

# Abandoned Mine Lands Case Study



## Lefthand Creek Watershed Use of NPL as Catalyst for Abandoned Mine Cleanup



- Mining operations began in 1858 and ended in 1993
- Five mills and at least eight mines are located along the banks of Lefthand Creek
- EPA, Colorado, and Boulder County are coordinating detailed investigations, communications, and cleanup efforts
- Colorado Department of Public Health and Environment (CDPHE) released a comprehensive community involvement plan in July 2004

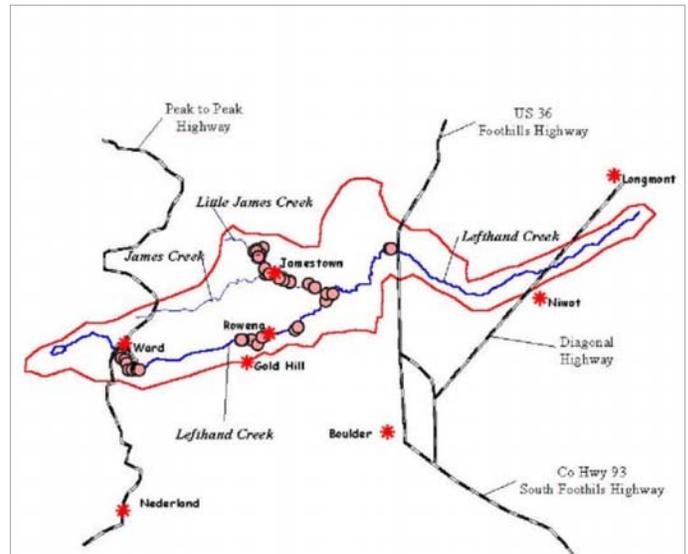


OVER 100 YEARS of mining activities in the mountains outside of Boulder, Colorado have resulted in heavy metal and other mining-related contamination scattered throughout the Lefthand Creek watershed. When the U.S. Environmental Protection Agency (EPA) approached the potentially impacted communities in 1999 about the possibility of a Superfund National Priorities List (NPL) designation in order to fund necessary cleanup activities, a significant controversy arose among local governments and the public. As illustrated in several front page articles in local newspapers at the time, little public support existed for an NPL designation for part or all of the contamination. In response, EPA funded the Boulder County Health Department (BCHD), through a grant to the Colorado Department of Environmental Quality (CDEQ), to create a community-based task force to explore alternatives to an NPL designation as well as to inform the impacted communities on Superfund and other cleanup options. During its research into cleanup options, the task force convened meetings between EPA and community stakeholders. Following recommendations by the watershed task force and a public opinion turnaround, Captain Jack Mill was proposed to the NPL in April 2003 with community support. In addition, a corporation has begun a voluntary cleanup for part of the watershed and the U.S. Forest Service (USFS) has plans to begin similar efforts.

## LEFTHAND CREEK MINING HISTORY

The Lefthand Creek watershed covers approximately 85 square miles and lies in north central Colorado on the eastern slope of the front range of the Rocky Mountains, northwest of Boulder, Colorado. Although many intermittent streams exist throughout the watershed, Lefthand, James, and Little James creeks are the only perennial streams. Little James Creek flows into James Creek, which drains into Lefthand Creek. Combined, the basin discharges approximately 28,840 acre-feet annually.

The Captain Jack mining district is located in the Lefthand Creek drainage area. Mining began in the watershed soon after European settlement in the late 1850s and continued through the latter half of the 20<sup>th</sup> century. In the 19<sup>th</sup> century, Boulder County and the Lefthand Creek area was one of the richest gold and silver producing regions in the country, mining the metals from low-grade sulfide ores. In addition, tungsten, copper, fluorspar, and uranium deposits were mined and processed along Lefthand, James, and Little James creeks. This extensive mining resulted in 230 mine openings and 186 tailings piles in the Lefthand Creek watershed.



*Map of water sources and towns in study area.*



*Old mine workings near the lower end of the Captain Jack Mine. Lefthand Creek runs on the opposite side of the pile shown in this picture, at the base of the hill.*

As early as 1863, there were conflicts over appropriation and contamination of Lefthand Creek water supply. Lefthand Creek was considered a dead creek in the 1930s, unable to support fish until natural attenuation cleaned

portions of the creek by the middle of the 20<sup>th</sup> century. Several segments of the stream remain impacted today. Little James Creek and Lefthand Creek are listed on the state of Colorado's 303(d) list of impaired water bodies for not supporting aquatic life and both creeks are listed with a high priority for total maximum daily load (TMDL) development.

### Major Mines and Mills in Region

- Burlington Mine
- Big Five Mine
- Captain Jack Mine and Mill
- Slide Mine and Mill
- Conqueror Mine and Mill
- White Raven Mine and Mill
- Golden Age Mine and Mill
- Bueno Mine and Mill

In the mid 1960s, BCHD discovered high sulfate and metal concentrations in discharge from the Burlington mine on Little James Creek. Several minor actions were initiated, including sampling investigations and the addition of settling ponds in order to mitigate the contamination; however, no major actions were undertaken.

Portions of the Burlington Mine and Little James Creek are on federal land owned by the USFS.

Currently, Lefthand Creek is the primary drinking water supply for over 14,000 people. The potential exists for metals to enter drinking water supplies via surface water or groundwater migration. EPA conducted an expanded site investigation (ESI) in 1998 and 2000. Approximately 50 percent of the samples collected by EPA exceeded the drinking water criteria for iron and 33 percent exceeded the drinking water criteria for manganese.



*Upper and lower portions of Slide Mine waste area.*

## **PUBLIC INVOLVEMENT: MOVING FROM SKEPTICISM TO DECISIONS**



*Acidic pond at foot of bright white fluorite waste from Burlington Mine.*

In the late 1990s, EPA and Colorado Department of Public Health and Environment (CDPHE) investigations showed some of the mining sites in the Lefthand Creek watershed warranted consideration for listing on the NPL. In March 2000, BCHD agreed jointly with CDPHE and EPA to assume a leadership role in substantively involving the community in further investigations, cleanup, and related activities. In April 2000, BCHD began holding information briefings in the mountain communities of Ward and Jamestown to discuss the heavy metal contamination in the streams. Additional meetings among Ward, Jamestown, EPA, and BCHD followed in 2000 and 2001. EPA Region 8 NPL Coordinator, Dave Williams, the EPA Remedial Program Manager (RPM), Victor Kettelaper, Joe Vranka with CDPHE, and Mark Williams with BCHD took a hands-on approach by personally getting to know community members and understanding their concerns. These

meetings focused on education and outreach illustrating the extent and history of the problem, as well as discussing cleanup options.

In response to community concerns, EPA delayed site listing in June 2001. This delay allowed EPA to strengthen its communications and interactions with the public and gave the community time to research the magnitude of the contamination and explore cleanup options.

In July 2001, EPA funded the Boulder County's Environmental Health Program, via CDPHE, to conduct community and partnership efforts involving Lefthand Creek watershed. BCHD facilitated the formation of the Lefthand Watershed Task Force whose mission was to assess existing environmental and health data related to the Lefthand Creek watershed and determine if a cleanup action was needed and, if necessary, evaluate cleanup options and recommend the preferred option to the Boulder County Board of Health. EPA's Region 8 Technical Outreach Services to Communities (TOSC) provided an independent study summary to identify the size and levels of impacts and possible pros and cons of cleanup under Superfund.



*Flow from pond downstream of Burlington mine. This flows into James Creek.*

## PUBLIC INVOLVEMENT: ENCOURAGING COMMUNITY-BASED CLEANUP DECISIONS

In March 2002, the Lefthand Watershed Task Force presented their findings and recommendations to Boulder County. These findings and recommendations included:

- Establishing a Watershed Oversight Group (WOG) to serve as a hub for communication and information throughout the Lefthand Creek watershed;
- Pursuing further assessment and remediation using the Superfund NPL for the Captain Jack Mill; and
- Pursuing further assessment using alternatives to Superfund throughout the remainder of the Lefthand Creek watershed and the communities of Rowena and Jamestown.



*Old mine workings near the lower end of the Captain Jack Mine. Lefthand Creek runs on the opposite side of the pile shown in this picture, at the base of the hill.*

After presenting findings and recommendations to Boulder County and EPA, the Lefthand Watershed Task Force fulfilled its charge and disbanded.

Acting on the community recommendations, EPA proposed the Captain Jack Mill to the NPL in April 2003. No negative comments were received by EPA during the NPL public comment period.

As recommended by the Lefthand Watershed Task Force, a new stakeholder group, the Lefthand Watershed Oversight Group was formed to develop a watershed plan to direct future efforts at cleaning up mine wastes. In the summer of 2003, the Lefthand Watershed Oversight Group was awarded two years of funding (\$25,000) through the state's Nonpoint Source Council.



*View from the tailings pile associated with Upper Captain Jack and Big Five Mine and Mill. Tailings pond is at the center of the photo, with an acidic stream of drainage flowing from the foreground. Lefthand Creek is to the left of the photo and converges with the pond drainage just downhill from the pond.*

## FUNDING AS RESULT OF NPL LEVERAGE

Several studies and cleanup activities are underway throughout the Lefthand Creek watershed, partly as a result of the NPL listing. These include:

- Remedial Investigation funding became available in 2003 for Captain Jack Mill.
- A Voluntary Cleanup began summer of 2003 at Burlington Mine, Jamestown. Honeywell Corporation will spend about \$1.5 million to prevent water from contacting the waste rock at the Burlington Mine.
- USFS will begin non-time critical removals in areas around Jamestown, Colorado.
- A CWA 319 grant was awarded to develop and implement state Nonpoint Source (NPS) Pollution management programs and to maximize the focus of such programs for Lefthand Creek watershed.
- TMDL funds are available for resolving non-point source problems in section 303(d)-listed water bodies.
- A One Cleanup Program pilot grant of \$38,000 was awarded to the Captain Jack Mill/Lefthand Creek cleanup efforts.



*Detail of revegetation study area at Burlington Mine.*

## USE AS NATIONAL MODEL

Over 52.4 percent of Boulder County residents over 25 years of age have a bachelor's degree, compared to the national average of 24.4 percent. The educated population took an active role in both questioning the need for cleanup and exploring cleanup options while professors from local universities provided needed expertise and input to the task force. In addition, the median value of owner-occupied housing units in the county was \$241,900 in 2000, compared to \$119,600 for the national average. The high cost of housing and development potential may have induced the local governments and the citizens to explore cleanup options that could both protect home values and assure risks to human health and the environment are addressed. Such factors could alter the outcome of similar community involvement projects in other abandoned mining sites across the country.



*Revegetation study area on waste rock/tailings at Burlington Mine.*

**MAIN REFERENCES**

C. Barge. EPA puts Superfund on Hold. *Daily Camera*. June 27, 2001. 1 page.

EPA Region 8 letter to Sen. Allard. Re: Delaying proposal of Captain Jack Mill to NPL. Undated. 1 page.

Lefthand Watershed Task Force. Final Report to the Boulder County Board of Health. March 11, 2002. 114 pages.

M. Whaley. Tiny Towns Seek Superfund Delay. *Denver Post*. June 20, 2001. 1 page.

Lefthand Creek watershed Map. 1 page.

Lefthand Watershed Task Force meeting notes 8/2001-1/2002.

HRS package and references for Captain Jack Mill NPL proposal. April 2003.

1998 ESI Captain Jack Mill (*June 1997 sampling*) EPA Contract No. 68-W5-0031, TDD 9609-0008

1998 ESI Golden Age Mine (*Sept/Oct 1997 sampling*) EPA Contract No. 68-W5-0031, TDD 9704-0017

Field Sampling Plan for SI Captain Jack/Left Hand Creek Watershed (*June 2000 sampling*) EPA Contract No. 68-W5-0031, TDD 9906-0007

Interviews with EPA Region 8 staff, Lefthand Creek Water District staff, and others.