

# EAGLE MINE SUPERFUND SITE TOUR

JULY 29, 2008  
4 P.M. – 6:45 P.M.





Colorado Department  
of Public Health  
and Environment



## EAGLE MINE SUPERFUND SITE – BACKGROUND

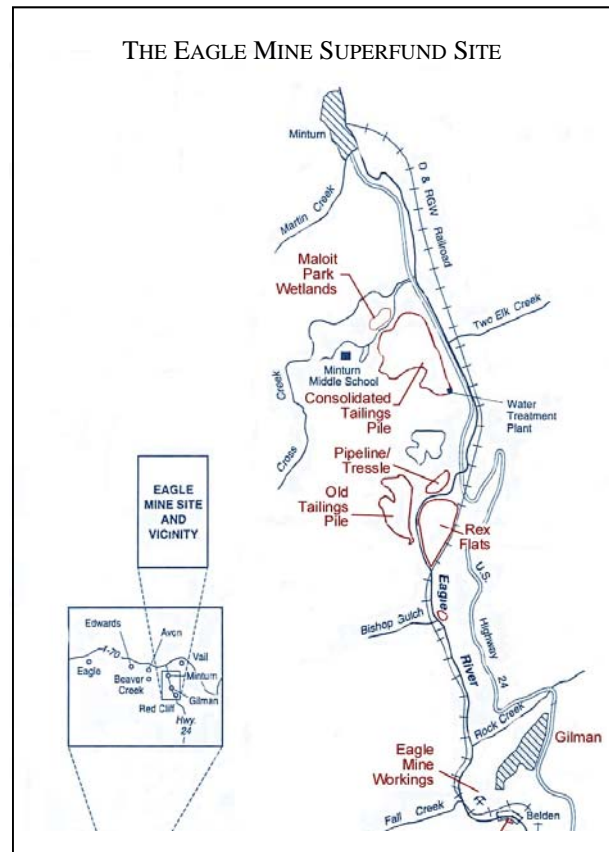
### SITE LOCATION

The Eagle Mine site, located in Eagle County, Colorado, is approximately one mile southeast of Minturn. The site comprises an inactive mining and milling facility, associated waste rock and former roaster pile areas, a consolidated tailings pile, the abandoned Town of Gilman, Belden mill area, Rex Flats, Rock Creek Canyon and the Maloit Park wetlands. The Eagle River, Cross Creek and several other Eagle River tributaries run through the site.

### HISTORY OF THE EAGLE MINE

In the late 1800s, miners discovered gold and silver between Redcliff and Minturn. Gold and silver mining continued until the turn of the century, when zinc mining began. In 1912, the Empire Zinc Company began to acquire properties in the Red Cliff and Gilman areas. The Empire Zinc Company then consolidated its properties into one operation, the Eagle Mine. Around 1917, The New Jersey Zinc Company acquired Empire Zinc, including the Eagle Mine operation, and a mill was constructed underground within the mine workings. The mill tailings were slurried through a wood-stave pipeline/trestle system to a location down stream, known as the Old Tailings Pile. When the Old Tailings Pile reached capacity, the pipeline was extended and tailings were deposited near the confluence of the Eagle River and Cross Creek in an area now known as the Consolidated Tailings Pile, or CTP. Zinc, which is used to harden steel, was a valuable wartime resource. During World War II, the population of Gilman surpassed 1,000 people. At its peak in the 1950s, the Eagle Mine employed more than 700 workers.

In 1966 Gulf + Western Industries acquired The New Jersey Zinc Company. Successive ownership led to involvement of certain of the mine property holdings in bankruptcy. After more than 100 years of mining, the mine was abandoned in 1984. In 1983 the State of Colorado filed a Superfund lawsuit for natural resource damages due to elevated levels of metals found in the Eagle River. The Eagle Mine site was added to the National Priorities List as a Superfund site in 1986. At that time the



U.S. Environmental Protection Agency (EPA) and the State of Colorado entered into an agreement designating the Colorado Department of Public Health and Environment (CDPHE) as lead agency on the project. The entity responsible for the clean-up project (the Potentially Responsible Party or PRP) at the Eagle Mine Site is CBS Operations Inc. (CBS), formerly known as Viacom International Inc., the successor in interest to Gulf + Western.

### SITE CLEAN-UP

Metals present in wastes at the Eagle Mine site include: arsenic, cadmium, copper, iron, lead and manganese,

with zinc occurring in the highest concentrations. The risks from this site are primarily environmental. Both fish and aquatic insects were impacted by the degraded water quality caused by metal discharges into the Eagle River.

Implementation of the remedial action plan began in 1988. The remedial action included: bulkheading adits, which flooded the mine workings; constructing diversion ditches around waste rock piles; consolidating mine wastes in the Consolidated Tailings Pile; capping the Consolidated Tailings Pile with a multi-layer, engineered cap; and revegetating disturbed areas with native plants. Modifications to the plan were implemented throughout the clean-up process as problems with the original remedy were identified. In addition, further remedial action was required as a result of studies conducted by EPA. In 1995, EPA, the state and Viacom entered into a three-party consent decree to implement the additional work. This work included development of a biologically based water quality clean-up standard for the Eagle River and removal of contaminated soils from the Maloit Park wetlands. In October 2001, construction of the remedy was declared complete. Ongoing operation, maintenance and monitoring activities continue.

## GINN REDEVELOPMENT

In 2004, Ginn Battle North, the current owner of the northern-most portions of the Eagle Mine Superfund Site, approached EPA and CDPHE with a preliminary proposal to redevelop the North Property into a private residential golf and ski community called Battle Mountain. However, previous clean-up activities on the Eagle Mine Superfund Site were not intended to achieve clean-up levels for residential or recreational uses. Therefore, the proposed redevelopment requires additional clean-up actions to ensure that residents, workers and visitors will be protected.

For administrative purposes, EPA created a new operable unit, Operable Unit 3 (OU3), to mirror the boundaries of the proposed Battle Mountain development. Operable Unit 3 includes the North Property of the Eagle Mine Superfund Site and two areas adjacent to the Eagle Mine Superfund Site. EPA and the state are ensuring that Ginn Battle North takes all necessary steps required in the Superfund process to allow for potential residential and recreational use at Operable Unit 3. Ginn conducted and completed a remedial investigation report for OU3 in September 2006 and finalized a feasibility study in March 2007.

The next step is preparation of a proposed plan. Public comments will be accepted on the proposed plan and EPA will host a public meeting and respond to public comments. At the conclusion of the public comment period, EPA will prepare a record of decision with a

responsiveness summary recapping the public comments about the proposed plan and EPA and state responses.

## WATER TREATMENT

Problems with the original remedial action plan became apparent when water being pumped back into the mine reached fractures in the bedrock at an elevation around 8,520 feet above sea level. Water contaminated with metals began to seep out, causing the Eagle River to turn orange.

At that point, the plan to flood the mine workings was abandoned and a small water treatment plant was installed to treat water from the mine. The plant soon was upgraded to a full-scale process plant. The water treatment plant continues to be a vital part of the remedy. In addition to treating water from the mine, groundwater is collected at the Consolidated Tailings Pile through a trench system and pumped to the water treatment plant. The plant treats around 140 million gallons of water annually (averaging around 350 gallons per minute), and removes approximately 175 pounds of zinc per day. On April 30, 2008, the water level in the mine pool stood at 8,450 feet above sea level, near the all-time low level, and only seven feet higher than the elevation of the gravity-feed intake at 8,443 feet.

The water treatment plant is a "lime and settling" type plant. Lime and soda ash are added to the contaminated water to raise the alkalinity (pH) of the water. A chemical, or "polymer," is then added to promote the settling of the solid particles containing metals. The solids are settled out in a clarifier. Sludge is removed from the bottom of the clarifier and pumped to sludge presses that squeeze out the water. Dried sludge is disposed of in a lined, on-site disposal area. Acid is added to reduce the alkalinity of the treated water to acceptable discharge limits. The treated water is then discharged to the Eagle River under the provisions of a discharge permit issued by the state's Water Quality Control Division.

## RECENT DEVELOPMENTS

**Eagle River Standards:** On June 10, 2008, the Colorado Water Quality Control Commission approved an amended proposal from the Colorado Department of Public Health and Environment's Hazardous Materials and Waste Management Division and EPA's Superfund Program for permanent standards for segments of the Eagle River impacted by the Eagle Mine Superfund Site. These standards will be used to negotiate a new consent decree with CBS for additional clean-up work and long-term operation and maintenance of the remedy. The changes to the water quality standards and the new consent decree also will trigger changes to the EPA's record of decision. The EPA will conduct a formal public involvement process, including a public comment period.

**Belden Cribbing Removal:** During mining operations, some waste rock from Belden was placed in timber cribs high above the banks of the Eagle River. Snowmelt and rainwater seep through the cribbing, potentially adding to metals loading of the Eagle River. In addition, the timbers have deteriorated over time, causing concern that they may collapse, spilling waste rock directly into the river.

Due to property issues and site limitations, neither constructing an onsite repository nor removing the material for offsite disposal are workable options. Therefore, EPA plans to construct a reinforced concrete wall beneath the cribbing to catch falling waste rock before it reaches the river should the timbers fail in the future.

## MEASURES OF SUCCESS

The success of the Eagle Mine clean-up is measured directly in the following ways:

- Through re-vegetation monitoring, and erosion and settlement monitoring at the Consolidated Tailings

Pile. Re-vegetation criteria have been met in all areas.

- Metals monitoring shows a downward trend in zinc and cadmium concentrations in the Eagle River. Populations of trout and aquatic insects have increased. Biological data were used to establish permanent water-quality standards for the Eagle River.



SHRINKING METAL LEVELS AND GROWING FISH POPULATIONS BODE WELL FOR THE EAGLE RIVER.

## FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

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### On the Web:

[www.epa.gov/region8/sf/co/eagle/#6](http://www.epa.gov/region8/sf/co/eagle/#6)  
[www.cdph.state.co.us/hm/rpeagle.htm](http://www.cdph.state.co.us/hm/rpeagle.htm)

### View Documents at:

Minturn Town Hall  
P.O. Box 309  
Minturn, CO 81645  
(970) 827-5645

Colorado Department of Public Health and Environment  
Hazardous Material and Waste Management Division  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530  
(303) 692-3331

EPA Superfund Records Center  
1595 Wynkoop Street  
Denver, CO 80202-1129  
(303) 312-6473



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## CONSOLIDATED TAILINGS PILE REMEDIATION



1989 (BEFORE)



1999 (AFTER)

## ROASTER PILE #1 REMEDIATION



1988 (BEFORE)



1994 (AFTER)

## ROASTER PILE #3 REMEDIATION



1988 (BEFORE)



1994 (AFTER)

