

**COEUR D'ALENE RIVER BASIN (MULTIPLE CITIES, ID)
(MCSS DATABASE PROJECT 10-12)**

Site Description

In 1998, EPA designated the Coeur d'Alene Basin (the "Basin") as Operable Unit ("OU") 3 of the Bunker Hill Mining and Metallurgical Complex Superfund Facility under CERCLA. OU 1 encompasses work in the populated areas of the 21 square mile Bunker Hill "Box" and OU 2 includes the non-populated areas of the Bunker Hill "Box".

The affected water bodies within OU 3 are the (1) South Fork of the Coeur d'Alene River (SFCDR) and three primary tributaries (Canyon Creek, Ninemile Creek and Pine Creek); (2) Lower (main stem) Coeur d'Alene River; (3) Coeur d'Alene Lake; (4) proximate wetlands and lakes; (5) Spokane River between Coeur d'Alene Lake and Long Lake; and (6) possibly Long Lake (in the State of Washington). According to the EPA (October 2001) these areas were contaminated by mine and mill tailings, waste rock and atmospheric emissions from a lead smelter.

In the vicinity of the most upstream of the mines, the SFCDR is typically rapids and no more than 10 to 20 feet wide. Immediately above the confluence with the North Fork, the South Fork is a high energy, rapid flow stream no more than 30 feet wide and typically 2-3 feet deep. The three primary tributaries that flow into the SFCDR are Canyon Creek, Ninemile Creek, and Pine Creek, all high gradient streams. Downstream of the confluence of the North and South Forks, the Coeur d'Alene River flattens out and is wider and slower moving, with the floodplain width reaching upwards of one mile. This stretch between the confluence and Coeur d'Alene Lake is called the Lower Coeur d'Alene River. The Cataldo Mission Boat Ramp represents a transition point in the Coeur d'Alene River; boating is possible from this point to Coeur d'Alene Lake, a distance of roughly 30 miles. Eleven lateral lakes ranging from <100 to >600 acres in area and about 7,000 acres of wetlands are situated along the Lower Coeur d'Alene River.

The Lower Coeur d'Alene River flows into Coeur d'Alene Lake through a several hundred-acre delta area. The outlet from Coeur d'Alene Lake is controlled by a dam, built in the early 1900s. The normal full pool elevation of the lake is maintained at about 2,100 feet above sea level, with a surface area of about 32,000 acres. Mean water depth in the lake is 72 feet with a maximum depth of 209 feet. Downstream of the lake is the Spokane River.

The regulatory actions associated with the site are (1) a natural resource damages (NRD) settlement between the mining companies and State of Idaho in 1986; (2) NRD lawsuit brought by the U.S. Government and the Coeur d'Alene Indian Tribe in 1996; and (3) EPA fund-lead RI/FS investigation pursuant to CERCLA (the NPL facility was expanded, by court decision in 2000, to include the entire Coeur d'Alene Basin impacted by mining contamination and not just the 21 square mile Bunker Hill "Box").

Site History

Past mining practices for gold, silver, zinc, and lead in the area date back to 1882. By 1900, numerous mines were producing ore in the Upper Basin. The Coeur d'Alene Mining District became one of the largest and most productive lead-, silver-, and zinc-producing areas in the United States, earning the nickname, Silver Valley. A leader among the mines was Bunker Hill, near Kellogg, which in the 1980s was designated a Superfund site. Reportedly, much of the environmental contamination present in the Coeur d'Alene River Basin today can be attributed to

past mining and smelting activities in the area (EPA, October 2001). Initially, most of the area mines including the Bunker Hill smelter discharged all liquid and solid waste directly to the SFCDR and its tributaries. In 1928, a 160-acre central impoundment area was constructed in an area of the river floodplain and was the Bunker Hill Complex's main disposal area for solid and slurried mine wastes. The impoundment area has been identified as a source of heavy metal contamination to the river basin.

Additionally, until 1968 mine or mill tailings from many of the remaining area mines were discharged directly to the SFCDR or its tributaries. Since 1968, tailings have been impounded or placed back in the mines. An estimated 62 million tons of tailings were discharged to streams prior to 1968 containing an estimated 880,000 tons of lead and more than 720,000 tons of zinc (EPA, October 2001). Most of the tailings have been dispersed throughout the river during high-flow events and deposited as lenses of tailings or as tailings and sediment mixtures in the bed, banks, floodplains, and lateral lakes of the Upper and Lower Basins and in Coeur d'Alene Lake. Some fine-grained material washed through the lake and was deposited as sediment within the Spokane River flood channel. The estimated total mass and extent of contaminated material (primarily sediments) exceeds 100 million tons dispersed over thousands of acres.

Potentially Responsible Parties (PRPs)

There are 16 PRPs associated with the site, identified by EPA: ASARCO, Inc.; BH Properties, Inc.; Bunker Hill Mining Company (U.S.), Inc.; Bunker Limited Partnership; Callahan Mining Corporation; Coeur d'Alene Mines (including Callahan Mining); Gulf Resources and Chemical Corporation; Hecla Mining Company; Highland Surprise Consolidated-Mining Company; Minerals Corporation of Idaho; Silver Bowl, Inc.; Stauffer Chemical Company; Sunshine Mining Company; Sunshine Precious Metals, Inc.; Syringa Minerals Corporation; and Union Pacific Railroad.

Threats and Contaminants

The primary constituents of concern are heavy metals, primarily lead, arsenic, cadmium, and zinc, found in the mine tailings that have been distributed throughout the river basin. Additionally, erosion of riverbanks is a major concern, since the banks contain contaminated tailings. River levels in the Lower River are kept high in the summer by the dam at Coeur d'Alene Lake, an effect opposite to that which would be natural. As a result, banks stay inundated which prevents re-growth of stabilizing vegetation.

Selected Remedy

Following the completion of the RI/FS and a Proposed Plan in October 2001, a ROD was issued in September 2002. The selected remedy is described in the ROD as an interim action and includes (a) all actions for protection of human health in the communities and residential areas in the Basin and (b) a first increment of actions on a priority basis designed to achieve interim benchmarks for environmental protection. Coeur d'Alene Lake is not included in the interim action. The ROD anticipates that the individual components of the selected remedy would be implemented over a 30-year period. The major components of the selected remedy and their estimated costs (presumably, present worth costs in 2002) are as follows:

- Reduce soil lead concentrations by removal at levels above 1,000 ppm or capping/stabilizing at levels above 700 ppm. Cleanup lead contaminated dust at an estimated 252 residences and

implement institutional controls and alternative drinking water sources as necessary (Est. Cost: \$86 million). Property priorities are developed based on the level of contaminants present in soil and drinking water. Since 2003, approximately 1,760 basin properties, including residential, commercial, common properties and right-of-ways have undergone cleanup under the program. It is anticipated that this work will continue for about six to eight more years.

- At 15 mill sites and 31 recreational areas remediate lead in soil and dust to the same levels described above (Est. Cost: \$23 million). Initial cleanup efforts have been completed at the East of Rose Lake Boat Launch and Highway 3/Trail of the Coeur d'Alenes sites with capping being the primary remedial measure. Cleanups were completed at the Sisters site in 2005 and at the Golconda mill site in 2007. Construction activities at the Rex mill site began in June 2007. Work on the design for the US Bureau of Mines site near Osburn is ongoing and a priorities list of the remaining sites is being developed.
- Stabilize streambeds, stream banks, and waste piles in Canyon, Ninemile, and Pine Creeks, and in the SFCDR. Construct improvements to sewer and storm drains to reduce contaminated groundwater infiltration to the South Fork (Est. Cost: \$12 million). These remedial efforts are largely on hold while source control and remediation are being addressed.
- In Canyon Creek, treat creek water near the mouth of the creek to reduce the metals loading discharging to the SFCDR, and stabilize stream banks and waste piles (Est. Cost: \$35 million). Treatability studies have been completed and pilot testing of potential treatment systems began in 2005 and continues with emphasis on zinc removal. Canyon Creek contributes 20 to 25 percent of the metals load to the SFCDR.
- In Ninemile Creek, implement a series of remedies to allow natural reestablishment of the fishery above Success Mine and reduce the metals loadings to downstream areas. The major contributing sources of contamination are the Interstate, Rex and Success mine and mill sites. Anticipated efforts include (a) removing and relocating tailings piles; (b) capping tailings piles; (c) stabilizing stream banks and beds; and (d) installing a surface water treatment pond (Est. Cost: \$36 million). Cleanup activities at the Success and Interstate mill sites are ongoing and a groundwater pilot treatment program at the Success site is underway to treat cadmium-impacted groundwater.
- In Pine Creek, improve fishery conditions and mitigate mine impacts on riparian receptors by hot spot removals, bank and bed stabilization, riparian zone revegetation, regrading of stream reaches, and treatment of tributary water to reduce the metals load to Pine Creek, as necessary (Est. Cost: \$14 million). Considerable work has been conducted in this area including removal actions at Highland-Surprise, Nevada-Stewart, Hilarity, Little Pittsburgh, Sidney and Nabob mining areas.
- In SFCDR, upstream of the Bunker Hill "Box," remove hot spots in the upper floodplain and stabilize and bioengineer stream channels and banks to protect riverine and riparian receptors (Est. Cost: \$16 million). Again, in-river remedial efforts are on hold pending completion of control and remediation efforts.
- For Lower Basin stream banks and beds, remove contaminated bank wedges from highly erosive areas; stabilize banks and revegetate removal areas; construct and operate sediment traps in areas where the river overflows its banks; and periodically remove river bed

sediments in natural depositional areas (to be identified). The ROD calls for removing up to 2.6 million cy of contaminated sediment from the natural deposition areas (Est. Cost: \$71 million). The 19-acre East Mission Flats Repository was recently selected as a repository for contaminated soils and sediments generated during implementation of the ROD (currently the Big Creek Repository is the primary disposal site). Up to 700,000 cy of material may be disposed at East Mission Flats over the next 20 years. Following project completion, the slopes of the repository will be sculptured to reflect local topography and the site capped with clean soil.

- For the Lower Basin floodplain, reduce waterfowl exposure to lead and reduce human health concerns in wetlands (seven areas totaling 1,169 acres) and five lateral lakes (1,859 acres) by implementing a combination of removal, capping, and soil amendments (Est. Cost: \$81 million). Currently, the EPA along with property owners, the US Fish and Wildlife Service and Ducks Unlimited are continuing to convert nearly 400 acres of farmland to wetland habitat.
- In the Spokane River downstream of Coeur d'Alene Lake, reduce human health and ecological exposures at ten selected shoreline sediment depositional areas by implementing a combination of capping, removal, and performance monitoring, and remove contaminated sediments trapped behind the first downriver dam (Est. Cost: \$11 million). The Starr Road recreation area cleanup, which included shoreline soil removal and capping of a two-and-a-half acre rainbow trout habitat and upland recreational area, was completed in the Fall of 2007.
- Establish and implement an annual basin-wide monitoring program, estimated at \$750,000 per year (Est. Cost: \$22.5 million over 30 years). The annual monitoring program began in 2002 and includes the collection of fish samples, both fish fillets and whole fish, from Coeur d'Alene Lake and analyzing the samples for select metals (arsenic, cadmium, lead, mercury and zinc). Based on the 2002 results, a fish consumption advisory was issued in 2003 which recommends limiting the amount of fish consumed.

The Proposed Plan estimated the total cost of the interim action to be \$384.7 million (2002 dollars) and included an estimated volume of material to be removed of 3.1 to 3.5 million cubic yards, including 1.3 million cubic yards of river bed sediments from depositional areas. The ROD revised the estimated cost upward to \$410.7 million (2002 dollars) and increased the removal volume to 4.4 to 4.8 million cy to accommodate a doubling of the targeted removal volumes in depositional areas of the Lower Basin.

Future Activities

As previously indicated, the remedial actions associated with implementation of the ROD are anticipated to take up to 30 years to complete. To-date, little in-river remediation has taken place while efforts concentrate on source control and removal.

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