



Colorado Department
of Public Health
and Environment

UPDATE FACT SHEET

CENTRAL CITY/CLEAR CREEK SUPERFUND SITE

October 2012



Site Summary

Location

The Central City/Clear Creek Superfund site is located in Clear Creek and Gilpin counties, approximately 30 miles west of Denver. The Superfund study area covers the 400-square mile drainage basin of Clear Creek, which has been affected by a number of inactive precious metal mines. The Superfund investigation has focused on mine drainage tunnels and mine tailings and waste rock piles.

History

Gold was discovered near Idaho Springs in 1859, and in the Black Hawk/Central City area in 1860. For the next 20 years, the Black Hawk/Central City area was the leading mining center in Colorado with the construction of mills to process the gold and silver found through placer and hard rock mining. The decline of mining in the area began with the silver crash in the 1890s and the rise in mining in Leadville. However, mining continued to be an important industry in Clear Creek and Gilpin counties from the turn of the century until approximately 1950. Since 1950, mining in the area has been limited, with only a handful of mines currently operating.

The site was placed on the list of Superfund sites in September 1983. Since that time, the Colorado Department of Public Health and Environment (the department), the U.S. Environmental Protection Agency (EPA) and the local community have worked to clean up heavy metal contamination resulting from decades of hard rock mining in the area. The department and EPA have developed clean-up plans to deal with the worst sources of contamination within the Clear Creek watershed.

In 1992, limited stakes gaming began in Central City and Black Hawk, leading to land use changes. While these changes have the potential to increase the direct human exposure to mine wastes, many mine waste clean-up projects were implemented as property developed.

Environmental Concerns

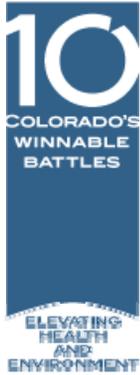
The most significant environmental impacts associated with the site affect the Clear Creek stream system, including a reduced fishery and significant impacts to other aquatic life and habitat. Acidic mine water that drains from many mines contains various heavy metals, and mine wastes such as tailings and waste rock contribute to the non-point source impacts to the basin. Clear Creek is a drinking water source for more than one-quarter million people living in the Denver area, and is a favored place for kayaking, rafting, fishing, wildlife watching and gold panning. The human health hazard from this site involves potential exposure to heavy metals, primarily lead, arsenic, and cadmium. Soil from the tailings piles and waste rock contains heavy metals.

Pipeline Project Now Complete

The State Highway 119 Mine Drainage Pipeline Project in Black Hawk is now complete. K.R. Swerdfeger Construction built the pipeline, designed to convey contaminated water to the site of a planned water treatment plant south of Black Hawk. Construction began in May 2011 and was completed in May 2012.

The Colorado Department of Transportation still has an active highway-straightening project under way on State Highway 119.

Treating Mine Water a Priority in Colorado's 10 Winnable Battles



Colorado's 10 Winnable Battles are public health and environmental priorities addressable by known, effective strategies. One of the Winnable Battles is Clean Water, including water treatment at mining sites. The Colorado Department of Public Health and Environment currently operates or regulates active water treatment plants at five historic mining sites around the state, treating a total of approximately 938 million gallons of contaminated water each year.

Colorado's mining history is both a precious legacy and an environmental challenge. Rain and melting snow percolate through soil, filling abandoned mine workings and seeping through waste rock and mill tailings piles scattered around the high country. Sulfur in the disturbed rock raises the water's acid level, dissolving zinc, copper, cadmium and manganese, which can enter streams and rivers, harming fish and other aquatic life. Mining-related contamination generally is not a threat to human health.

Balancing source control and active water treatment is crucial to sustainability. Capping piles and plugging tunnels prevents acid drain-

age, reducing treatment cost, while water treatment plants, though expensive to operate, effectively remove contamination from Colorado waterways. The ultimate indicator of healthy rivers will be attaining water quality standards and healthy aquatic communities in waterways previously damaged by historic mining activities. Restored rivers create new opportunities for fishing and rafting, as well as new jobs in the tourism and outdoor recreation sector.

Colorado's 10 Winnable Battles

- Clean Air
- Clean Water
- Infectious Disease Prevention
- Injury Prevention
- Mental Health and Substance Abuse
- Obesity
- Oral Health
- Safe Food
- Tobacco
- Unintended Pregnancy

For more information about Colorado's 10 Winnable Battles, see "Hot Topics" on www.colorado.gov/cdphe.

Consultants Tour Tunnel

Argo Tunnel Flow Control Project Moves Ahead

The Colorado Department of Public Health and Environment on Aug. 30 held a pre-submittal site tour of the Argo Tunnel for engineering consultants interested in designing a flow-control structure to regulate the release of mine-contaminated water from the tunnel. Representatives of eight engineering firms took part in the tour. Construction is anticipated to begin in the fall of 2013, assuming funding is available.

The structure would prevent large releases of contaminated water and sediment from over-

whelming the Argo Tunnel Water Treatment Facility downstream and would improve operational flexibility, according to Mary Boardman, state project manager for the Argo Tunnel Water Treatment Facility.

Concrete basins upstream of the water treatment plant can store water for 12 hours, depending on flow, limiting how long the plant can remain down for maintenance. A valve in the flow-through structure could shut off the flow temporarily, allowing more time for maintenance work at the plant.

High-Density Sludge Conversion Project for Argo Water Treatment Facility to Improve Efficiency, Reduce Costs

Construction has begun on a project to convert the Argo Tunnel Water Treatment Facility's existing low-density lime precipitation process to a high-density sludge (HDS) process. The contractor for the \$1.8 million conversion project is Aslan Construction of Berthoud, Colo. Work began on Sept. 10 and is expected to conclude in May or June 2013.

The HDS process will send metal hydroxides into a conditioning tank where they will be coated with lime and sent back through the system for up to 30 additional treatment cycles. This process will more efficiently remove metals from the water, resulting in denser filter cake, less material sent to landfills and savings for the state.

The most visible change will be a new thickener tank outside the building. Two existing clarifier tanks inside the building will be repurposed as reaction tanks, which may increase plant capacity.

Construction on the Argo Tunnel began in 1893. It allowed for the natural dewatering of mine workings, and for economical transportation of ore to the Argo Mill. By the time construction was completed, the tunnel reached an impressive 4.16 miles in length. However, as soon as oxygen was allowed contact with the mineralized rocks of the Colorado Mineral Belt, a chemical reaction was begun, and Clear Creek suffered a century of negative impacts.

The Argo Tunnel discharges water that is acidic and contains high concentrations of heavy metals. Flows range from a low of about 180 gallons per minute (gpm) in the winter, when the ground is frozen, up to 600 gpm in the spring when the snow is melting and water is infiltrating into the ground.

Nearly 850 pounds of dissolved metals are released from the tunnel each day. The metals include iron, manganese, zinc, aluminum and copper, with lesser amounts of arsenic, cadmium and nickel.

The Argo Tunnel Water Treatment Facility was built by the Colorado Department of Pub-



Before and after images of the Argo Tunnel Water Treatment Facility in Idaho Springs. The most visible change will be a new thickener tank outside the existing building, below. Two existing clarifier tanks inside the facility will be repurposed as reaction tanks, which may actually increase plant capacity. The conversion project will reduce waste, boost efficiency and save money.



lic Health and Environment and the U.S. Environmental Protection Agency as part of the Central City/Clear Creek Superfund Site. The site was listed in 1983 to address impacts of historic mining.

The plant began treating water in April 1998. Construction and the first 10 years of operation were funded 90 percent by the EPA, with the Colorado Department of Public Health and Environment paying the remaining 10 percent. The state now owns the plant and pays 100 percent of the operations costs. Operations and maintenance are contracted to a private company, Operations Management Inc. (OMI), a subsidiary of CH₂MHill. OMI began a five-year operations and maintenance contract on July 1, 2012.

Colorado Department of Public Health and Environment Launches New, Improved Website

The Colorado Department of Public Health and Environment recently redesigned its website. For information about the Central City/Clear Creek Superfund Site, go to www.colorado.gov/cdphe and use the "Topics A-Z" button to find the site's landing page.

The Central City/Clear Creek landing page has links to a site map, community involvement plan, fact sheets, posters, contacts and information about the site, environmental concerns and remediation.

To access the U.S. Environmental Protection Agency's website on the Central City/Clear Creek Superfund site, please see: www.epa.gov/region08/superfund/co/ccclearcreek.

WE VALUE YOUR FEEDBACK

1. How clear and understandable are our fact sheets and other mailings?
2. Are we providing the information you needed and in a timely manner?
3. What other information can we provide that would help you?

Please take a few minutes to telephone, e-mail or mail your response and any address changes to:

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