

# GILT EDGE MINE LEAD, SD

## Cleanup Activities

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## Background

The 360-acre Gilt Edge Mine site is located about 6.5 miles east of Lead, South Dakota. The primary mine disturbance area encompasses a former open pit and a cyanide heap-leach gold mine, as well as prior mine exploration activities from various companies. In the late 1990s, the most recent mine operator, Brohm Mining Company (BMC), abandoned the site and their on-going water treatment responsibilities to address acidic heavy-metal-laden water (acid rock drainage) that is constantly generated from the exposed highwalls of the three open mine pits and from the millions of cubic yards of acid-generating spent ore and waste rock.

Mining and mineral processing at the site began in 1876 when the Gilt Edge and Dakota Maid mining claims were located. Sporadic mining by numerous operators took place at the site until the early 1920s. Early gold miners developed extensive underground workings that wind through the central portion of the site and also engaged in some surface mining as well. From 1935 to 1941, the mines at the site were in steady production and the underground workings were expanded. Beginning in 1976, an extensive mine development program investigated potential production of gold or other minerals. In 1986, BMC commenced development of a large-scale open pit, cyanide heap leach gold mine operation. In July 1999 BMC abandoned the site and their on-going water treatment responsibilities to address acidic heavy-metal-laden water (acid rock drainage) that is constantly generated from the exposed highwalls of the three open mine pits and from the millions of cubic yards of acid-generating spent ore and waste rock remaining at the site.

Historical operations at the site contaminated surface water and groundwater with acidic heavy-metal-laden water. Investigation and cleanup activities at the site are ongoing. Interim remedies are currently in place for two of the site's three areas. And remedial action construction is in progress for the third area.

## What Has Been Done to Clean Up the Site?

The site is being addressed through federal and state actions.

EPA has completed the third five-year review of remedy implementation and performance at the site.

The five-year review concluded that the remedy at OU1 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

The interim remedy at OU2 is not protective because of the following issue: the numeric value for the chronic cadmium

standard for aquatic life is periodically exceeded in surface water.

The following actions need to be taken: EPA will evaluate this issue during the OU2 remedial investigation and feasibility study, after the OU1 remedy has been implemented to ensure protectiveness.

The interim remedy at OU3 currently protects human health and the environment because there are currently no completed exposure pathways. However, in order for the remedy to be protective in the long term, EPA will develop land use restrictions for the Ruby Repository to ensure protectiveness.

The next five-year review is required by June 2022.

The 2017 five-year review report is available for download:

- [Third Five-Year Review Report for Gilt Edge Mine Superfund Site, Lawrence County, South Dakota \(PDF\)](#) (57 pp, 5.2 MB, [About PDF](#))

Or can be viewed at the information repository:

- Phoebe Apperson Hearst Public Library  
315 Main Street  
Lead, South Dakota 57754  
(605) 584-2013

## **What Is the Current Site Status?**

EPA divided the site into three areas, also known as operable units (OUs). OU1 addresses surface contamination. OU2 addresses management and treatment of the acid rock drainage that threatens surface water in the area. OU3 addresses the Ruby Gulch Waste Rock Pile.

OU1: The long-term remedy, selected in 2008 and modified by an explanation of significant difference (ESD) in 2014, addresses source materials, including contaminated waste rock fill materials, spent ore, exposed rock surfaces, amended tailings, sludge and underground mine workings. It includes removal of mine waste from source areas and consolidation of this waste into on-site repositories in the Sunday, Dakota Maid and Anchor Hill Pits. The on-site repositories will be capped with a cover to limit infiltration. Areas that previously contained contaminated fill or other source material will be covered with enough topsoil to support vegetation. The remedy also includes institutional controls. Remedial design was completed in September 2014. Construction of the remedy began in 2017 and may take 8 to 10 years to complete. Progress on the construction will be dependent on the availability of federal funding.

OU2: An early-action remedy, selected in April 2001, included use of an existing acid rock drainage (ARD) collection system at the toe of the Ruby Gulch Waste Rock Dump and the existing water treatment facility to treat ARD. In November 2001, EPA selected an interim remedy to include collection and treatment of ARD from additional areas and converted the treatment process to a lime, high-density sludge system. This provided a cheaper and more efficient means of treating the water on site. Construction finished in October 2003. Water treatment and water quality monitoring are ongoing. After finishing the OU1 remedy, EPA will complete a remedial investigation/feasibility study (RI/FS) at OU2 to investigate the resulting new site conditions and develop a final cleanup plan.

OU3: EPA selected an interim remedy for OU3 in November 2001. Beginning in 2001, EPA graded and capped the Ruby Gulch Waste Rock pile, creating a repository to contain the waste rock and reduce water infiltration that produced large quantities of ARD. The cap also included a monitoring system, runoff and run-on diversion ditch control structures, an impermeable geomembrane and a clean soil vegetated cover. EPA also installed a toe drain to collect the residual acid mine drainage water generated due to base groundwater flows that could not be prevented. EPA finished the remedy in April 2006. Following construction, operation and maintenance activities and performance monitoring are ongoing.

In 2009, EPA, in consultation with the South Dakota Department of Environment and Natural Resources (DENR), performed additional work on the OU3 Ruby Repository surface water diversion ditches to reduce leakage of clean water

into the repository. Several sections of the diversion ditches were shown to be leaking. Pressure grouting was used to seal ditch sections with fractured rock and lining with HDPE plastic was used in other sections that had high rates of leakage. The work took place between 2009 and 2011.

A final remedy for OU3 will be developed in the future. The final remedy is anticipated to address the connection between the OU3 and the OU1 remedy cover systems by selecting a remedy for the final 8 acres of uncapped Ruby dump that are adjacent to the planned OU1 cover system. The final OU3 remedy will need to be consistent with the OU1 remedy cover system so that both remedies are effective in meeting their respective remedial action goals. The uncapped area is near the water treatment plant.

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