Ref: 8EPR-SR

ACTION MEMORANDUM – AMENDMENT

DATE:       June 2, 1999


FROM: Rebecca Thorn
Remedial Project Manager

TO: Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

Final NPL Site ID # 29
CERCLIS ID # COD980717938
Category of Removal: Non-Time Critical

I. Purpose

This Action Memorandum Amendment provides additional detail regarding the Agency’s selection of the Non-Time Critical Removal (response) Action described herein for surface water management and sediment control at the Resurrection #1 Tailings Pile, at the upper end of the Evans Gulch drainage, which constitutes a portion of Operable Unit VI (OU VI) of the California Gulch Superfund Site. The area involved is contaminated with metal-laden tailings from historic mining and milling operations.

Additional detail regarding proposed actions at the Resurrection No. 1 Tailings Pile is included in Amendment No. 2 to the Engineering Evaluation/Cost Analysis (EE/CA) for Stray Horse Gulch, Operable Unit 6, California Gulch NPL site, Leadville, Colorado, dated May, 1999. The Addendum also includes information requiring Amendment to the Action Memorandum Amendment for a
Non-Time Critical Removal in OU 6, dated July 15, 1998. This amendment will be addressed in a separate document. A map showing the areas addressed in Addendum No. 2 of the EE/CA is attached as Exhibit 3, Figure 3.1.

Interim measures were implemented at the Resurrection No. 1 Tailings Pile in 1998, in response to a letter request from the Parkville Water District to EPA dated July 16, 1998. The letter expresses the District's concerns relative to potential heavy metal contamination of the water at the Parkville Water District's intake structure which is located in Evans Gulch downstream of the Resurrection #1 Tailings Pile. The July 16, 1998 letter identifies the source of the potential contamination as the Resurrection #1 Mill site. This proposed Non-Time Critical Removal Action would be performed to implement final remedies at the Res #1 tailings pile.

The tailings pile addressed in this Amendment to the October 26, 1998 Action Memorandum comprises a small portion of the Superfund RI/FS Study Area of the California Gulch Superfund Site, located in the Leadville mining district of Lake County, Colorado. A map indicating the general location of the site involved is attached as Figure 1. A map showing OU 6 relative to other California Gulch Operable Units is attached as Exhibit 2.

The primary goal of this Removal Action is to prevent exposure of human populations to contaminants from tailings which are presently located in the pile and threaten the public water supply. This removal action would also reduce the leaching and migration of metals from the wastes into surface waters and would address catastrophic failure of the retaining structures. Although the primary contaminant of concern (COC) is lead, this response action would address any other COCs contained in the mine wastes.

The Removal Action contemplated by this Action Memorandum would be implemented to mitigate the majority of the source areas potentially impacting water quality in the Evans Gulch drainage.

The proposed Non-Time Critical Removal Action is consistent with the remedial activities which will be undertaken by EPA at OU 6. Final remedial alternatives for all areas of OU 6 will be evaluated in the Feasibility Study (FS) and Record of Decision (ROD) for OU 6 which will ultimately determine whether Remedial Actions beyond those response actions implemented pursuant to this Action Memorandum, and previous response actions, are required.

Consistent with response actions for other sources, alternatives to directly remediate surface water or groundwater in the vicinity of the Evans Gulch drainage have been deferred to OU 12. Response actions, if necessary, for site-wide surface and groundwater will be implemented after all source remediation has been completed by all parties undertaking Site cleanup activities.
EXHIBIT 1

California Gulch Superfund Site
General Location Map
Leadville, Colorado

Source: SMI/TerraMatrix, 1996a
TARGET AREAS FOR ACID ROCK DRAINAGE AND LEAD
CUS EBCA ADDENDUM NO.2
CALIFORNIA GULCH CUS EBCA
LEMONVILLE, COLORADO

EXHIBIT 3

LEGEND
○ AREA OF POTENTIAL ACID ROCK DRAINAGE
■ LEAD OVER 16,000 PPM
NOT TO SCALE
II. California Gulch - Site Conditions and Background

The California Gulch Site was listed on the National Priorities List on September 8, 1983. The Site is in a mining area covering 16 ½ square miles of a watershed that drains along California Gulch to the Arkansas River. Starting in 1859, the area was mined extensively for gold, lead, silver, copper, zinc, and manganese. California Gulch collects runoff that drains numerous abandoned mines and wastes from mining, milling and smelting. Miners built the Yak Tunnel to drain water from the mine workings and to make mineral exploration and development easier. This tunnel drains hundreds of miles of mine workings in its 4-mile underground course and was discharging approximately 210 tons of various metals each year into California Gulch prior to the construction and operation of the Yak Tunnel Water Treatment Plant (OU 1). Seventy-five known mills dumped tailings into 5-6 miles of drainages. Six impounded tailings dumps surround the City of Leadville. Many smelters, which are located around the City, processed silver, lead and zinc at various times. Heavy metal residues are present in much of the City. The Arkansas River which receives water from the California Gulch, has been classified as a recreational resource, and is used heavily for irrigation, livestock watering, public water supplies and fisheries. Approximately 7,400 people live in nearby Leadville and Lake County.

III. Background - Resurrection #1 Mill site

A. Background - Surface Water/Stream Sediments

The U.S. Bureau of Reclamation (BOR) conducted a Phase 1 surface water and sediment sampling which identified the Resurrection/Fortune Mine area as contributing to sediment and heavy metals loading in the upper Evans Gulch drainage. The findings of this sampling effort are included in a report entitled Draft Feasibility Study, Phase 1, Water and Sediment Sampling and Hydrologic Measurement Program, Results and Findings, 1995 Spring Runoff for Operable Unit 6, California Gulch NPL Site, Leadville, Colorado, November 14, 1996. BOR also conducted a Phase 3 surface water and sediment sampling in 1996. Findings for that sampling event are included in a report entitled Draft Environmental Geology of Operable Unit 6, Removal Action Design Data, California Gulch Superfund Site, Leadville, Colorado, February 14, 1997.

B. Mine Waste

Phase 2 soil sampling of mine waste rock and mill tailings was performed by BOR in 1996. Findings for that sampling event are included in a report entitled Draft Environmental Geology of Operable Unit 6, Removal Action Design Data, California Gulch Superfund Site, Leadville, Colorado, February 14, 1997. The results of this investigation and AVIRIS data identified high heavy metals (lead) content soil and water quality...
contaminants (low pH and Acid Mine Drainage [AMD]) materials existing in the impounded tailings at the Resurrection No. 1 millsite. The impoundment is contained by an old timber crib retaining wall.

IV. Site Characterization -

A. Surface Water/Stream Sediments

The BOR Sampling Event was conducted during the Phase 1 survey in the spring of 1995 to determine heavy metals concentrations in surface water and sediments within OU 6, during runoff conditions. Sampling Station EG03 is located down stream of the Resurrection #1 Mine Waste Pile. Analytical results for Surface Water samples collected during the 1995 sampling event are provided below (Refer to Table 4.2.3 on Page 30 of the Phase 1 BOR Report). Similarly, analytical results for the Sediment samples are shown below. (Refer to Table 4.2.8 on Page 35 of the Phase 1 BOR Report.)

The Phase 3 Surface Water and Sediment sampling events which were conducted in 1996 generally confirm results of the Phase 1 study. (Refer to Section 4.1.4 of Phase 3 Water and Sediment Sampling Report.)

Median Total and Dissolved Metals (ug/L) Phase 1 BOR Sampling Event
Sample Station EG03 - Surface Water

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Total Metals (ug/L)</th>
<th>Dissolved Metals (ug/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>36</td>
<td>&lt;20</td>
</tr>
<tr>
<td>Aluminum</td>
<td>46</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Manganese</td>
<td>9</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Silicon</td>
<td>Not Taken</td>
<td>2,010</td>
</tr>
<tr>
<td>Zinc</td>
<td>289</td>
<td>262</td>
</tr>
<tr>
<td>Copper</td>
<td>3.9</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Lead</td>
<td>2.7</td>
<td>&lt;1.4</td>
</tr>
<tr>
<td>Arsenic</td>
<td>3.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.8</td>
<td>0.7</td>
</tr>
<tr>
<td>Silver</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
</tr>
</tbody>
</table>
Median Total Metals (mg/kg) Phase 1 BOR Sampling Event
Sample Station EG03 - Sediments

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Total Metals (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>11,300</td>
</tr>
<tr>
<td>Aluminum</td>
<td>1,680</td>
</tr>
<tr>
<td>Manganese</td>
<td>2,240</td>
</tr>
<tr>
<td>Zinc</td>
<td>2,430</td>
</tr>
<tr>
<td>Copper</td>
<td>46</td>
</tr>
<tr>
<td>Lead</td>
<td>1,080</td>
</tr>
<tr>
<td>Arsenic</td>
<td>76</td>
</tr>
<tr>
<td>Cadmium</td>
<td>13</td>
</tr>
<tr>
<td>Silver</td>
<td>3.3</td>
</tr>
</tbody>
</table>

The Phase 1 BOR report identifies the EG03 sub-drainage that originates on the northwest slope of Little Ellen Hill and includes the Resurrection #1 and Fortune Mine waste piles and tailings as a source of acid rock drainage. The EG03 drainage flows for a short duration during the peak of the spring snowmelt and also, presumably, during large thunderstorm events. Because of dilution effects and buffering capacity of water in Evans Creek, this, and similar drainages, seem to have minimal impact on water quality in Evans Gulch. In general the drainages and source areas of acid rock drainage reflect those mine complexes identified and mapped by Emmons as mining the massive sulfide ore bodies.

Runoff and deterioration of the timber cribbing has resulted in breaches/failures in the wall that cause tailing material to be eroded and carried down to the Evans Gulch drainage during snowmelt or heavy rainfall events. There is concern that continued deterioration of the crib wall could result in a catastrophic failure, releasing the impoundment's large volume of tailing material into the drainage. This could result in significant degradation of the upper Evans Gulch water quality that would be extremely costly and time consuming to clean up.

Sudden failure of the tailings impoundment would also seriously impact the water quality at the Parkville Water District's intake structure which is in Evans Gulch, a short distance downstream from the Resurrection #1 Tailings Impoundment.
B. Mine Waste

The Resurrection #1 Mine Waste Pile was sampled during the Phase 2 survey conducted by BOR. The results of the sampling are presented below. (See Drawing FMA-1 of the Phase 2/3 BOR Report)

<table>
<thead>
<tr>
<th>Sample I.D.</th>
<th>Surface (0 to 4&quot;)</th>
<th>At Depth (1 Foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southernmost</td>
<td>57,192</td>
<td>49,453</td>
</tr>
<tr>
<td>North-West #1</td>
<td>31,128</td>
<td>29,170</td>
</tr>
<tr>
<td>North-West #2</td>
<td>38,315</td>
<td>40,446</td>
</tr>
<tr>
<td>North-East #1</td>
<td>17,323</td>
<td>5,074</td>
</tr>
<tr>
<td>Northernmost</td>
<td>30,452</td>
<td>16,129</td>
</tr>
</tbody>
</table>

The principal concerns addressed by this Removal Action are:

* The release of contaminated material from the Resurrection #1 Tailings Pile into the intake structure of the Parkville Water District potentially exposing the public to heavy metals contained in the tailings.

* Direct ingestion of contaminated surface water and/or sediment by casual users.

* Transport of waste particles by surface water run-off and direct ingestion of contaminated soil.

V. Other Actions to Date

Prior to the 1998 work, no response actions had been performed in Evans Gulch. However response activities have been performed in the Stray Horse Gulch, Starr Ditch, and Hamm's/ Penrose Tailings pile areas. These Removal Actions were summarized in the Action Memorandum for response actions at the Resurrection No. 1 Tailings Pile dated October 26, 1998.
In 1998, a removal response action was performed under the Action Memorandum dated October 26, 1998. The action included installation of a storm water run-off collection channel and a small retention basin in the Resurrection No. 1/Fortune Mine Area as short term measures to help prevent contaminated sediments from reaching the portion of Evans Gulch where the city of Leadville drinking water supply intake is located.

VI State and Local Authorities’ Roles

A. Cultural Resources

A site visit by a representative from the State Historic Preservation Office (SHPO) was conducted and a letter from SHPO dated October 30, 1998 confirms that based on the information provided the proposed work will have no effect on either the Resurrection No. 1 Tailings Pile (5LK961). Since no activities will be performed which will adversely impact the cultural resources, no mitigation plan is required.

B. Public Involvement

A draft Addendum No. 2 to the Engineering Evaluation/Cost Analysis for Stray Horse Gulch, Operable Unit 6, California Gulch NPL Site, Leadville, Colorado, was submitted for public comment on March 18, 1999. The preferred alternative for Stray Horse Gulch (OU 6) is continuing to implement water management at mine waste source areas. The public comment period for the EE/CA Addendum No. 2 ran through April 19, 1999. Comments received were addressed in a Responsiveness Summary which is attached to the Final EE/CA, May 1999.

VII. Threats to Public Health or Welfare or the Environment

The off-site migration of contaminants is observable during site reconnaissance and has been confirmed by studies performed by the U.S. BOR. Since the intake structure for the water supply for Parkville is in Evans Gulch, a short distance downstream from the Resurrection #1 Tailings Pile, this migration and catastrophic failure of the containment structure are potential threats to water quality in the Parkville water supply.

This removal action is necessitated by the threat to public health, welfare, and/or the environment posed by the direct contact, inhalation, and ingestion exposure routes to hazardous substances and by heavy metals contamination of surface water and sediments.
VIII. Endangerment Determination

Actual and/or threatened releases of hazardous substances from the Resurrection #1 Tailings Pile, if not addressed by implementing the removal actions selected in this Action Memorandum, will present endangerment to public health, or welfare, or the environment. The public will continue to be exposed to the release of significant quantities of contaminated materials to a public water supply.

IX. Proposed Actions/Performance Standards/Estimated Costs

A. Proposed Actions

Installation of collection channels and a retention basin in the drainage basin downstream of the Resurrection #1 Tailings Pile as shown on Exhibit 4, Figure 5.4. The basin will be revegetated to prevent surface erosion. Monitoring wells would be installed near the basing to monitor groundwater levels and movement in the subsurface. Sediment removal from the retention basin may be required on a periodic basis.

B. Applicable or Relevant and Appropriate Requirements (ARARs)

Potential Chemical Specific, Location Specific and Action Specific ARARs are shown in the ARARs Table attached as Exhibit 4 of the October 26, 1998 Action Memorandum. No new ARARs have been identified.

C. Performance Standards

1. The designed and constructed response actions include provisions to ensure that there are no visible emissions (dust) during removal activities.

2. The design contains requirements to ensure that erosion, run-on, and run-off are prevented and to ensure that slope stability is maintained by the response action.

3. A long-term maintenance program may be implemented if required by the Final Record of Decision for Operable Unit 6 (OU 6) to ensure the long-term effectiveness of the response action.
D. Project Schedule

The response actions are scheduled to be completed in 1999.

E. Estimated Costs

The estimated cost for implementation of the proposed Removal Action is $240,000.00.

X. Expected Change in the Situation Should Action Be Delayed or Not Taken

If these removal actions are delayed, or not taken, potential exposure to the public to heavy metals contained in the Resurrection #1 Tailings Pile in upper Evans Gulch will continue. Without these response actions, release of contaminated tailings into Evans Gulch will continue and will pose an imminent and substantial endangerment to the Parkville water supply.

XI. Outstanding Policy Issues

A Record of Decision will be issued selecting the final remedial action for Operable Unit VI (OU VI) of this Site.

XII Enforcement

This Removal Action will be performed by EPA under the 1994 Consent Decree.
XIII. Recommendation

This decision document represents the selected removal action for the Resurrection #1 Tailings Pile in OU VI of the California Gulch Superfund Site, in the City of Leadville, County of Lake, State of Colorado. It was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. These decisions are based on the Administrative Record for the Site.

Conditions at the Resurrection #1 Tailings Pile and in the Evans Gulch drainage, meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend approval of the removal action.

APPROVAL

[Signature]
Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protection
and Remediation

DISAPPROVAL

Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protection
and Remediation