



UMTRCA Title I

Mexican Hat, Utah, Disposal Site

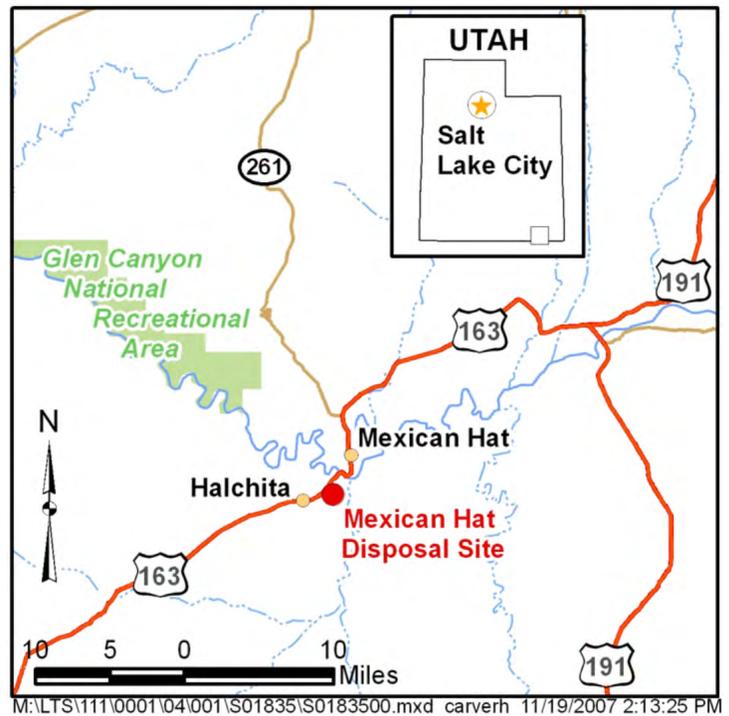
This fact sheet provides information about the Uranium Mill Tailings Radiation Control Act of 1978 Title I processing site at Mexican Hat, Utah. This site is managed by the U.S. Department of Energy Office of Legacy Management.

Site Location and History

The Mexican Hat disposal site is located on the Navajo Reservation in southeast Utah, 1.5 miles southwest of the town of Mexican Hat and 1 mile south of the San Juan River. The site is 10 miles north of the Utah-Arizona border and approximately 15 miles north of the Monument Valley processing site. The site is also the location of a former uranium-ore processing mill. Texas-Zinc Minerals Corporation constructed the Mexican Hat mill on land leased from the Navajo Nation and operated the facility from 1957 to 1963. Atlas Corporation purchased the mill in 1963 and operated it until it closed in 1965. A sulfuric acid manufacturing plant operated at the site from 1957 to 1970. Control of the site reverted to the Navajo Nation after the lease expired in 1970.

Much of the ore brought to the mill contained a considerable amount of copper sulfide and other sulfide minerals and was processed to recover both copper and uranium. The milling process produced radioactive tailings, a predominantly sandy material. Spent tailings were mixed with process water and pumped through a pipeline to two onsite tailings piles.

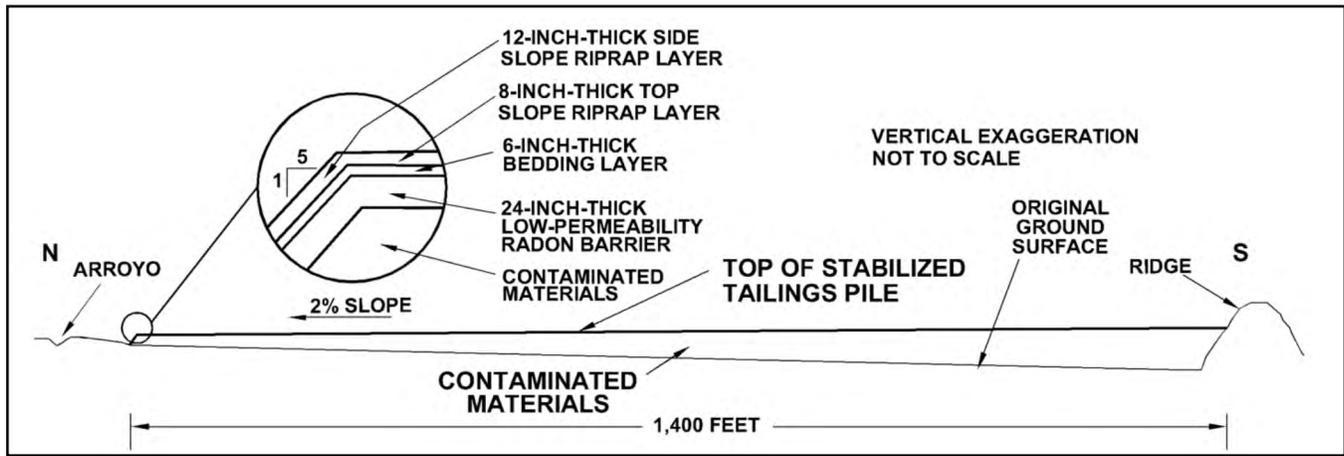
The U.S. Department of Energy (DOE) completed surface remedial action at the site in 1995. Radioactive materials from the former upper tailings pile, demolished mill structures, and 11 vicinity properties were placed in a disposal cell constructed at the site of the former lower tailings pile. An additional 983,000 cubic yards (1.3 million dry tons) of tailings and associated waste were hauled from the Monument Valley, Arizona, Processing Site approximately 15 miles to the south and placed in the cell on top of contaminated materials from the Mexican Hat site. A total of approximately 3.6 million cubic yards (4.4 million dry tons) of residual radioactive materials were stabilized in the Mexican Hat disposal cell.



Location of the Mexican Hat, Utah, Disposal Cell

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



North-South Cross Section of the Mexican Hat Disposal Cell

at the processing sites. The U.S. Nuclear Regulatory Commission general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Mexican Hat disposal site was included under the general license in 1997.

Disposal Site Description

The Mexican Hat disposal site lies on a relatively flat mesa at an elevation of approximately 4,300 feet. The San Juan River is approximately 1 mile to the north and receives surface drainage from the site and surrounding area. Bounding the relatively flat mesa to the north and east are the ephemeral drainages North Arroyo and Gypsum Creek.

Average annual precipitation is 6 inches and is fairly evenly distributed throughout the year. The area is sparsely vegetated by desert shrubs and grasses, and the land around the site is used for limited residential purposes and livestock grazing.

The Permian Halgaito Formation is the geologic unit exposed at the site. Soil is thin to nonexistent in the area because of the extremely dry climate. Siltstone is the predominant rock type in the Halgaito; shale, fine-grained sandstone, and limestone lenses are also present but less common. The Halgaito is 80 to 215 feet thick in the site area and is divided into upper and lower units. Most of the upper unit is unsaturated but has some scattered groundwater in fractures and as perched water overlying finer-grained zones. The lower unit is classified as the uppermost aquifer at the Mexican Hat site. Groundwater in the lower unit is under artesian pressure and is isolated from groundwater in the upper unit by limestone beds that limit vertical water movement.

Although groundwater in the lower unit of the Halgaito has not been contaminated by past milling operations, the natural water quality near the site is unsuitable for human consumption. Groundwater samples collected from monitoring wells installed in the lower unit of the Halgaito showed the presence of hydrogen sulfide gas and naturally occurring petroleum.

Compliance Strategy

The groundwater compliance strategy for the Mexican Hat site is no remediation. Groundwater in the uppermost aquifer (the lower unit of the Halgaito Formation) has not been contaminated by uranium-milling activities. Although site-related contamination has been detected in groundwater of the upper unit of the Halgaito, the occurrence of groundwater is sporadic and ephemeral. Site-related contamination is not expected to produce any adverse effects to human health or the environment.

In accordance with the Long-Term Surveillance Plan, DOE performed water quality monitoring at six seeps as a best management practice to evaluate disposal cell performance. During the 8 years of monitoring, seep flows were often too limited for obtaining samples; seep flows were expected to diminish following disposal cell construction. Although water quality monitoring results appeared to suggest site-related contamination was present in the seeps downgradient of the site, risk assessments concluded that no significant human or ecological risks are associated with the seeps at these minimal flows. Therefore, water quality monitoring of the seeps was discontinued in 2006. Visual observation, along with photographic documentation, of seep flows continues as part of the annual inspection of the site. Water quality monitoring will resume if seep flows increase as compared to historical observations.

Disposal Cell Design

The cell occupies an area of 68 acres on the 119-acre site. It abuts a rock outcrop on the south and rises 50 feet above the surrounding land on the other sides. A posted barbed-wire perimeter fence surrounds the cell. Residual radioactive materials in the cell were compacted before being covered. The cover of the disposal cell is a multicomponent system designed to encapsulate and protect the contaminated materials.

The cover comprises (1) a low-permeability radon barrier (first layer placed over compacted tailings), (2) a bedding layer of sand and gravel placed as a capillary break, and

(3) a rock (riprap) erosion protection layer. The cell design promotes rapid runoff of precipitation to minimize leachate. The cell cover was constructed with a 2 percent grade sloping to the north and east. Runoff water flows down the 20 percent side slopes into the surrounding rock apron and exits the cell via three toe drains to arroyos north and east of the cell.

The site location and design were selected to minimize the potential for erosion from onsite runoff or storm water flow. All surrounding remediated areas were regraded and reseeded with native species. Existing gullies in the vicinity of the cell were armored with riprap that was keyed into competent rock to control erosion. Riprap-protected diversion ditches were installed to channel surface runoff water away from the cell.

Legacy Management Activities

The DOE Office of Legacy Management (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 observes groundwater seeps to verify the continued integrity of the disposal cell.

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 Mexican Hat disposal cell will last indefinitely.

Contacts

Documents related to the Mexican Hat disposal site are available on the LM website at http://www.lm.doe.gov/mexican_hat/Sites.aspx.

For more information about LM activities at the Mexican Hat site, contact:

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

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