



## Mine Waste Repository Fact Sheet

Clark Fork Operable Unit of the Milltown Reservoir/Clark Fork River Superfund Site

January 2018

### What is a mine waste repository?

A mine waste repository is a secure, permanent storage area for contaminated mine tailings, soils, sediments and waste rock. The design and construction of mine waste repositories are closely regulated by state and federal law, which may include an impermeable liner and cap to prevent human and ecological exposure to arsenic and heavy metals such as cadmium, copper, zinc and lead. Repositories are generally excavated, and can be located below grade, above grade or both, depending on site conditions.

Repositories are designed with a cover soil and top soil to establish vegetation. The cover serves as a barrier to prevent human and environmental exposure to waste.

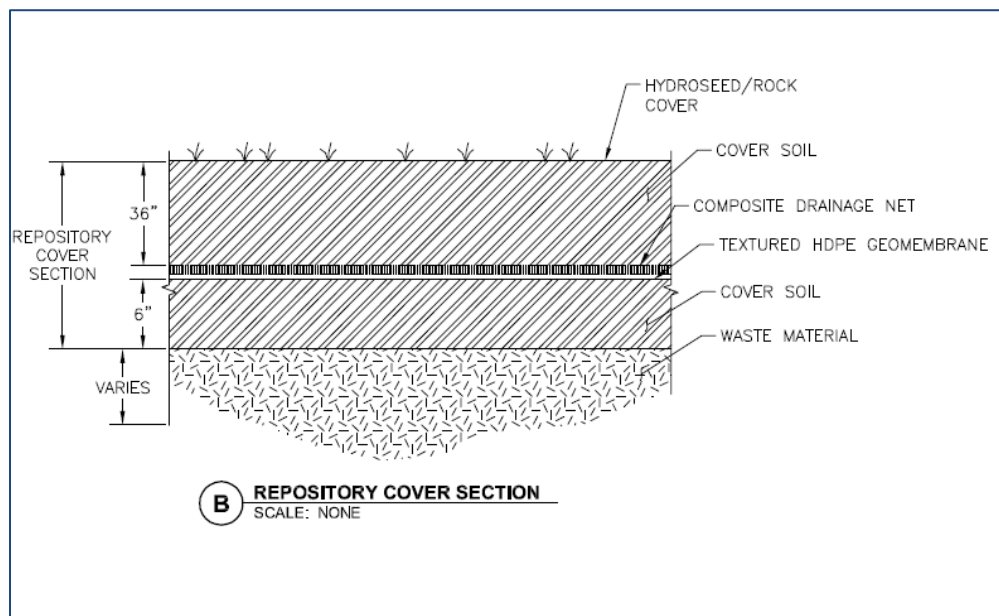


Figure 1 - Conceptual Repository Design with a Top Liner

### Why is DEQ considering construction of a mine waste repository on the Clark Fork?

One of the most significant costs of any mine waste cleanup project is hauling waste long distances. Cleanup costs can be substantially reduced by building a new repository closer to future work sites, freeing cleanup settlement dollars for upcoming cleanup phases.

### Where are the existing tailings repositories for the project located and how big are they?

Currently, DEQ hauls contaminated materials from the Clark Fork River Project to the Opportunity Ponds near the town of Opportunity, Montana. The Opportunity Ponds were designed and built as a tailings impoundment for waste byproduct from the Anaconda smelters. Processed mine waste (tailings) from the smelters was mixed with water (slurried) and pumped to the site. The waste management area (WMA) has not truly been a “pond” for many years.

Starting in the late 1990’s, the ponds were being capped and transitioned into a WMA. In recent decades the area has been used as a management area for wastes from other regional Superfund sites. In particular, mine tailings removed from the Silverbow Creek, Milltown Dam site near Missoula, and the Clark Fork River were transported to the Opportunity Ponds. The Opportunity Ponds cover approximately 5.4 square miles, with tailings deposits averaging about 20 feet in depth; in the upper tiers of the repository, tailings deposits are as much as 80 feet deep. The Opportunity Ponds holds hundreds of millions of cubic yards of mine waste.

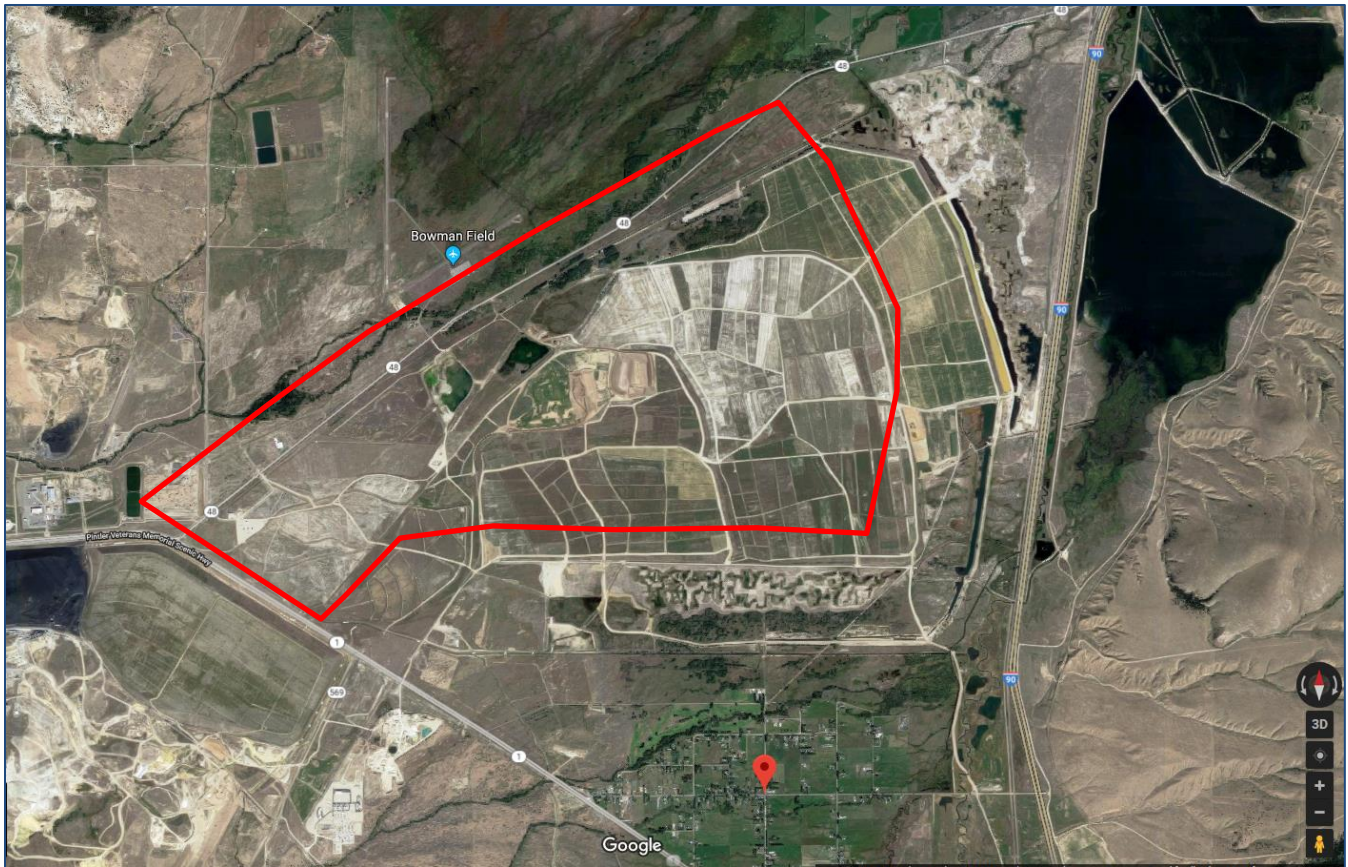


Figure 2 - Opportunity Ponds East of Anaconda, Montana. Red line indicated the approximate boundary.

**What measures would be taken to ensure that heavy metals in a new mine waste repository don't impact the surrounding environment?**

The design, engineering and construction of mine waste repositories are guided by a wide range of state and federal regulations to protect human health and the environment over the long term. These regulations are called "Applicable or Relevant and Appropriate Requirements" or "ARARS." Under the CERCLA (federal Superfund) requirements, a new repository must meet all of those laws and requirements. For example, mine waste repositories cannot degrade surface or groundwater quality, be located in a seismic (earthquake) impact zone, within 200 feet of a fault line, or in a geologically unstable area. Federal and/or state law also require storm water run-on and run-off control, control of wind dispersal of particulate matter, and long-term cap maintenance and monitoring, among many other criteria. State law also governs transportation of waste to the repository to prevent dumping, spilling or leaking from the transport vehicle.

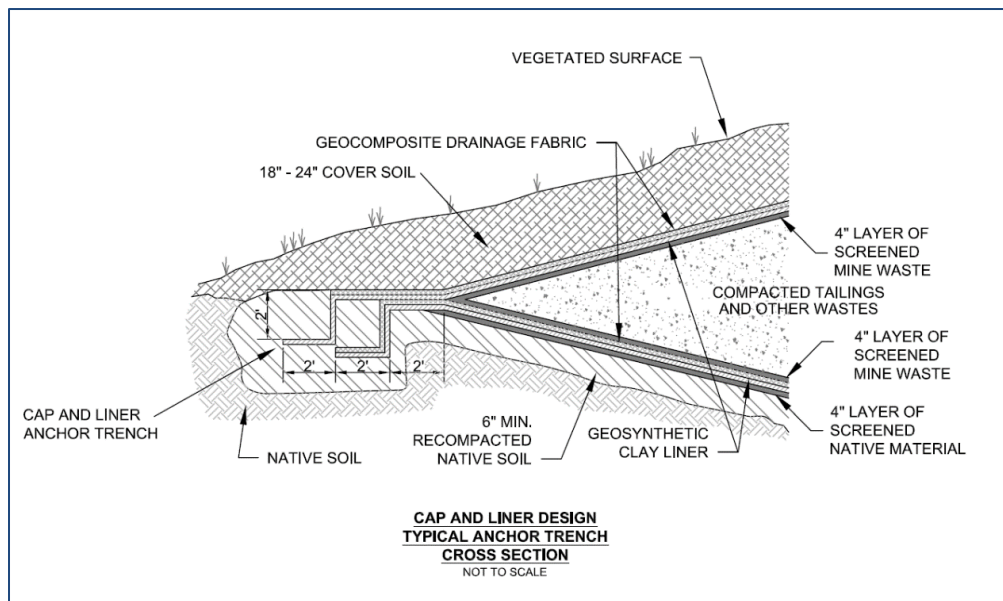


Figure 3 - Conceptual Repository Design with a Top and Bottom Liner

**What is the process for identifying a new mine waste repository?**

DEQ is conducting a Preliminary Repository Investigation to evaluate whether suitable new repository locations exist. Based on economic viability and land availability, DEQ will perform a site-specific Repository Investigation to further assess the conditions at the preferred repository locations. Once a final location has been identified, DEQ will seek public comment to determine whether to move forward with design and construction. Any additional repository location/s will have to be approved by the EPA before construction.

**What factors does DEQ consider when siting a repository?**

DEQ is statutorily required under state and federal law to comply with many factors when identifying potential sites for mine waste repositories including:

Evaluation Criteria	Basis of Evaluation
<b>Available Area</b>	Based on the best available data, does the site have enough space to dispose waste and/or conduct site operations?
<b>Slope</b>	Based on the best available data including USGS Quad Maps, DEM contours and survey data, what is the typical slope of the site?
<b>Available Capacity (cy)</b>	How much waste can be disposed at the site?
<b>Groundwater Concerns</b>	Based on the best available data including test pits, well logs, and topography, what is the anticipated depth to groundwater at the site? Does vegetation suggest seasonally saturated areas?
<b>Surface Water Concerns</b>	Based on existing mapping and aerial photography, are there surface water expressions, wetlands, stream channels or other surface water drainage concerns at the site? What is the approximate distance to the nearest surface water receptor?
<b>Geotechnical Concerns</b>	Based on the best available data including SSURGO Soils data, test pits, well logs, boring logs, geotechnical reports, design reports, and local geologic setting, does the site have obvious stability, seismic, or constructability concerns?
<b>Suitable Soils</b>	Based on the best available data including SSURGO Soils data, test pits, well logs, boring logs, geotechnical reports, design reports, and local geologic setting, does the site appear to have soils suitable for repository construction?
<b>Potential Borrow Source</b>	Based on the best available data including SSURGO Soils data, test pits, well logs, boring logs, geotechnical reports, design reports, and local geologic setting, does the site have the potential to produce clean backfill materials for reclamation work in the OU and for capping the repository?
<b>Land Ownership</b>	Based on current Montana NRIS GIS landowner data, CAMA Data, previous reports, and communications with agencies who currently owns the site?
<b>Accessibility</b>	Based on the best available data including USGS Quad Maps, Aerial photographs, GIS Data, visual and topographical survey data, previous reports and communications with agencies, is road access to the site currently available?
<b>Haul Distance</b>	What is the estimated haul distance to the site on existing roads from the mining area?
<b>Distance From Residences</b>	Based on the best available data including USGS Quad Maps and Aerial photography, what is the estimated distance to nearby buildings, business, or residences?
<b>Visibility</b>	Based on the best available data including USGS Quad Maps and Aerial photography, is the site visible from main (paved) roads?
<b>Short-Term Impacts</b>	What will be the potential short term impacts to the surrounding landowners, infrastructure, etc.?
<b>Human Health and Safety</b>	Are there any particular Human Health and Safety concerns associated with waste disposal at this location?

Figure 4 - Initial Screening Criteria

**What happens when DEQ is done moving waste to a repository?**

When mine waste cleanup is finished, or when a waste repository has reached capacity, the repository is covered with a cap to prevent rain or snow melt from seeping down to contaminated material and leaching into groundwater. The cap may include an impermeable liner and then cover and top soil. Repository conditions may also require a bottom impermeable liner. Design of the repository depends on site conditions and waste.

“Institutional Controls,” such as access or usage restrictions, are established to ensure that human activity, such as off-road vehicle traffic, doesn’t damage the cap. DEQ would be responsible for management of any repository and necessary maintenance. Cattle grazing could easily be part of any long-term management scenario.



Figure 5 Excavating and Placing Waste in a Repository

#### How are repositories monitored over the long term?

Federal and state regulations include criteria for the long-term monitoring and maintenance of mine waste repositories after closure. Such monitoring includes vegetation and groundwater monitoring.



Figure 5 - Repository after Revegetation Currently Supporting Wildlife Habitat

#### What if a suitable new repository site can’t be found?

If the cost benefit analysis of a new repository precludes moving forward, the DEQ will negotiate expanding the existing site at Opportunity Ponds to accommodate waste from cleanup.