CALIFORNIA GULCH SUPERFUND SITE

FIVE-YEAR REVIEW REPORT

PREPARED BY

REGION VIII

U. S. ENVIRONMENTAL PROTECTION AGENCY

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Date 2/2/96
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EXHIBITS:
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  No. 2: Site Location Map.
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  No. 6: Operable Unit-10.
  No. 7: Fluvial Tailings Deposits.
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  No.9A: Final Design Report/Discussion of Chemical Specific ARARs.
  No.9C: Final Design Report/Discussion of Location and Action Specific ARARs.
INTRODUCTION

Authority Statement:

The United States Environmental Protection Agency Region VIII conducted this review pursuant to CERCLA 121 (c), Section 300.430(f) (4) (ii) of the National Contingency Plan (NCP), OSWER Directive 9355.7-02 dated May 23, 1991, and OSWER Directive 9355.7-02A dated July 26, 1994. It is a statutory review.

The purpose of a five-year review is to ensure that a remedial action remains protective of human health and the environment and is functioning as designed. This document will become a part of the Site File. This is a Type 1A review which is the applicable review for a site that has an ongoing response.

Site Description and History:

The California Gulch Site is located in Lake County, Colorado in the upper Arkansas River Watershed, approximately 100 miles southwest from Denver. The site encompasses approximately 16.5 square miles and includes the towns of Leadville and Stringtown, various parts of the Leadville Historic Mining District, and a section of the Arkansas River from the confluence of California Gulch downstream to the confluence of Lake Fork Creek.

The California Gulch Site is located in a highly mineralized area of the Colorado Rocky Mountains. Mining, mineral processing, and smelting activities have produced gold, silver, lead, and zinc for more than 130 years.

The main mining-related features in the California Gulch Site which have been selected for remediation are listed below:

- Mine water drainage tunnels
- Acid Drainage
- Seven major tailings impoundments
- More than two thousand waste rock piles
- Abandoned mine, milling, and reprocessing operations
- Fluvial tailings
Miscellaneous Early Response Actions at California Gulch:

There have been a number of miscellaneous response actions at Calif Gulch which are unrelated to any of the Operable Units. These are:

Maestas' Home Well: This well was connected hydraulically to Cal-Gulch groundwater. From Jan. 1984 through June 1986 the well showed elevated levels (above primary and secondary drinking water standards) of zinc, manganese, iron, sulfate, and cadmium. An EPA Emergency response Action provided a water connection from the Parkville Water District supply to the Maestas residence. This was completed on 5/29/86.

Starr Ditch, Garibaldi Workings, North Mike Workings, Oregon Gulch Tailings Pond: Sampling conducted in April 1986 showed high levels of various heavy metals from Spring runoff along 5th Avenue and in Starr Ditch. Local children used Starr ditch as a playground. Under an AOC, the PRP initiated work in October 1986 to isolate the area from children and animals. The area was fenced off with a chain link fence and the open ditches were converted into covered culverts.

The three Non Time Critical Response Actions NTCRAs): Garibaldi; North Mike; and Oregon Gulch were similar in scope. The objective was to reduce the volume of "run on" by regrading adjacent roadways, constructing diversion ditches, and rerouting the water around the workings and tailings pond.

This Removal Action was started in October 1990 and completed in January 1994.

California Gulch-Fluvial Tailings Site: In June of 1993, high spring run off from the Arkansas River was threatening severe erosion of one section of the river bank. This section was at a sharp bend in the river and was situated some 200 feet upstream from the confluence of Lake Fork Creek.

An Emergency Response Team resolved this by driving steel beams into the river and building up a wall of some 250 sand bags which action stabilized the river bank for that season.

Two other Time Critical Removal Actions (TCRAs) were performed at the Fluvial Tailings Site in September 1994. Both of these response actions were to stabilize the embankments of two properties which abutted the Arkansas River.
Description of Yak Tunnel, OU-01:

Yak Tunnel is the primary point source of California Gulch surface water contamination. The Yak Tunnel, constructed between 1895 and 1923, is approximately 3.5 miles long. It was designed to provide drainage, facilitate exploration, and provide transportation routes for removing ore from mines in the Leadville mining district.

It collects ground water from the mines and then discharges this water into California Gulch. In an average year the tunnel discharges a combined total of approximately 210 tons of zinc, cadmium, copper, lead, and other metals into California Gulch. California Gulch, in turn, flows into the Arkansas River. The tunnel contributes 75% to 80% of the metal contaminants released into the Arkansas river.

To implement the remedies specified in the ROD, ROD Modification, and the BSD, three discrete Remedial Actions were undertaken at Operable Unit-01.

RA 01-Surge Pond and Interim Treatment Plant:

This Remedial Action was started in September 1988 and completed in June 1991. It consisted of four main elements:

1. Conveyance System
2. Surge pond
3. Barge Transfer System
4. Gravity Filters

The conveyance system consists of a series of lined ditches and plastic pipes to convey the contaminated water from the portal of Yak Tunnel to the surge pond. Under normal operation, the conveyance system is separate and distinct from the California Gulch drainage and diversion ditches.

The Surge Pond covers 7.5 acres and is designed to capture normal and surge flow events. Because of the retention time of the effluent from the Yak Tunnel in the pond, the surge pond acts as a primary filter by settling out the larger suspended solids in that effluent.

Geomembrane and Geofabric are the primary elements in the design and construction that make this a leak proof water retention system.

The barge transfer system conveys water from the pond to the multimedia filters. This is accomplished by (2) pumps which are mounted on a barge in the surge pond. The barge, in turn, is supported by steel pontoons. As the water is pumped from the pond over and onto the filter media, a metered charge of alum and polyelectrolytes is added to the system.
The effluent from the WTP discharges into the Upper Arkansas River at a point just above Lake Fork. This segment of the river, which proceeds from just above California Gulch to a point just above the confluence of Lake Fork, is designated as "2B" and is classified as Aquatic Cold; Recreation 2; Agriculture.

A defining statement in the Act is: "An upstream use cannot threaten or degrade a downstream use."

A review of the monthly Water Analysis Summaries from the Treatment Plant shows that the effluent from the WTP in OU-01 meets the standards as set forth for Segment 2B of the Upper Arkansas River Basin and does not degrade its use.

There are a number of other ephemeral tributaries from the California Gulch NPL Site which still contribute a small but non-compliant metals loading into the Arkansas River.

The Remedial Action to eliminate contamination from these other sources has been on-going through the 1995 construction season and will be substantially, if not completely, completed in the construction season of 1996.

**RA 03-Yak Tunnel Bulkhead:**

This Remedial Action was started in March, 1994 and completed in November 1994.

The Yak Tunnel Bulkhead is designed to control surges of water from the tunnel. It is located approximately 1678 feet into the tunnel from the portal. It is a concrete wall doweled to surrounding competent rock and grouted to prevent leakage.

Before constructing the wall, it was necessary to rehabilitate the 1678 feet of tunnel by removing ties and rails, clearing collapsed areas in the tunnel, and retimbering those areas.

During normal operation of the WTP and the Bulkhead, the flow control valve at the bulkhead will be operated from the WTP control system. It can also be operated manually at the bulkhead.

The operating characteristics of the Bulkhead/Impoundment have not yet been established. These will be established in 1996 when the planned program to calibrate the relationship between the pressure head, volume of water impounded, and flow rates will be completed.
Applicable or Relevant and Appropriate Requirements Review:

Compliance with ARARs for the selected alternatives for remedial action is provided for in Appendix C of the OU-01 ROD dated March 29, 1988 and in the Modification to this ROD dated March 23, 1989.

The Action and Location ARARs with respect to the WTP have been reviewed. There are no new findings.

The Colorado Water Quality Control Act has been recently modified. It is expected to be signed and become an official document in mid November, 1995. The Applicable change here is a reclassification of one segment of the Upper Arkansas River Basin from Recreation "2" to Recreation "1". This is a reduction in the allowable amount of fecal coliform. Since this standard is already being attained, there is no impact to this Site.

The USEPA and the CDPHE have not identified any new information which would alter the ARARs analysis provided in the ROD and ROD modification. However, as the Cal-Gulch Site-Wide Ground and Surface Water Remedial Investigations proceed, EPA and CDPHE will review the results of these investigations with respect to the OU-01 and other ARARs.

This Five-Year Review finds that the Water Treatment Plant meets the ROD, ROD Amendment, and ESD; remains effective, is operating and functioning as designed, and is protective of Human Health and the Environment.

Summary of Five-Year Review Site Visit:

During the course of the 1995 construction season at Leadville, the RPMs have been at the Site throughout the season and for extended periods of time. Thus there was no need to make a special trip to review the site for this five-Year Review.

Status of Other Operable Units:

OU-02, Malta Gulch:

Two Removal Actions are planned here for the construction season of 1995.

1. The Hecla Tailings Impoundments will be regraded and this area will be utilized as a Site-Wide Repository for tailings and waste rock.

2. In Lower Malta Gulch, a broad expanse of fluvial tailings will be removed and placed in the Site-Wide Repository. The disturbed area will be regraded and revegetated.
OU-03, D & RG Slag Piles:

The slag will be screened and slag of sufficient size will be re-used as ballast by the railroad. Slag not meeting the screening criteria will be addressed in a Feasibility Study.

OU-04, Upper California Gulch (Garibaldi Mine Site):

The prominent features of this site are: 1.6 acres of waste rock piles, collapsed drainage tunnel, seeps, and acid mine drainage.

The response action in the 4th quarter of 1995 entails the interception and diversion of stream flow (including portal flow) around the waste rock by the reconstruction of existing channels and/or the construction of new channels. It also entails the diversion of shallow alluvial groundwater around the waste rock by construction of groundwater interceptor trenches.

This and other Upper California Gulch drainage basins will be channeled through the Cal-Gulch diversion ditches and into the Water Treatment Surge Pond.

A Focused Feasibility Study will be developed for each drainage in Upper California Gulch.

OU-05, Smelters/Mill Sites:

The Smelter Remedial Investigation Report dated April 1993 refers to 17 smelter sites where some form of smelter waste was identified. Extensive soil sampling was conducted in these areas. The primary Contaminants of Concern are Arsenic, Cadmium, Lead, and Zinc.

A Focused Feasibility Study scheduled for completion in the 2nd quarter of 1996 will determine what Remedial Response will be selected.

OU-06, Hamms Tailings, Penrose Dump, and Starr Ditch:

The Removal Action scheduled for this construction season will perform the following actions:

1. The Penrose Dump will be excavated and relocated to the Hamms Tailings Site.

2. At Hamms Tailings, the pile will be regraded, capped, and revegetated.

Literally hundreds of waste rock piles are strewn throughout the Stray Horse Gulch area of OU-06. A Removal Action is planned for this area during the construction season of 1996.
OU-07, Apache Tailings:

The Tailings Disposal Area Remedial Investigation was completed in January, 1994. In general, the surficial and subsurface concentrations of the contaminants of concern are elevated. Ground water shows some contamination. The ROD scheduled for the 2nd quarter 1996 will specify the remedies.

A Treatability Study for de-watering the tailings is now underway.

OU-08, Colorado Zinc Lead Tailings:

The CZL tailing pile covers approximately 2 acres and contains an estimated 17,000 cubic yards of material. The Tailings RI indicate that this impoundment is a minor source of heavy metals.

This tailing pile will be relocated to the Oregon Gulch Tailing Impoundment. The disturbed area will be covered with borrow material, graded, and revegetated.

OU-09, Residential and Commercial Soils/Kids first Program:

The "Kids First Program" is an interim program for interested parents of young children. They may request a site assessment of their property and if there is a toxicity risk present, the lead in soil, dust, paint, or water shall be remediated. This is an on-going program.

Further remediation of lead in OU-09 soils is contingent upon the Human Health Risk Assessment final report scheduled for October 1995.

OU-10, Oregon Gulch Sediments:

The Removal Action scheduled for completion in the Fall of 1995 will provide diversion ditches to direct run-on away from the impoundment and into a catch basin. In the 1996 construction season, the impoundments will be capped, regraded, and revegetated.

OU-11, Arkansas Floodplain:

Over time a considerable amount of tailings have been washed into and along the banks of the Arkansas River. These alluvial tailings are scheduled for remediation in 1997 when all upstream sources of potential contamination will have been remediated.
OU-12, Ground Water RI:

Although a great deal of surface and ground water testing has been conducted at California Gulch, a composite picture of the hydrology and hydrogeology of this watershed does not exist. The purpose of this RI is to achieve this. This will be a State of Colorado Lead.
California Gulch Superfund Site
Operable Units and Areas of Responsibility

Legend
- Transportation and Cultural Features
- Hydrography
- Operable Unit Boundaries
- RIFS Study Area Boundary
- Areas Containing Fluvial Tailing
- Waste Rock
- Tailing Impoundments
- Slag
- Smaller Locations

Operable Units
- OU1 - 1/28 Transmission, Turbine Plan
- OU2 - Mali, Gulch Fluvial Tailing/Slag
- OU3 - CA Mine Fluvial Tailing
- OU4 - Silver Colorado Gulch
- OU5 - Alaska Jinping/Alp Mid Dome
- OU6 - Star Dech/Frances Dome
- OU7 - Upper California Gulch
- OU8 - Lower California Gulch
- OU9 - Boundary Enlarged Area
- OU10 - Pacific Gulch
- OU11 - Animas River Valleyd Neighbours
- OU12 - Site Waste Quay

Work Areas
- Asarco owned (under properies)
- EPA-Negligible Areas other TIP's
- Renovation
- Future Liability
- Determination
- Joint Venture

References
- This map may be revised following the resolution of outstanding data issues and completion of remedial investigations.

EPA

DGN: 48DD 39 M019 Revision Date: 28 APR 1995
Scale: 1:31,680
EXHIBIT NO. 3

C O L O R A D O

CALIFORNIA GULCH
SUPERFUND SITE

Project No.: 01283
Design By: DEYANS
File: RESWLOC.DWG
Scale: N/A

Drawn By: T.Boehler
Date: JUNE 1995

RESURRECTION MINING COMPANY
1506 LINDEN STREET
DENVER COLORADO 80210

CALIFORNIA GULCH SITE

GENERAL LOCATION

FIGURE 1

FIGURE 1 CALIFORNIA GULCH SITE

GENERAL LOCATION
### TABLE 1-2
WATER TREATMENT PLANT EFFLUENT
NEW SOURCE PERFORMANCE STANDARDS (NSPS)
SUPPLIED BY RES-ASARCO

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<th>Maximum for Any One Day (mg/L)</th>
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</tr>
<tr>
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</tbody>
</table>
2.1.3.1 Chemical-Specific Requirements - Chemical-specific ARARs set health or risk-based concentration limits in various environmental media, or discharge limitations for specific hazardous substances, pollutants, and contaminants. These requirements generally set protective levels for the chemicals of concern in designated media, or else indicate an acceptable level of emission or discharge of such substances. The Environmental Protection Agency (EPA) and the State identified ARARs under the Safe Drinking Water Act, Colorado safe drinking water authorities, the Clean Water Act, and the Colorado Water Quality Control Act. However, the ROD modification provided for waiver of attainment of the following chemical-specific ARARs: the federal MCLs for drinking water; the federal ambient water quality criteria; and the state water quality "Table Values" in 5 CCR 1102-8. The State water quality "basic standards" portion of the Basic Standards and Methodologies (5 CCR 1002-8) and the State water quality antidegradation standard were retained in the ROD Modification as chemical-specific ARARs for the Yak Tunnel Operable Unit. These two ARARs are described below:

2.1.3.1.1 Basic Standards - Colorado Code of Regulations (CCR) 1002-8 - The State has identified the "basic standards" portion of the Basic Standards and Methodologies (5 CCR 1002-8) as an ARAR for the Yak Tunnel Operable Unit. Section 3.1.11 of these regulations establishes basic standards applicable to all waters of the State. The key portions of these standards for the Yak Tunnel Operable Unit state:

Substances attributable to human-induced discharges ... shall not be introduced into waters of the State:

- Which can settle to form bottom deposits detrimental to the beneficial uses. Deposits are stream bottom buildup of materials which
include, but are not limited to, anaerobic sludges, mine slurry or tailings, silt, or mud; or

- Which form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or

- Which produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impact any undesirable taste to significant edible aquatic species or to the water; or

- In amounts, concentrations, or combinations which are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or

- In amounts, concentrations, or combinations which produce a predominance of undesirable aquatic life; or

- In concentrations which cause a film on the surface or produce a deposit on shorelines.

These basic standards will apply to discharge of treated effluent from the treatment facility component of the selected remedy.

2.1.3.1.2 Antidegradation Standard (CCR 1002-8)

The State of Colorado has also identified its antidegradation standard as an ARAR for the Yak Tunnel Operable Unit. Section 3.1.8 of The Basic Standards and Methodologies, 5 CCR 1002-8 provides:
Existing uses shall be maintained as required by state and federal law. No further water quality degradation is allowable which would interfere with or become injurious to existing uses.

Under Section 3.1.3, the antidegradation standard applies to all waters of the State.

The selected remedy will meet this requirement and will, in fact, substantially reduce the current metals loadings in California Gulch.

2.1.3.2 Location-Specific ARARs - Operation of the Yak Tunnel Water Treatment facility could affect fish and wildlife resources. Therefore, ARARs protecting these resources are pertinent to the facilities' operations.

To comply with these ARARs, best management practices will be employed to minimize impacts on any fish or wildlife resources that could be affected by the project. The treatment facility has been designed to minimize impacts on the California Gulch and minimize the release of raw or inadequately treated Yak Tunnel water.

2.1.3.3 Action-Specific ARARs - Performance, design, and other action-specific requirements set controls or restrictions on particular kinds of activities that may be conducted as part of the operation of the Yak Tunnel Water Treatment Facility. As discussed in the ROD, certain requirements from federal and state regulations include several federal requirements under the Resource Conservation and Recovery Act (RCRA), which is administered by the State of Colorado under its authorized RCRA program; the substantive federal requirements under the Clean Water Act; and several state requirements. To the extent that state requirements are more stringent than associated federal requirements, the state requirements will govern.