

Monument
Valley, Arizona,
and Mexican Hat,
Utah, Sites Tour



Overview

The Navajo Nation and Hopi Tribe reservations are in the Four Corners area of the southwestern United States, in a region geographically identified as the Colorado Plateau. Geologic formations that form the Colorado Plateau include numerous deposits of uranium ore.

The rush to build nuclear weapons during World War II and the early years of the Cold War brought an unprecedented level of uranium exploration, mining, and milling activity to the region. Between 1944 and 1986, nearly 4 million tons of uranium ore were extracted from Navajo lands under leases with the Navajo Nation government.

The U.S. Department of Energy (DOE) remediated four Navajo Nation sites under the Uranium Mill Tailings Remedial Action (UMTRA) Project, in accordance with standards approved by the U.S. Environmental Protection Agency. After the uranium-ore processing mills closed, DOE removed the radioactive tailings from the former mill sites and vicinity properties. The radioactive materials were placed in engineered disposal cells licensed by the U.S. Nuclear Regulatory Commission. The DOE Office of Legacy Management (LM) is responsible for conducting disposal site inspections, groundwater monitoring, groundwater treatment, and site maintenance.

The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) is a federal law that provides for safe and environmentally sound disposal, long-term stabilization, and control of uranium mill tailings in a manner that minimizes or eliminates radiation health hazards to the public and the environment. LM is responsible for long-term surveillance and maintenance at four UMTRCA Title I sites within the Navajo Nation, which include three disposal sites and one processing site. LM's responsibility for maintaining the safety and integrity of these sites will last indefinitely.

LM works in consultation with the Navajo Nation and the Hopi Tribe to protect human health and the environment.



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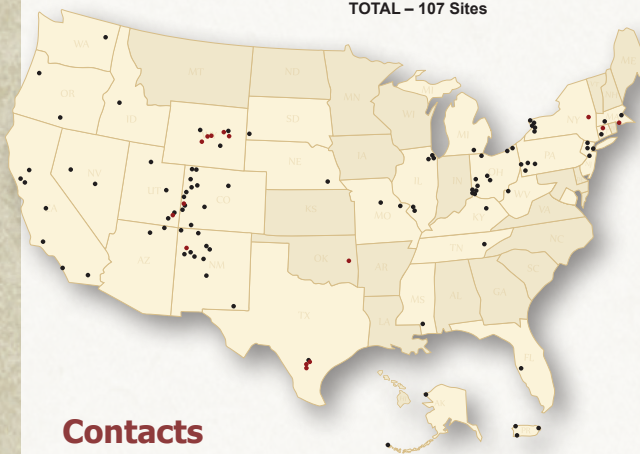
Legacy
Management

Mission

LM's mission is to fulfill the Department's post-closure responsibilities and ensure the future protection of human health and the environment.

- Goal 1** – Protect human health and the environment
- Goal 2** – Preserve, protect, and share records and information
- Goal 3** – Safeguard former contractor workers' retirement benefits
- Goal 4** – Sustainably manage and optimize the use of land and assets
- Goal 5** – Sustain management excellence
- Goal 6** – Engage the public, governments, and interested parties

- FY 2018 – 92 Sites
- FY 2021 – 15 Anticipated Sites
- TOTAL – 107 Sites**



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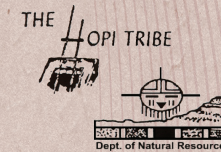


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LM Sites on Navajo Nation Land

- Mexican Hat, Utah, Disposal Site
- Monument Valley, Arizona, Processing Site
- Shiprock, New Mexico, Disposal Site
- Tuba City, Arizona, Disposal Site



Navajo Abandoned Mine Lands (AML)
Reclamation/Uranium Mill Tailings Remedial
Action (UMTRA) Program • Hopi Tribe UMTRA Project

Mexican Hat, Utah, Disposal Site

The Mexican Hat disposal cell contains mill tailings and other low-level radioactive materials from both the former Mexican Hat, Utah, and the Monument Valley, Arizona, processing facilities. LM personnel conduct annual site inspections to evaluate surface-feature conditions, perform site maintenance as necessary, and visually monitor groundwater seeps along arroyos near the site. LM is actively monitoring the disposal cell to ensure that it remains protective of human health and the environment.



Mexican Hat, Utah, Disposal Site

Shiprock, New Mexico, Disposal Site

Remedial action at the Shiprock site consists of natural flushing with active groundwater cleanup in the floodplain. For the Terrace East areas, the remedial action is an active pump-and-evaporation system. Since completing construction on the major component of this system, more than 190 million gallons of contaminated water has been treated. Groundwater contaminants include uranium, nitrate, and other metals.



*Shiprock,
New Mexico,
Disposal Site Tour*

*Chapter House
Meeting in
Shiprock, New Mexico*



Tuba City, Arizona, Site Tour

Tuba City, Arizona, Disposal Site

Groundwater at the Tuba City site is contaminated with uranium, nitrate, and sulfate. The area of contamination is limited, and there is no impact on water supply wells for individual residences, agricultural or livestock watering, or the community potable system. LM used a pump-and-treat system from 2002 through 2014, which operated in the following manner:

- Extraction wells pumped contaminated groundwater to the surface for treatment at a rate of 80 gallons per minute.
- Extracted groundwater was treated with an ion-exchange and a distillation process to remove all contaminants.
- Treated groundwater was returned to the aquifer through an infiltration trench; 92 percent of the extracted and treated water was preserved and returned to the aquifer.
- Liquid waste from distillation was pumped to an on-site evaporation pond. Waste collected in the pond will be taken off-site for disposal.

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.

As of May 2018 more than 415 million gallons of groundwater have been pumped.

*Tuba City, Arizona,
Disposal Site
Evaporation Pond*



*Monument
Valley Mill*

*Monument Valley, Arizona,
Processing Site*



Monument Valley, Arizona, Processing Site

Groundwater at the Monument Valley site is contaminated with nitrate and sulfate. Nitrate and sulfate contamination in the alluvial aquifer has migrated more than 6,000 feet from the area of the former mill site. Uranium is also found in a few isolated areas of the alluvial aquifer and has not moved from the area of the former mill site.

- In 2011, LM completed several studies designed to evaluate remedies for the nitrate and sulfate in the alluvial aquifer. The studies showed that native desert plants and other natural processes can remove nitrate from the soil, and that natural attenuation is occurring in the groundwater plume.
- To ensure a clean water source for local residents, DOE provided funding to support the installation of a clean water supply system to serve residents in the Cane Valley area. The clean water supply system was completed in 2003 in cooperation with the Bureau of Indian Affairs and the Navajo Tribal Utility Authority (NTUA). NTUA retains responsibility for the operation, monitoring, and maintenance of the clean water supply system.
- DOE is in the process of developing plans for additional site characterization (data collection) activities to support the development of a Groundwater Compliance Action Plan, which will describe DOE's strategy for complying with groundwater standards.

*Monument Valley,
Arizona,
Public Meeting*

