## Next Steps in the Cleanup Process

### Community Involvement

Community members are encouraged to contact USEPA and NNEPA to stay involved in the removal action planning process for the Mac and Black Jack Mines, share input on future land uses at the site, and ask questions. Public meetings and other opportunities for discussion and input will occur throughout the cleanup process.

### Planning for the Removal Action

Permitting and access agreements with the Navajo Nation will be obtained prior to the removal action. Federal, state, and Navajo Nation regulations requiring compliance will be identified to be incorporated in the removal action design.

### Pre-Design Investigation

Additional information about the site conditions and the extent and depth of contaminated material will be collected in a pre-design investigation, if necessary, to improve the waste volume estimate, cleanup area extent, and removal action design.

### Removal Action Design

Design options for implementing the removal action are currently under development. The design phase includes several steps to plan out the removal action and incorporates feedback from USEPA and NNEPA throughout the process. The removal action design plan includes elements critical to the implementation of the removal action, such as:

- Construction specifications and designs
- Plan for monitoring site conditions during construction activities
- Plan for transporting waste material, including identification of the haul route
- Plan for site restoration and monitoring after cleanup

### Removal Action Implementation

The removal action will consist of excavation of contaminated soils at the four mines, transport of excavated material from Black Jack No 2, Mac No. 2, and Mariano Lake Mines to the Mac No. 1 repository by haul truck, and consolidation of the transported material with waste from Mac No. 1 itself for disposal at the regional repository at the Mac No. 1 Mine. Waste material at the Black Jack No. 1 Mine will be excavated, consolidated, and capped in place. During the removal action, dust control measures, truck tarping, and stormwater controls will be used to protect the community and the environment.

### Site Restoration

After the removal action is completed, caps on the repositories will be revegetated to restore the land and designed to support traditional Navajo lifeways following revegetation. USEPA will evaluate the cap design to ensure that such traditional activities at the Site are protective. Native vegetation will be planted to prevent erosion and control stormwater. The future land use for Black Jack No. 2 and Mac No. 2 Mines following the cleanup will be determined by the Navajo Nation.

### Long-Term Maintenance and Post-Removal Site Controls

Maintenance and site inspections will be performed regularly at the repository locations at Mac No.1 and Black Jack No. 1. Access to the repository will be restricted during regrowth of native vegetation. The stability of the cap will be monitored to ensure that it remains effective.

## How Can You Learn More?


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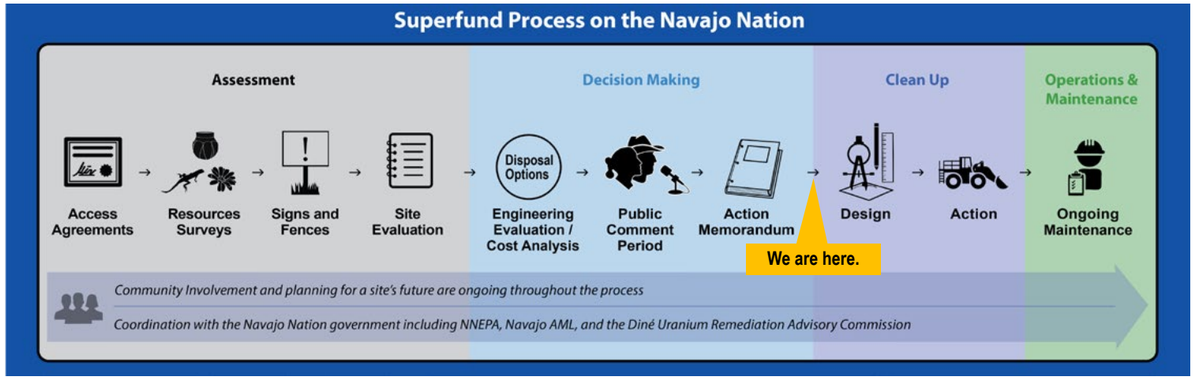
**Mac and Black Jack Mines:** https://www.epa.gov/navajo-nation-uranium-cleanup/mac-and-black-jack-mines
Diné Bizaad translations are available upon request.

# Mac and Black Jack Mines Removal Action Planning


U.S. Environmental Protection Agency • Region 9 • San Francisco • CA • May 2025


The U.S. Environmental Protection Agency (USEPA) has issued an action memorandum for a plan to clean up waste from historical uranium mining operations at the Mac and Black Jack Mines. This fact sheet presents background information on the Mac and Black Jack Mines, the cleanup option selected, and the next steps for cleaning up waste material, also referred to as the removal action.

## Superfund Process on the Navajo Nation

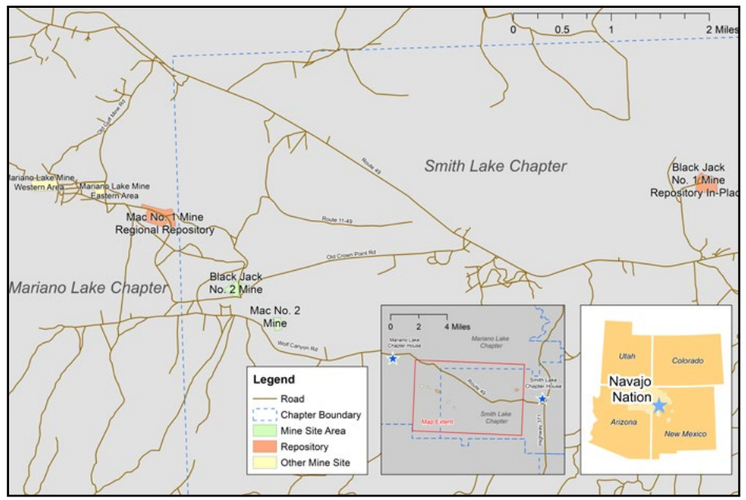



## Location

The Mac and Black Jack Mines consists of four mines: Mac No. 1, Mac No. 2, Black Jack No. 1, and Black Jack No. 2. The mines locations are shown on the figure below. Three mines are about 5 miles southeast of the Mariano Lake Chapter House. The fourth mine is about 2 miles west of the Smith Lake Chapter House.

## Background

The Mac and Black Jack Mines were active off and on between 1959 and 1979. The Homestake Mining Company joined with other mining companies to run these mines. About 1.75 million tons of uranium ore came from the mines, including 1.4 million tons of ore from the Black Jack No. 1 Mine alone.




Cleanup options were identified in the Engineering Evaluation and Cost Analysis (EE/CA) and the recommended option was presented to the public in multiple meetings. There was a public comment period from October 21, 2023 to March 8, 2024. USEPA and the Navajo Nation EPA (NNEPA) considered input and feedback from the community and other Navajo Nation representatives on the cleanup options. The EE/CA identified seven cleanup options to deal with arsenic, selenium, uranium, vanadium, and radium-226 in soils. Those are the contaminants that pose a risk to human and environmental health at the site.

NNEPA worked with USEPA to ensure the cleanup aligns with Navajo Nation laws and community priorities. The soils will be cleaned up to levels that are safe for local residents and near levels that exist naturally in the environment, also called background concentrations.

## Action Memorandum

The action memorandum was published on September 27, 2024. The document describes the plan for implementing the selected cleanup option. The cleanup option includes combining contaminated soils into two regional repositories. Waste from the Black Jack No. 1 Mine will be covered in place in its own repository. A second repository at the Mac No. 1 Mine will include waste from Mac No. 1, Mac No. 2 Mine, and Black Jack No. 2 Mines. Also, waste material from a cleanup at the nearby Mariano Lake Mine will be trucked to and buried in the regional repository at the Mac No. 1 Mine.

Radium-226, arsenic, selenium, vanadium, and uranium have been identified as contaminants for removal action in soil at the Mac and Black Jack Mines. The concentrations of these contaminants exceed safe levels for human health. The soils will be cleaned up to levels that are close to background concentrations and are safe for local residents.

## Removal Action Implementation

About 710,000 cubic yards of waste material need cleanup at the Mac and Black Jack Mines. The actual amount of waste will be determined in the design phase. Material where concentrations exceed the cleanup levels for radium-226, selenium, vanadium, and uranium will be combined in repositories at Mac No. 1 and Black Jack No. 1 Mines.

The removal action will last about 4 years, including combining and capping soils and restoring the sites. After the cleanup is done, the affected areas will be sampled to check that the soil meets the cleanup goals.

## Regional Repository

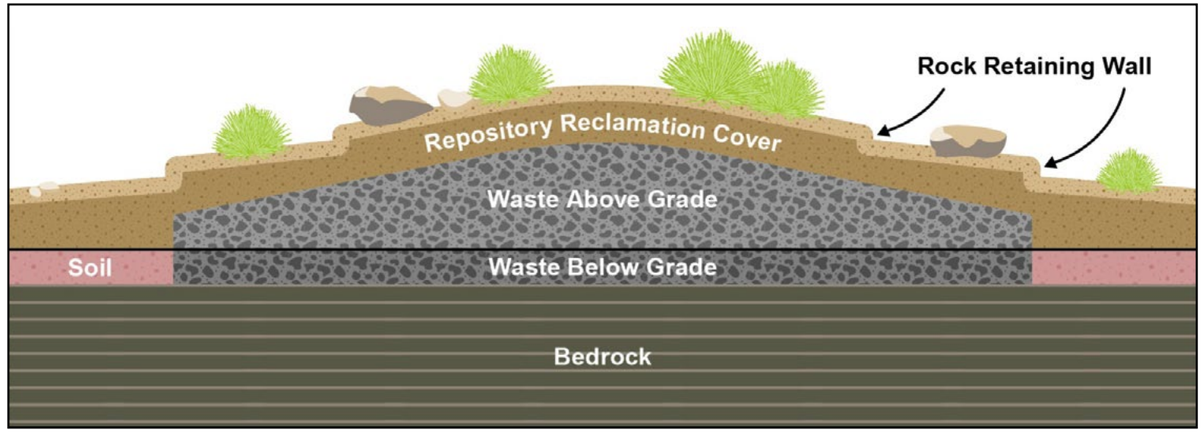
Contaminated material from the Mac No. 1, Mac No. 2, and Black Jack No. 2 Mines will be combined and buried at the Mac No. 1 Mine. Waste from the nearby Mariano Lake Mine will also be driven by truck to the regional repository at the Mac No. 1 Mine, located about one mile away. A repository in-place will be constructed at Black Jack No. 1 and it will only contain waste from the Black Jack No. 1 Mine.

USEPA's selected cleanup alternative is capping waste material in-place with a repository reclamation cover, such as an evapotranspiration (ET) cover, after waste has been combined. The land area of the repositories at the Mac No. 1 Mine and the Black Jack No. 1 Mine will be smaller than the areas of the mine boundaries.

## Repository Design

After the cleanup is done, the repositories will be closed and reclamation covers will be installed to protect the covered waste and prevent contaminant transport.

The repositories are designed to protect the public and prevent contamination of soil and water. The repositories are located away from drainage pathways and include features to deflect the flow of surface water. Waste material buried in the repository will be covered with clean soil and rock to form a protective layer on top of the ET cover. The ET covers are designed for long-term stability to prevent surface water from contacting the waste. An example repository design is shown on the figure on the opposite page. This figure shows waste buried underground, mounded, and covered with a reclamation cover and rock retaining wall.




## Site Restoration and Long-Term Maintenance

After the cover is placed, disturbed areas at will be restored with native vegetation. Excavations will be backfilled with clean fill soil and these areas will be regraded to prevent erosion, control the flow of stormwater, and support traditional land uses such as grazing, water sourcing, sacred sites, cultural preservation, and gathering in the future.

The repositories at the Mac No. 1 and Black Jack No. 1 Mines will be maintained in perpetuity. Signage and fencing will be installed to protect the regrowth of native vegetation. The signs and fences will be removed once vegetation is well established to ensure long-term sustainability. Ongoing maintenance on the cover and site inspections will be completed regularly.

## Glossary

| | |
|---|---|
| **Action memorandum** | Awritten record of a decision to remove hazardous materials from a site. |
| **Cleanup goal** | The level of contamination remaining in soil that is safe for people and the environment at the site after a cleanup is done. |
| **Cleanup option** | An option for a cleanup design to remove or safely contain hazardous materials at a contaminated site. |
| **Design phase** | A step in the cleanup process to plan the details of the construction and how the cleanup will be completed. |
| **Evapotranspiration (ET) cover** | A type of cover placed over a repository to prevent water from reaching the contaminated material and to isolate it from people and wildlife. ET covers store water from rainfall and snowmelt until drier or warmer weather evaporates the water, or plant roots take up the water and release it to the air as water vapor through the leaves and stems in a process called transpiration. |
| **Engineering Evaluation and Cost Analysis (EE/CA)** | A document comparing the advantages and disadvantages of different cleanup options to plan for the removal action. |
| **Removal action** | An action to clean up hazardous materials that pose a danger to people and wildlife. A removal action may include the excavation of contaminated soil, safely burying and covering contaminated material in a repository, and/or hauling contaminated material to a repository or a certified landfill located away from the site. After a removal action, the natural landscape is restored and vegetation is planted. |
| **Repository** | A central location where contaminated material is stored, covered, and managed. |