

## Award Winning Project - Upper Blackfoot Mining Complex – Phase 2 Construction



### Montana Contractors' Association Award Water Quality Special Project Award

*Project 2011-Current. In 2011 Pioneer began site investigations. Phase 1 construction on the Upper Blackfoot Mining Complex (UBMC) repository began in 2013 and Phase 2 began in 2014. This project is currently in the second year of construction with construction completion expected in 2017.*

The UBMC encompasses 6 square miles of historic mining areas at the headwaters of the Blackfoot River. The area is the headwaters of the Blackfoot River and is also known as the Mike Horse, which is the largest mine in the area. This project involves remediating a large expanse of mine-impacted soils and floodplain wastes caused by a massive dam break in the mid-1970s, placing the wastes in a mine waste repository, and restoring the Upper Blackfoot River, Beartrap Creek, and Upper Mike Horse Creek.

#### Upper Blackfoot Mining Complex Phase 2 Construction Project Description/Dates

Helena Sand & Gravel, Inc. began work on the Upper Blackfoot Mining Complex Phase 2 in July 2014 under the direction of the Montana Department of Environmental Quality (DEQ) and Pioneer. The Phase 2 project was substantially complete in December 2015.

The Upper Blackfoot Mining Complex (UBMC) is a state superfund facility located about 15 miles east of Lincoln. Mining activities began in the UBMC project area in the late 1800s and continued into the 1950s. Lead, zinc, and copper were the major mine products, with some minor production of gold and silver. In 1941, the Mike Horse Dam was constructed across Beartrap Creek creating the Mike Horse Tailings Impoundment where tailings from Mike Horse Mine mill were disposed.

Phase 2 is one segment of an ongoing cleanup effort lead by Montana DEQ in coordination with the U.S. Forest Service (USFS) and Montana Natural Resource Damage Program (NRDP). The Phase 2 work included excavating and removing mine wastes/tailings with heavy metal concentrations and placing the waste in a lined repository. Additional features of the project included installation of storm water controls, stream channel and floodplain reconstruction, building temporary haul roads, removal of debris, and reclamation of areas impacted during construction. Specifically, the Upper Blackfoot Mining Complex Phase 2 work included the tasks below:

#### **The Team**

**Montana DEQ:** Project Owner

**Pioneer Technical Services Inc.:**

Project Engineer. Repository design, site investigations for the floodplain, groundwater, and repository; remedial investigation and feasibility study (RI/FS), design process.

**River Design Group:** Flood plain and stream channel design.

**Spectrum Engineering:**

Impoundment removal design

**Helena Sand & Gravel:** Construction contractor.

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- Removing approximately 150 tons of debris.
- Excavating 136,000 cubic yards (cy) during the construction of Phase 2 repository.
- Constructing 2,950 linear feet (lf) of repository sub-drain.
- Installing 55,440 square yards of drain gravel, geotextile, and low permeability fill during construction of Phase 2 repository.
- Excavating, hauling, and placing 335,000 cy of mine tailings.
- Constructing 500 lf of temporary creek channel.
- Constructing 2,450 lf of stream channel with step pools, wood, and vegetated soil lift treatments.

Extensive dewatering was required during the removal of tailings/impacted soils, repository construction, and placement of new vegetative backfill.

### What Makes the Project Special?

Prior to reclamation efforts, the UBMC consisted of mine tailings, waste rock dumps, surface water, soil, and groundwater contaminated from mining over the past 100 years. In 1975 the Mike Horse Dam was breached during a spring storm event that produced heavy rain runoff combined with rapid spring runoff. The breach released an estimated 100,000 tons of tailings and other materials into the UBMC project area below the dam. The removal of the Mike Horse Dam and the tailings stored in the impoundment area will eliminate future events like the 1975 Dam breach. *Removing the impacted soils and reconstructing the*

*stream channel and floodplain will help to restore a self-sustaining ecological process that will result in clean, connected habitat for Westslope cutthroat trout, support downstream populations of bull trout and other important aquatic species, and maintain adjacent riparian and terrestrial habitat to support wildlife populations that depend on those habitats.*

Prior to reclamation, much of the floodplain and stream banks were unable to support vegetation such as grasses, shrubs, trees, willows, and other plants. These areas were barren of vegetation, more susceptible to erosion, and poorly suited to support wildlife. During the project, impacted soils were removed and replaced with contaminant free and nutrient rich soils better suited to support vegetation. A vegetative stream bank and floodplain also improves the aquatic habitat of the UMBC project area. Once trees, willows, and grasses grow along the stream banks and floodplain, they will provide shade that's needed to keep the stream cooler. Trout and other aquatic species rely on cooler water temperatures to survive and thrive.

While removing the tailings/impacted soils the project design also called for stream channel enhancements. The new stream channel incorporates pools and varying stream widths to improve aquatic habitat and diversity beyond just removing the contaminants.

### How Does the Project Benefit the Environment?

The UBMC project area is located in the headwaters of the Blackfoot River where numerous perennial and intermittent streams contribute to the combined flow of the Upper Blackfoot River. All surface waters within the UBMC project area affect the growth and propagation of Salmonid fishes and associated aquatic life, waterfowl, and furbearers as well as recreation activities, agriculture and industrial water supplies, and ultimately drinking



Excavation & Removal of Tailings/Impacted Soils



Repository

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water. Prior to reclamation efforts, the contaminated areas of the UMBC were releasing pollutants (cadmium, copper, iron, lead, manganese, zinc, and aluminum). The Mike Horse Tailings Impoundment along with un-vegetated steep valley walls bordering Mike Horse Creek had contributed large sediment loads transported by Beartrap Creek and deposited downstream into the Blackfoot River and its floodplain. By removing the contaminated/impacted soils and enhancing the stream channel, the UMBC reclamation project removed the contaminant source and provided direct improvements:

- Improved water quality in the Beartrap Creek and Upper Blackfoot River.
- Improved groundwater quality in the surrounding area.
- Allowed for the area to naturally reestablish native vegetation in stream banks and floodplain to support a diverse wildlife habitat and maintain cooler water temperatures for the aquatic ecosystem.
- Eliminated future erosion resulting in contamination entering waterways.
- Enhanced the stream channel, which improved erosion control, aquatic habitat diversity, and water quality.

All the improvements have substantial benefits to wildlife, aquatic diversity, and human health/safety. Once the revegetated areas are more established, the project area will more closely resemble pre-disturbance conditions and will offer a beautiful place for hiking, biking, birdwatching, and general recreation.

For a virtual tour of the area visit <http://www.deq.mt.gov/statesuperfund/ubmc/virtour/default.mcp>. For more information visit the Pioneer website at [www.pioneer-technical.com](http://www.pioneer-technical.com).

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