

Upper Blackfoot Mining Complex Fact Sheet

Introduction

The Upper Blackfoot Mining Complex (UBMC) is an inactive mining district, which was mined intermittently from 1889 to the 1950s. The UBMC is located at the headwaters of the Blackfoot River in a fairly remote location on both private and National Forest land. The town of Lincoln is about 15 miles downstream. A tailings impoundment area (Mike Horse dam and impounded tailings) as well as numerous mining portals and waste piles were created as part of the historic mining activities at this site. These features have and continue to cause environmental and human hazards due to their heavy metals contents. Tailings are fine-grained materials created during mineral processing that contain metals. Beartrap Creek was diverted in the 1940s and the tailings were placed behind an earthen dam (Mike Horse dam), which blocks the drainage. The Mike Horse dam failed in 1975 contaminating the floodplain with tailings and killing fish and other aquatic life for several miles downstream.

The removal of the mine waste and tailings will include approximately 420,000 cubic yards from the impoundment and an additional estimated 400,000 cubic yards from the remainder of the UBMC. The amount of material that will be removed from the floodplain has not been determined to date, so this preliminary estimate could be higher or lower. The total amount of tailings and mine waste removal over the entire UBMC is much more than the amount considered in the Engineering Evaluation/Cost Analysis (EE/CA). Throughout the UBMC floodplains, including the impoundment, the chemical and physical properties of the waste and tailings will require special handling during removal. The removal will include adequately drying, compacting, and covering the waste and tailings to reduce/eliminate exposure and subsequent reactivity with air and water.

Need for a Repository

Locating a suitable repository for these tailings must happen before clean up (remediation) and restoration of the UBMC can begin. A repository is an engineered facility to contain and control waste. Generally, repository locations need to include the following to reduce the potential for contaminating surface and groundwater:

- Located outside the 100-year floodplain,
- Located outside of wetlands,
- Have gentle topography (land shape),
- Be large enough (enough capacity) to hold the amount of tailings to be removed, and
- Have favorable chemical and physical characteristics.

Topography, distance to surface and groundwater, and seismic stability are also evaluated to determine the suitability of a potential repository site. The goals are to reduce risk of contamination and reduce cost by creating a reliable, stable, low-maintenance repository that is within a reasonable haul distance from the UBMC. A site that also provides its own borrow material for construction and reclamation is preferred. Borrow is soil or rock taken from one area to use at another, as in a borrow ditch along the roadway where the material was used to build the road.

Repository Options

Paymaster

The Paymaster was identified as the preferred repository location in the EE/CA, pending design level investigation. The Paymaster area was further evaluated in 2009/2010 as a borrow source and repository location. Design at this site, located south of the Blackfoot River, between Paymaster and Meadow Creeks, becomes more difficult and more complex with the amount of waste that must be placed in a repository.

Upper Blackfoot Mining Complex Fact Sheet

The following summarizes conditions that are less than ideal at the Paymaster:

- The average slope is steep (24%).
- Preliminary design indicates that to create the necessary capacity a 50-80 foot highwall (retaining berm) would be placed approximately 50 feet from the Blackfoot River and its wetlands. Blasting of the hillside may also be required for capacity.
- The depth to groundwater on the lower slopes of the proposed repository is between 6 and 11 feet below ground surface as measured in August/September 2009. Generally, at least 10 feet of separation between the bottom of a repository and groundwater is required.
- Chemical test results from the native soil at Paymaster show high metals levels with a potential to leach into the environment at levels that exceed water quality standards. Exposing this material to air and fluctuating water levels will cause undesirable reactivity conditions; therefore, it is not suitable for borrow material to rebuild the floodplain. Additionally, if used as a cap or retaining berm, significant engineering controls would be necessary to keep rainwater from penetrating into the cap and to keep groundwater from rising into the berm from below.
- There are clay layers that make engineering an appropriate design more difficult. Clay layers like the ones observed at Paymaster are typically created by geothermal reactions that modify the surrounding rock. Therefore, the clay exists where the water travelled and is not in distinct, predictable layers.
- The seismic safety factor achieved at Paymaster is 1.1, which just meets the minimum standard safety factor. Implementing significant engineering controls to reduce long-term risk of failure (settling, sloughing, movement down slope, etc.) would be required. This risk reduction would be costly and require a high level of quality control during construction and maintenance in the long term.

Township 15 North, Range 7 West in Section 35 northeast of Highway 279 – A Possibility

Section 35 is approximately five miles from the new Meadow Creek Road via Highway 200 and Highway 279. This site was evaluated to determine if the physical and chemical properties were suitable for a repository or borrow source for the UBMC. Data collected at this site does not show any problems that would restrict the use of the site for either a repository or borrow material. A repository could be built on Section 35 with enough distance from the Blackfoot River and Nora Creek that there would be virtually no risk of contaminated material reaching surface water. Additionally, the following information identifies this site as potentially favorable:

- Highway 279 bisects Section 35 from approximately the southeast to the northwest corners and visibility along the highway is good. This allows safe access to the site.
- The observed topography and the acreage of the site allows for significant separation from surface water. Except for elevated cadmium and zinc levels in the Blackfoot River from upstream sources, the surface water on the site is of good quality.
- Data verified significant deposits of glacial till and alluvium over shales. The glacial till has very low permeability. Low permeability soils are useful when trying to limit exposure to and restrict movement of air and water, such as the construction of a cap or liner.
- The groundwater elevation seems to match the elevation of Nora Creek. Once accurate topography is available, this will be verified. The depth to groundwater in the majority of the site would allow, with proper design, adequate separation/protection of groundwater. Areas of shallow groundwater would be easy to avoid during construction.
- The soils have low metals values and are not reactive, which make them suitable for use as a borrow source for reclamation and restoration.

While these factors individually don't determine "suitability," they do support the potential for the use of the site as a repository and borrow source.

Section 35 is owned by Stimson Lumber Company and Seiben Livestock Co. Under a state Administrative Order on Consent, Stimson must pay the Montana Department of Environmental Quality \$300,000 for past costs associated with the cleanup of another site. The DEQ has the option of accepting the Stimsons' ownership interests on the Section 35 property in lieu of the payment, if the property is ultimately determined to be a suitable repository or borrow location.

Upper Blackfoot Mining Complex Fact Sheet

Other Places We've Looked

- The Forest Service Repository Siting Investigation (April, 2006) resulted in the review of ten potential sites. Of these sites only the Paymaster site and an area west of the existing tailings impoundment were evaluated in detail as alternatives in the EE/CA.
- First Gulch was identified as a possible repository location in 2006 and evaluated in the EE/CA, since this land had just been acquired by the Forest Service. It is located on the north side of Highway 200 and is about four miles from the Mike Horse Mine road, including 1.25 miles of dirt access road. The evaluation included data from eleven test pits, ranging in depths from 6 to 10 feet. The excavated material consisted of considerable amounts of coarse rock and suggests that bedrock is not much greater than the depth of the test pits. This also indicates that potential for borrow may be minimal and of poor quality due to the rock content. There were two wells drilled to depths of 80 feet which encountered groundwater at around 60 feet below ground surface. Preliminary repository design estimates show that multiple repositories would be needed to accommodate the tailings, and those locations are all on steep slopes above tributaries to the Blackfoot River.
- The Montana DEQ Repository Siting Investigation Report (September, 2006) included lands outside the upper drainage (within a 10 mile radius). This evaluation identified five general areas where there was the potential for suitable characteristics. The Horsefly Creek repository site was included in the EE/CA as a result of its identification during this effort. The Horsefly Creek area is located approximately 5 miles downstream from the UBMC, as the crow flies. While the topography and capacity look suitable, the access to the area is either on a dirt road, which adds several miles to the haul equating to a significant increase in cost, or through a residential and industrial property and up through the Horsefly Creek drainage.
- In 2009, DEQ and the Forest Service conducted another effort to find a suitable repository site within the upper Blackfoot River tributaries area. This search identified additional possibilities not previously included in the reports in the EE/CA, but there were no suitable alternatives. Below is a list of other options considered:
 - A ridge above Mike Horse Creek as a possible repository location based on available topography maps. However, field inspection revealed the ridgeline was too narrow and steep to be used for this purpose.
 - A flat bench in the upper drainage of Shave Gulch, but field inspection determined this area was too small to be a viable repository.
 - The option of pumping the tailings from the impoundment back into the mine has been considered. This option is difficult to evaluate because of the poor condition of the mine. Access to the mine is difficult and dangerous, either because of collapsed mine entrances, or because the workings are flooded. Significant, expensive mine repair would be required for safe entry to evaluate the suitability. Even with repairs, predicting the impact to groundwater would be challenging.
 - The Shave Gulch site, located north of the Blackfoot River, east of Shave Gulch, is farther from both surface and groundwater than Paymaster, but its storage capacity is less than 400,000 yards. The depth to groundwater on the lower slopes of the proposed repository is 14 feet below ground surface as measured in August/September 2009. And the seismic safety factor achieved at Shave Gulch is 1.1, which just meets the minimum standards for safety.
- During public field trips in late summer 2010 to the UBMC and Section 35, two additional repository options were identified by participants that the agencies agreed to include as part of their continuing evaluation of repository options. These sites include McDonald Meadows and a possible site on the east side of the Continental Divide. The Technical Memorandum that will be issued for public comment will include a generalized comparison of features of these sites to Section 35.



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