



Client: Pioneer Technical

Project Background

The McLaren Tailings Abandoned Mine Site, once an active hard rock mine and milling operation, was designated as a priority for cleanup by the Montana Department of Environmental Quality’s Mine Waste Cleanup Bureau.

Mill tailings and waste rock were among the waste sources identified within the historic floodplain of Soda Butte Creek. These materials contributed to acid mine drainage, which degraded both water and sediment quality in the creek.

Key contaminants of concern (COCs) included aluminum, arsenic, barium, cadmium, chromium, copper, mercury, iron, lead, manganese, nickel, and zinc. Elevated concentrations of copper, iron, and manganese were detected downstream.

The reclamation project aimed to reduce exposure to these hazardous contaminants, curtail their migration, and address the negative effects on local surface and groundwater. The project involved removing waste from key areas and relocating the stabilized tailings to an engineered on-site repository.

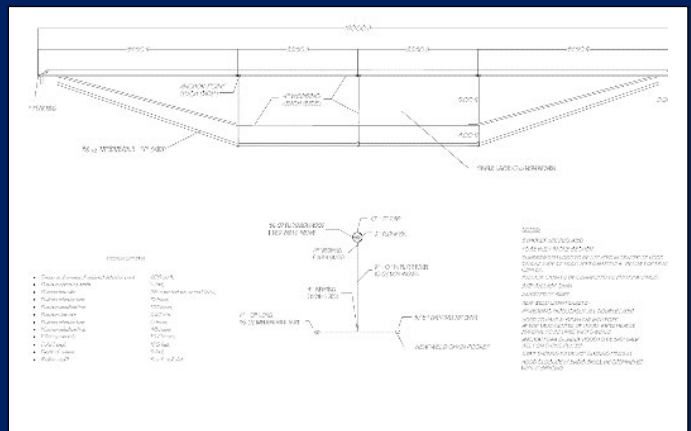


Figure 1. DWG cross section of barrier design



Figure 2. Aerial view of deployed barrier system

Design and Installation

As part of the reclamation process, wastewater was directed to an onsite treatment facility where it was treated using a combination of hydrated lime and oxygen.

After treatment, the water was released into a sediment retention pond equipped with two bottom-sealing filter barriers, each tailored to the pond's bathymetry.

These barriers featured composite filter layers designed to capture increasingly finer particulates. The system allowed for a flow rate of up to 300 gallons per minute, facilitating the precipitation of metals as the water passed through the pond.

Once filtered, the clean water was discharged into nearby Soda Butte Creek.

Conclusion

In collaboration with engineers from Pioneer Technical, the bottom-sealing filter barrier was selected to enhance the effectiveness of the sediment detention pond.

Combining chemical treatment of the influent with fine particle filtration, this system ensured that the treated effluent could safely rejoin the pristine waters of Soda Butte Creek, successfully meeting the project's environmental goals.

References:

Final 2012 Construction Completion Report for the McLaren Tailings Abandoned Mine Site, Pioneer Technical

McLaren Tailings Reclamation Project Status,
Montana Department of Environmental Quality

Table 1. System Discharge vs. DEQ Standards

Chemical	Target	Maximum	Average
Iron	0.3	1.2	0.59
Manganese	0.05	0.096	0.042
Aluminum	0.087	<0.03	<0.03
Copper	0.012	<0.005	<0.005
Cadmium	0.00033	0.002	<0.00008
Zinc	0.15	<0.01	<0.01

Table 2. Water Quality vs. DEQ Standards

Chemical	Target	Tailings	Influent
Iron	0.3	1490	21.7
Manganese	0.05	19.6	0.47
Aluminum	0.087	13.9	<0.03
Copper	0.012	1.86	0.1
Cadmium	0.00033	0.006	0.00011
Zinc	0.15	1.73	0.04

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