

## **Milltown Reservoir**

### **Site Description**

The Milltown Reservoir Sediments Operable Unit (OU) of the Milltown Reservoir/Clark Fork River Superfund Site is located in Missoula County, Montana at the confluence of the Clark Fork and Blackfoot Rivers, and adjacent to the unincorporated communities of Milltown and Bonner. The Milltown Dam, built in 1907, constricts both rivers at their confluence. During the past century, mine waste materials have washed downstream and now some 6.6 million cubic yards (mcy) of sediments have accumulated in the Milltown Reservoir. Mine wastes in the sediments contain elevated concentrations of metals and arsenic. Water from the reservoir is used as a drinking water source and a presence of arsenic presents potential human health risks. An alternate drinking-water supply was provided to the immediately affected people of Milltown in 1984 and 1985, but the aquifer contains arsenic and trace metals and the plume is potentially unstable. There are also risks to downstream aquatic life, primarily from copper, when high flows and ice scour events release sediments over the dam.

The goals for cleanup of the Milltown Reservoir Sediments OU are to restore the Milltown drinking-water supply, to allow unrestricted fish passage, and to return the Clark Fork and Blackfoot Rivers to a more natural and free-flowing state leaving the community with new hiking, biking and equestrian trails.

### **Potentially Responsible Parties (PRPs)**

Under the Consent Decree, the Atlantic Richfield Company (ARCO) and North Western Corporation have agreed to perform the cleanup at the OU.

### **Threats and Contaminants**

Historical non-point discharges of mining wastes from mining operations at Butte and Anaconda as far as 120 miles upstream consisting of heavy metals, primarily arsenic, cadmium, copper, lead and zinc.

### **Cleanup Approach and Remedial Activities**

As stated in the Record of Decision dated December 20, 2004, the selected remedial action(s) include:

- the removal of 2.6 mcy of sediment from the reservoir
- the construction of a new river channel (bypass channel) with flood plains through Area 1
- removal of the spillway and radial gate of Milltown Dam to prevent future impoundment of new sediments
- additional restoration activities for the removal of the powerhouse, right abutment, and divider block; changes in the floodplain topography and channel alignment throughout the entire Milltown Reservoir Sediments OU; implementation of soft stabilization/revegetation techniques to stabilize the channel
- the removal of the Stimson Dam as an extension of this project; it is being planned by the United States Fish and Wildlife Service (USFWS) with matching funds. The Stimson Dam is located 1.5 miles upstream from the Milltown Dam on the Blackfoot River
- adjustment of hydrologic conditions to accelerate natural attenuation of groundwater contamination, allowing natural attenuation processes to restore the aquifer through time

The Milltown Reservoir Sediments OU is divided into two sections: the upper reservoir sediment areas (Areas 4 and 5) and the lower reservoir sediment areas (Areas 1, 2, and 3). The upper and lower reservoir sediment areas were further divided into areas 1 through 5 based on sediment accumulation.

Sediments in Area 1 will be removed. Prior to sediment removal and the construction of the bypass channel, the sediment in Area 1 will be isolated from the Clark Fork River by a wall of interlocking sheet piling at the head of the bypass channel and at the mouth of the channel where it connects to the Blackfoot River. This includes the dewatering and removal of the primary source of sediment in the reservoir, approximately 2.6 mcy over an approximate area 4,300 feet long by an average of 800 feet wide. Sediment from Area 1 will be transported by rail and disposed of in an existing waste repository at the Anaconda Smelter Company Superfund Site. This repository for "dry" materials, called Opportunity Ponds, is located approximately 100 miles upstream of the Milltown Reservoir. Sediments in Areas 2, 3, 4 and 5 will initially be left in place. Approximately 2 mcy, out of the total 2.6 mcy, will be removed by pre-loading. The method of pre-loading covers sediments with a layer of

clean fill material up to 9 feet thick to force the sediment to consolidate and to release excess water to the lowered reservoir channel areas. The consolidated sediment is more stable for the equipment removing it. The sediment will be removed using large excavators and will be backfilled following the excavation.

A bypass channel will be constructed prior to the drawdown and removal of sediments from Area 1. The Clark Fork River will be routed through the bypass channel originating at the Duck Bridge abutments and will run adjacent and parallel to I-90 to a new confluence point with the Blackfoot River. The channel will be approximately 100 feet wide; it will be excavated into the underlying alluvium (up to 5 feet) to maintain the desired grade through the confluence with the Blackfoot River. The EPA requires the channel to contain a 100 year, 24 hour flood event. Approximately 600,000 cy will be removed from the bypass channel (this 600,000 cy is part of the total 2.6 mcy to be removed from Area 1). Prior to excavation of the sediment the reservoir water level will be lowered 8 to 10 feet below the normal level by opening the radial gate in the Milltown Dam.

Approximately 416,000 cy of higher metals-containing sediment located in Area 3, directly adjacent to the Milltown Dam and Blackfoot River, will be left in place but will be isolated from the flood plain. This area will remain above the constructed river's 100 year floodplain. An additional 30,000 cy of sediment located in front of Milltown Dam within Area 3 will be removed and placed with the higher metals sediment that is to be left in place.

A rail staging area will be constructed between I-90 and the river for the transport of excavated sediment to the Opportunity Ponds waste repository. Rail transport will be provided by two unit gondola rail cars and will require approximately 26,500 to 29,000 rail car loads with 83 cy capacity cars. The rail cars will be transported every night to Opportunity Ponds, so a train full of empty cars will be onsite every morning. The sediment transported to Opportunity Ponds may be used to cap Cell D at the waste repository.

According to the EPA, the estimated cost for removal of the dam and sediments that have the highest concentration of metals is \$95 million.

### **Activities to Date**

Envirocon, the supervising contractor hired by ARCO, is performing all portions of the remedial action cleanup work and Montana Rail Link is providing the sediment

transportation services. Once the dam is removed, the sediment will be excavated and transported by rail to Opportunity Ponds, in Opportunity, Montana where it will be used in the reclamation of inactive tailings impoundments. Opportunity Ponds is a waste repository at the Anaconda Smelter Company Superfund Site owned by ARCO.

### **Dewatering Reservoir Sediments**

To determine how efficiently and quickly water could be removed from the sediments in the Milltown Reservoir; a dewatering test was performed in 2006 and completed in January 2007. Approximately 40,000 cy of sediments were excavated by Envirocon from a “test pit” using a model 600 Truck Excavator with a 58’ reach and a 4 yard bucket. The excavated sediment was stockpiled and surrounded by a temporary berm, then later transported by rail to Opportunity Ponds. The test pit was surrounded with dewatering wells that were set down in the alluvium to draw water out. A wick drain system connected to eductor wells was installed in the sediment layer for additional drainage. The dewatering wells performed adequately and the wick drains and eductor wells were not necessary. A 25 ton articulated truck was used to haul excavated sediment and a D 6 Cat was used to move materials within the test pit area. The D 6 Cat was chosen because it has special treads that enable it to climb slopes better than other equipment. This test pit is located in what will become part of the bypass channel.

### **Site Infrastructure**

Before sediment excavation can begin, all of the necessary site infrastructure must be constructed to safely support sediment dewatering, removal and transport. Infrastructure includes the Clark Fork River bypass channel, roads to move materials and excavated sediments, containment areas, construction of the Clark Fork River and Blackfoot River flood berms, sedimentation basins to keep rain and snowmelt from flowing to the portion of the Clark Fork River within the Milltown Reservoir, the rail yard and loading facility, as well as offices, repair and on-site maintenance shops. The road network is used to move materials to and from various areas of the site. The roads will eventually be used to move sediments excavated from the reservoir to the rail line for transport to the Opportunity Ponds waste repository at the Anaconda Smelter Company Superfund Site.

Conventional excavators and trucks are planned as the equipment to excavate, sort and transport material within the Milltown Reservoir Sediments OU. Road legal trucks will be used to haul the material destined for disposal at BFI landfill in

Missoula, Montana. Articulated off-road haul trucks will be used to haul the remaining excavated sediment and material to the temporary staging area before it is railed to Opportunity Ponds.

### **Clark Fork and Blackfoot River Flood Berms (2007)**

Construction of the Clark Fork River flood berm (along the bank of the river In Sediment Accumulation Area I (SAAI)) began in February 2007 and construction of the Blackfoot River flood berm began in March 2007.

The Clark Fork River flood berm was completed in April 2007. It was built to withstand a 10-year flood event. The berm was constructed of approximately 12,000 cy of rip rap and 40,000 cy of compacted fill to protect the project area from flooding and erosion and to prevent impacted sediments from entering the Clark Fork River. The Blackfoot River flood berm was completed in May 2007. The Blackfoot River flood berm was constructed of approximately 9,100 cy of rip rap and 5,600 cy of compacted fill.

### **Current Site Activities as of the week of August 7, 2007 (the most recent Weekly Update posted by the EPA):**

- Excavation of the bypass channel continues. Envirocon excavated 21,000 cy of sediment from the bypass channel. To date 346,800 cy of sediment has been removed. Excavated soil is being stockpiled onsite until it is sent to the repository in September or October 2007. Construction of the bypass channel is expected to be complete in September 2007.
- Work continues on the bypass channel berm, mixing native alluvium (rockier soils) with original topsoil. The berm is built using clean materials which will not re-contaminate the area.
- Dewatering of the sediment continues. Envirocon is currently pumping water from 20 dewatering wells on-site. Approximately 2,685 gpm is being discharged into the Clark Fork River and 695 gpm is being discharged into the Blackfoot River. Due to high levels of copper, arsenic, and iron in the lower wells, Envirocon re-routed the water through the Sedimentation Ponds before discharging it into the rivers. The arsenic level in discharged water has decreased from 343 ppb to 33.2 ppb.
- Work on the railroad bridge over the bypass channel began; the bridge should be complete in about 5 weeks.

- The US Army Corps of Engineers (USACE) is continuing the stabilization for the I-90 bridges.
- Missoula County is on schedule with construction of the pedestrian trail along Highway 210 E and should be complete in mid-August 2007.
- Envirocon conducted air monitoring in July for arsenic, copper and lead; all results were well below detection limits and worker health standards.

### **Scheduled Site Activities**

Envirocon will continue the bypass channel excavation and channel berm construction, the rail road bridge construction, finish final grade of rail spur, and construction of the pedestrian trail along Highway 210 E. Envirocon will begin hauling rip rap for the bypass channel from mid-August 2007 through September 2007, entering the site through Rustic Road access.

The USACE will continue the I-90 abutment underpinning and begin the I-90 center pier upgrade. USACE will also begin removal of the rock crib piers in the Blackfoot River above Stimson Mill, and will begin the micro-pile wall installation. In mid-August USACE will begin hauling rock for the “reno mattresses” to line the bypass channel and then begin installation of the bypass channel liner.

In late September or early October 2007, stockpiled sediments from the bypass channel will be transported by rail to Opportunity Ponds.

The dam is scheduled to be removed in 2008, and the sediments are scheduled to be excavated during 2008 and 2009 with restoration activities scheduled to be completed by 2012.

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