

CASE STUDY

Black Butte Mercury Mine Lane County, Oregon

August 2010

**Prepared by
The Interstate Technology & Regulatory Council
Mining Waste Team**

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BLACK BUTTE MERCURY MINE, LANE COUNTY, OREGON

1. SITE INFORMATION

1.1 Contacts

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1.2 Name, Location, and Description

The Black Butte Mine is located on the northeast flank of Black Butte in southern Lane County, approximately 10 miles south of Cottage Grove, Oregon. The 300,000-cubic yard tailings pile fronts Dennis Creek, which flows into the Coast Fork Willamette River and the Cottage Grove Reservoir. Site features include several tailings piles, a former mill structure with a rotary kiln, several dilapidated buildings, an unimproved road system, and partially caved-in mine adits (see www.deq.state.or.us/lq/cu/wr/blackbutte/SiteLocationMap.pdf).

The Black Butte Mine operated from the late 1890s to the late 1960s, with peak production 1927–1943. Ore was mined and crushed and then heated to volatilize the mercury. Mercury vapor was cooled to condense the mercury, which was bottled for shipment. Between 1900 and 1957, a total of 16,094 flasks (over 1.2 million pounds) of elemental mercury was produced.

2. REMEDIAL ACTION AND TECHNOLOGIES

The Removal Action was conducted in 2007 as an interim action to stop the migration of contaminated tailings into Furnace Creek. Tailings with higher levels of mercury were excavated and placed into an on-site repository, which was capped with tailings containing lower concentrations of mercury. Tailings on the banks of Furnace Creek were excavated and used for capping of more highly contaminated areas. The slopes of the creek banks were regraded to slow erosion of tailings into the creek.

3. PERFORMANCE

Three different action levels were set to guide the excavation (Table 3-1). For the area of the Old Ore Furnace, the Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goal of 23 mg/kg for mercury in soil in a residential scenario was used. This value is protective of mercuric chloride for the dermal contact exposure pathway. Oregon Department of Environmental Quality (DEQ) calculated a cleanup value for mercuric sulfide, as opposed to mercuric chloride, protective of the dermal contact pathway in a residential scenario, and determined 115 mg/kg would be an appropriate action level at the New Furnace area, regarding

the slopes of the Main Tailings Pile and the cover material taken from the Main Tailings Pile. Selective sequential extraction analysis results had shown that the mercury in these areas was tightly bound as mercury sulfide. For areas where the tailings could potentially flood or erode into a creek, an action level was calculated by determining a background concentration and multiplying that value by 3.

Table 3-1. Cleanup concentrations

Contaminant	Cleanup concentration (mg/kg)
Mercury (tailings)	23
Mercury (tailings on creek banks)	10
Mercury sulfide (cinnabar)	115

4. COSTS

Costs of activities at this site are reported as a total for the entire removal action project and include EPA (direct and indirect), U.S. Coast Guard, and contractor costs.

- Capital: \$472,148

Cost can also be broken down by cubic yard of tailings treated:

- Capital: \$17.70/cubic yard
- Operation and maintenance: \$0.50/cubic yard per year for 10 years

5. REGULATORY CHALLENGES

No regulatory challenges were encountered during the Removal Action. There was good coordination between EPA and DEQ. As a final remedy, it will require a deed restriction restricting use and restricting certain construction activities to maintain the repository and the slopes/vegetation. This remedial action is currently considered an interim removal. Additional contamination was found to be present during the removal action which will need to be addressed at a later date. The Black Butte Mine is scheduled to be proposed for the National Priorities List in fall 2009.

6. STAKEHOLDER CHALLENGES

Oregon DEQ conducted community relations activities, including the distribution of a fact sheet and the creation and maintenance of a website where updates of the cleanup were listed.

7. OTHER CHALLENGES AND LESSONS LEARNED

No information available.

8. REFERENCES

U.S. Environmental Protection Agency. 2008. *Final Removal Action Report of Black Butte Mine*. www.deq.state.or.us/Webdocs/Forms/Output/FPController.ashx?SourceId=1657&SourceIdType=11