatment approaches, are being studied while operations continue under interim treatment status. Studies will lead to a revision of the GCAP, with protection of human health and the environment being imperative in the development of the future groundwater compliance strategy.

Disposal Cell Design

The five-sided disposal cell occupies an area of 50 acres on the 145-acre site. The cell rises 44 feet above the surrounding land. An interceptor ditch was constructed on the upslope side of the site. A woven wire fence with locked gates surrounds the site, and the site perimeter is marked with warning signs and permanent monuments.

The cover of the disposal cell is a multicomponent system composed of:

1. a low-permeability radon barrier (first layer placed over compacted tailings) consisting of clayey soil,
2. a granular bedding material placed as a capillary break, and
3. rock (riprap) erosion protection layers.

The cell location and design were selected to minimize the potential for erosion from wind and storm water runoff. Surrounding disturbed areas were regraded and reseeded with native vegetation.

Legacy Management Activities

The DOE Office of Legacy Management (LM) is responsible for ensuring that the selected groundwater compliance strategy at the Tuba City disposal site continues to be protective 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, performs site maintenance as necessary, and monitors groundwater 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 Tuba City disposal cell will last indefinitely.



CONTACT INFORMATION

**IN CASE OF AN EMERGENCY AT THE SITE,
CONTACT 911.**

Site-specific documents related to the **Tuba City, Arizona, Disposal Site** are available on the LM website at www.energy.gov/lm/tuba-city-arizona-disposal-site

For more information about LM activities at the **Tuba City, Arizona, Disposal Site**, contact:

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All groundwater and surface water quality data for the site are publicly available on LM's Geospatial Environmental Mapping System (GEMS) website at <https://gems.lm.doe.gov/#site=TUB>. New data are posted to the GEMS website after each semi-annual sampling event.



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