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EPA Superfund
Record of Decision:

California Gulch Site OU 9
Leadville, CO
9/2/1999

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

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Colorado Department of Public Health and Environment

September 2, 1999

William P. Yellowtail
Regional Administrator
EPA Region VIII
999 18th Street, suite 500
Denver, Colorado 80202-2405

Dear Mr. Yellowtail:

Subject: Concurrence in the Selected Remedial Alternative at Operable Unit 9, Residential Populated Areas, California Gulch Superfund Site, Leadville, Colorado

On behalf of the Colorado Department of Public Health and Environment, I am pleased to concur in the selected remedial alternative for Operable Unit 9 of the California Gulch Superfund site. This is a significant milestone in the CERCLA process in Leadville. I congratulate EPA for listening to local representatives and working to accommodate their needs. The remedy is the result of this work and reflects the strong local interest in a remedy which meets Leadville's unique circumstances.

As you know, there are several issues which we will continue to work on together in the design and implementation of this remedy. Representatives of our department look forward to working with you, local representatives, and the mining companies on these issues so that the remedy, as it is designed and implemented, continues to protect public health and the environment while meeting local concerns and interests.

Sincerely,

For Jane Norton

Jane Norton
Executive Director

cc: Lake County Commissioners
Ken Chlouber, State Senator
Carl Miller, State Representative

RECORD OF DECISION
RESIDENTIAL POPULATED AREAS
OPERABLE UNIT 9
CALIFORNIA GULCH SUPERFUND SITE
LEADVILLE, COLORADO

September 1999

U.S. ENVIRONMENTAL PROTECTION AGENCY
999 18TH STREET SUITE 500
DENVER, COLORADO 80202

RECORD OF DECISION
RESIDENTIAL POPULATED AREAS OPERABLE UNIT 9
CALIFORNIA GULCH SUPERFUND SITE
LEADVILLE, COLORADO

The U.S. Environmental Protection Agency (EPA), with the concurrence of the Colorado Department of Public Health and Environment (CDPHE), presents this Record of Decision (ROD) for the Residential Populated Areas Operable Unit 9 (OU9) of the California Gulch Superfund Site in Leadville, Colorado. Residential/populated area soils include those in residential yards, vacant lots, parks, school yards, playgrounds, and community use areas, including unpaved streets and alleys. The ROD is based on the Administrative Record for OU9, including the Residential Soils Feasibility Study, the Proposed Plan, the public comments received, including those from the potentially responsible parties (PRPs), and EPA responses. The ROD presents a brief summary of site characteristics, actual and potential risks to human health and the environment, and the Selected Remedy. EPA followed the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, the National Contingency Plan (NCP), and appropriate guidance in preparation of the ROD. The three purposes of the ROD are to:

1. Certify that the remedy selection process was carried out in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9601 *et seq.*, as amended by the Superfund Amendments and Reauthorization Act (collectively, CERCLA), and, to the extent practicable, the National Contingency Plan (NCP);

2. Outline the engineering components and remediation requirements of the Selected Remedy; and

3. Provide the public with a consolidated source of information about the history, characteristics, and risk posed by the conditions of OU9, as well as a summary of the remedial alternatives considered, their evaluation, the rationale behind the Selected Remedy, and the agencies' consideration of, and responses to, the comments received.

The ROD is organized into three distinct sections:

1. The **Declaration** section functions as an abstract for the key information contained in the ROD and is the section of the ROD signed by the EPA Regional Administrator and the CDPHE Director.

2. The **Decision Summary** section provides an overview of the OU9 characteristics, the alternatives evaluated, and the analysis of those alternatives. The Decision Summary also identifies the Selected Remedy and explains how the remedy fulfills statutory and regulatory requirements; and

3. The **Responsiveness Summary** section addresses public comments received on the Proposed Plan, the Residential Soils Feasibility Study, and other information in the Administrative Record.

DECLARATION

SITE NAME AND LOCATION

Residential Populated Areas Operable Unit 9
California Gulch Superfund Site
Leadville, Colorado

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Selected Remedy for OU9 within the California Gulch Superfund Site in Leadville, Colorado. EPA, with the concurrence of CDPHE, selected the remedy in accordance with CERCLA and the NCP.

This decision is based on the Administrative Record for OU9 within the California Gulch Superfund Site. The Administrative Record (on microfilm) and copies of key documents are available for review at the Lake County Public Library, located at 1115 Harrison Avenue in Leadville, Colorado, and at the Colorado Mountain College Library, in Leadville, Colorado. The complete Administrative Record may also be reviewed at the EPA Superfund Record Center, located at 999 18th Street, 5th Floor, North Terrace in Denver, Colorado.

The State of Colorado concurs with the Selected Remedy, as indicated by their concurrence letter dated September 2, 1999.

ASSESSMENT OF THE SITE

Soils at the Site have elevated levels of heavy metals as a result of mining and smelting operations in the Leadville area. Although metals other than lead are not present at concentrations that present risk, levels of lead, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The California Gulch Superfund Site is divided into twelve media and geographically-based operable units (OUs) within the Site. Operable Unit 9, designated as the residential populated areas, addresses concentrations of lead in soil, dust, paint, and water that exceed a specific set of trigger criteria. The purpose of this response action is to reduce the risk of lead exposure to children in Leadville and surrounding areas. Remedial actions taken within OU9 are intended to be consistent with the remedial action objectives and goals identified for the entire California Gulch Superfund Site and other OU investigations.

The selected remedy for addressing residential populated areas is the Lake County Community Health Program (LCCHP), presented in the Final Feasibility Study (ASARCO, 1998) as Alternative 7. This is similar to the Lead Risk Reduction Program and the Kids First Program, described in the Consent Decree[1]. The Kids First Program is currently being implemented. The Selected Remedy combines blood lead monitoring, education, community awareness, and residence-specific response actions to reduce the risk of lead exposure to children in Leadville and surrounding residential areas. This program will address lead from soil and dust, interior or exterior paint, leaded plumbing fixtures, and other potential sources beyond an individual residence.

The major components of the selected remedy include:

- An extensive education and intervention program to manage lead exposure at the site. The education program will focus on raising public awareness about risks from lead and encourage participation in the Lake County Community Health Program.

- Continued voluntary blood lead monitoring (with financial incentives, as appropriate) for all children age 6-72 months and voluntary blood lead monitoring for pregnant and nursing women.

- If the concentration of lead in blood of a child or a pregnant or nursing woman exceeds the blood lead criterion, or if the concentration of lead exceeds a specified set of trigger criteria for one or more of the environmental media at a residence, then appropriate actions will be taken to address the exceedance. These trigger criteria are summarized below:

Blood Lead	greater than or equal to10 μg/dL
Soil	greater than or equal to 3,500 ppm
Dust	greater than or equal to 2,000 ppm
Paint	Interior or exterior paint, in poor condition, with the following lead levels:
	greater than or equal to 1 mg/cm^2 Education
	greater than or equal to 6 mg/cm^2 Active Remediation
Tap Water	greater than or equal to 15 μg/L

[1] On August 25, 1994, a Consent Decree between the United States, State of Colorado, ASARCO, Inc. (ASARCO) and Resurrection Mining Company was entered in U.S. District Court in Denver. The Consent Decree defines areas of responsibility for these two companies as well as the U.S.

- When one or more of the trigger criteria are exceeded, a range of different response actions, as provided in the Decision Summary, will be evaluated. The most appropriate response actions will be determined by evaluating the nature and extent of the exceedance, overall protectiveness of the action, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, short-term effectiveness, implementability, cost-effectiveness, and community impacts. Views of the property owner will also be considered. No response action will be conducted without the permission of the property owner.

- The selected remedy also includes institutional controls, discussed in detail in the Decision Summary, to ensure effectiveness of the LCCHP and to provide a notification system for property owners.

- Since the LCCHP is considered a "pilot project" that involves a number of innovative approaches, it includes ongoing review to ensure that the program is operating as intended and that human health is being adequately protected. In addition, the program will be evaluated by a group of outside scientists. And, as with any remedy where waste is left in place, EPA will conduct five-year reviews to ensure that the remedy is protective of human health and the environment. Any problems with the program will be identified and adjusted as necessary.

STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment. It complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective. Although this alternative does not satisfy the statutory preference for a remedy that employs treatment to reduce the toxicity, mobility, or volume of contaminants as a principal element, this remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Because this decision will result in hazardous substances remaining on site, above health-based levels, five-year reviews of this response action will be required. These reviews will be conducted during site-wide five-year reviews. The next five-year review is scheduled to be performed not later than February 2001.

Max H. Dodson, Assistant Regional Administrator
Environmental Protection Agency, Region VIII

Date 9/2/99

Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this site.

- Chemicals of concern (COCs) and their respective concentrations
- Baseline risk represented by the COCs
- Cleanup levels established for COCs and the basis for their levels
- Current and future land and groundwater use assumptions used in the baseline risk assessment and ROD
- Land and ground-water use that will be available at the site as a result of the Selected Remedy
- Estimated capital, operation & maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected
- Decisive factor(s) that led to selecting the remedy

DECISION SUMMARY

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DECISION SUMMARY FOR THE RECORD OF DECISION
RESIDENTIAL POPULATED AREAS
CALIFORNIA GULCH SUPERFUND SITE
LEADVILLE, COLORADO

I. SITE NAME, LOCATION, AND DESCRIPTION

The California Gulch Superfund Site (EPA ID #COD980717938) consists of an approximately 18.5-square-mile area that is part of the historic Leadville Mining District in Lake County, Colorado. This site is located in the Colorado Mineral Belt, a highly mineralized area of the Colorado Rocky Mountains. Ore mining, mineral processing, and smelting activities have produced lead, zinc, gold, and silver from this world-class mineral deposit for more than 130 years.

The elevation of the California Gulch Site ranges from 9,448 feet at the confluence of Lake Fork Creek and the Arkansas River at the southwestern boundary of the site to over 12,000 feet above mean sea level near Ball Mountain east of Leadville, Colorado. Two parallel, north-south oriented mountain ranges, the Sawatch Range on the west and the Mosquito Range on the east, form a long, narrow valley in which the Residential Populated Area is located. Leadville is located on the eastern side of the valley created by these two mountain ranges. The eastern portion of the site is composed of the steep foothills of the Mosquito Range. The California Gulch flows along the southern boundary of Leadville, passing to the north of Stringtown, and then flows west-southwest before entering the Arkansas River near the Lake Fork Trailer Park.

This Record of Decision (ROD) applies to areas of the Site that have been designated as Operable Unit 9 (OU9) Residential Populated Areas. These areas include portions of the site where the land use is residential or that are currently zoned as residential-populated areas and as low-density residential areas (Appendix A). The selected remedy is necessary to prevent the actual or the potential release of lead contamination which could impact public health.

II. OPERABLE UNIT HISTORY AND ENFORCEMENT ACTIVITIES

The California Gulch Superfund Site is located in and around the community of Leadville, Colorado, about 100 miles southwest of Denver. The Leadville area was the site of extensive mining, milling, and smelting operations beginning about 1860. Most of the facilities ceased operations around 1900, although several facilities continued operations into the 1920s (Western Zinc) and the 1960s (AV Smelter) (Walsh, 1993). Nearly all of the mines within the Site boundaries are presently inactive, and all of the mills and smelters have been demolished.

EPA placed the Site on the National Priorities List (NPL) in 1983 primarily due to concern over the impact of mine drainage on surface waters in the California Gulch and the Arkansas River. Subsequent site investigations revealed the presence of heavy metals in soils and in waste piles in and around the current residential and commercial areas of Leadville.

Numerous investigations have been conducted at the Site. These include remedial investigations conducted by EPA, the State of Colorado, Resurrection and ASARCO beginning as early as 1986. Remedial investigations included determination of nature and extent of contamination in the following media: surface water, groundwater, air, tailings (both fluvial and impounded), waste rock, slag, and soils. Other remedial investigations which have been conducted include: metals speciation, aquatic ecosystem, terrestrial ecosystem, and the evaluation of sources of lead in and around residential homes. Current activities at the Site include completion of feasibility studies evaluating remedial alternatives, remedial design, and construction.

A summary of enforcement activities at the site includes:

- On December 9, 1983, the State of Colorado filed an action for injury, destruction, or loss of natural resources associated with the release of hazardous substances and the cost of assessment of such injury from the Yak Tunnel and associated mine workings. The State amended its complaint on April 8, 1985, to include additional claims for reimbursement of costs incurred and to be incurred in response to the release or threat of release of hazardous substances at the Yak Tunnel, associate mine workings, California Gulch, and portions of the Arkansas River.

- On August 6, 1986, the United States of America filed an action seeking injunctive relief for performance of responsibilities consistent with the National Contingency Plan (NCP) and for reimbursement of costs incurred and to be incurred by the U.S. in response to the release or threat of release of hazardous substances at the Site.

- On February 3, 1987, the federal and state actions were consolidated into one proceeding.

- Counter-claims were asserted for contribution against both the United States and the State in this consolidated action.

- On March 9, 1988, EPA issued a ROD selecting the remedial action for the Yak Tunnel Operable Unit. This ROD has subsequently been amended. The defendants are conducting this work under a Unilateral Administrative Order (UAO) issued by EPA.

- In response to a release, or a substantial threat of a release, of hazardous substance(s) at or from the Site, EPA commenced (or administratively ordered various parties to commence) various remedial investigations and feasibility studies or other work consistent with the NCP:

- On September 28, 1990, EPA and the Settling Defendants entered into an Administrative Order on Consent (AOC) for the performance of soils sampling and air monitoring.

- On December 14, 1990, EPA and the Settling Defendants entered into an AOC for performance of site improvement activities at the Garibaldi Workings, the North Mike Workings, the Oregon Gulch Tailings Pond, and the Starr Ditch.

- On August 29, 1991, EPA issued a Unilateral Administrative Order (UAO) that required ASARCO to conduct studies and complete RIs related to the following: Demographics Work Plan; Final Sampling Plan for Sampling and Analysis of Lead Occurrence Within and Immediately Adjacent to Residences; Soil Investigation Work Plan; Mine Waste Pile Remedial Investigation; Tailing Disposal Area Remedial Investigation Work Plan and Surface Water, Bed Material and Aquatic Ecosystem Data Collection Program Work Plan. A First Amendment to this UAO, issued on October 8, 1991, required ASARCO to conduct and complete the Hydrogeologic Work Plan. A Second Amendment to the UAO, issued November 21, 1991, required ASARCO to conduct and complete the Smelter Site Investigation Work Plan. A Third Amendment to this UAO, issued September 8, 1992, required ASARCO to conduct and complete the Work Plan for Terrestrial Ecosystems Evaluation. A Fourth Amendment to this UAO, issued on March 9, 1993, required ASARCO to conduct and complete the pre-mining Soil Geochemistry Remedial Investigation (RI). The remaining work performed by ASARCO under UAO 91-19, as amended was the final RI report for each of the above activities.

- To date, ASARCO has submitted final RI reports for Mine Waste, Tailing Disposal, Surface Water, Terrestrial Ecosystem Evaluation, Smelter Site Remedial Investigation, Hydrogeologic Remedial Investigation Report, Soil Inventory and Geology, with Data Amendments, Demographics Data Report, and Data Report for Lead Occurrence In/Adjacent to Residences.

- On September 10, 1991, EPA issued a UAO that required Resurrection Mining Company to conduct and complete the final Soils Investigation Work Plan. Field work under this UAO was completed in summer 1992. Resurrection submitted a final RI report to EPA pursuant to this UAO on July 15, 1994.

- On September 12, 1991, EPA and the Hecla Mining Company ("Hecla") entered into an AOC for preparation of an Engineering Evaluation/Cost Analysis ("EE/CA") for the Stringtown/Malta Gulch Tailings portion of the California Gulch Superfund Site. Pursuant to this AOC, Hecla was also required to determine the nature and extent of any releases of the Malta Gulch Tailings and any appropriate response activities to address such releases. On January 6, 1993, a Partial Consent Decree between the United States and Hecla was entered by this Court. A final EE/CA was issued on August 2, 1993, for public review and comment.

- On December 3, 1992, EPA and The Denver & Rio Grande Western Railroad Company ("D&RG") entered into an AOC for the performance of a remedial investigation/feasibility study on lead slag piles and performance of specified studies on one zinc pile at the California Gulch Superfund Site. D&RG submitted the "Final RI Report for Lead Slag Pile Remedial Investigation" to EPA on December 4, 1993, and submitted a "Final Zinc Slag Pile Remedial Investigation" to EPA on December 11, 1993.

- On September 24, 1992, EPA entered into an AOC with ASARCO and Resurrection for performance of a metals speciation program. The Metals Speciation Data Report was issued in September, 1994 and updated in May 1996.

- A consent decree between the United States and D&RG was lodged with the Court on September 15, 1993, and entered on December 15, 1993. Pursuant to the terms of this decree, D&RG paid a portion of the United States' response costs and agreed to conduct the remedial actions at the slag piles and railroad yard and easement known as OU3 (D&RG Slag Piles/Railroad Easement/Railroad Yard).

- A proposed consent decree between the United States and Hecla addressing the Malta Gulch tailings and Hecla's claims against the United States was lodged with the Court in April 1994.

- A partial Consent Decree among the United States, the State, and the Settling Defendants settling the U.S. and the State's claim for their past response costs incurred prior to February 1, 1991, and February 1, 1992, respectively, was entered by the Court on September 4, 1993.

- On August 25, 1994, a Consent Decree with ASARCO and Resurrection was entered in U.S. District County in Denver. The Consent Decree defined areas of responsibility for these two companies as well as the U.S. Government.

A summary of interim actions at the site includes:

An Engineering Evaluation/Cost Analysis work plan was prepared in November 1994 (ASARCO, 1994) to evaluate lead concentrations in soils within parks and playground areas in OU9. Based on the finding that soils at all identified play areas were below the trigger level of 3500 ppm lead, EPA approved no further action for the areas addressed by the work plan. Subsequently, one additional play area was identified on East 6th Street at St. Patrick Street. Soils at this play area exceeded 3500ppm lead in soil so this area requires remediation. Contaminated soils will be excavated, disposed in a suitable repository, and replaced with clean fill.

An Engineering Evaluation/Cost Analysis was prepared in 1995 (ASARCO, 1995) to evaluate removal action alternatives for 38 mine waste piles identified in the populated areas of eastern Leadville, within OU9, in accordance with the ASARCO Work Management Plan (WAMP) (Appendix B to the Consent Decree). An Action Memorandum issued by the EPA in August 1996 selected a non-time-critical removal action requiring the removal of 14 piles with surface lead concentrations greater than 3,500ppm. Removal of these piles prevents direct exposure to high lead concentrations and protects surface water by removing the potential for transport of metals away from the source area and, therefore, reduce metals impact to surface water or other areas. Implementation of this removal action began in 1997 with the removal of four mine waste piles. The removal of the remaining ten mine waste piles is scheduled for 1999. The selected removal action is consistent with the performance of the final remedial action selected for OU9 and will be considered as the final remedy for mine waste piles within OU9 when complete.

The Kids First Program is an interim response program designed to address sources of environmental lead at individual residential properties within OU9 (Woodward Clyde Consultants, 1994). The program has been implemented by ASARCO, with assistance from Lake County, since 1995. This voluntary program targets households with children under 6 years old and includes blood lead monitoring, testing of potential environmental sources of lead, and, when necessary, the development and implementation of risk-based response actions to reduce significant lead risks in and around the home. Lake County performs the blood lead monitoring and some education components of the program. Since 1995, soil remediation has been performed at 37 properties in accordance with Action Memorandums prepared for each property. In addition, dust abatement has been performed at 16 properties, paint remediation performed at 6 properties and drinking water addressed at 2 properties. All actions and no-action determinations have been developed and approved by the Kids First work group and accepted by the property owner. All interim response actions for paint, drinking water, and soil performed under the Kids First Program are considered consistent with the final remedial action selected for OU9.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Throughout EPA's work at the California Gulch Superfund Site, contact with members of the community has been maintained through public and neighborhood meetings, open houses, briefings for local officials, press releases, fact sheets, and other informal communication. EPA and the other parties involved in the Superfund project have also established local offices in Leadville so the community can speak directly with the project representatives.

Community groups are an important component of the community relations effort at the California Gulch Superfund Site. The Lake County Environmental Task Force (LCETF) is an open membership group of individuals interested in environmental issues in the Lake County area. The LCETF obtained a $50,000 technical assistance grant from EPA that enables the group to hire consultants and technical experts. These experts comment on technical documents and evaluate the scientific data on the Site for the community.

EPA's community relations activities at the Site included a series of risk assessment workshops conducted for community leaders and health professionals. In addition, a lead awareness program was begun in February 1990 to teach parents and children about the hazards of lead.

Several groups have formed as a result of the Superfund activities in Leadville. These groups provide opportunities for the citizens to take an active role in the consultation and decision-making process for the Site. A brief description of each of these groups is provided below.

- **Technical Assistance Committee.** The Technical Assistance Committee (TAC) was formed in 1991 and provides a forum for community representatives, companies working at the site, EPA, the State of Colorado, and their technical experts to discuss and evaluate the technical issues related to the Site. TAC meetings are open to the public and are held in Leadville and Denver. Any TAC member may call a meeting and prepare an agenda for discussion. Minutes from the TAC meetings are made a part of the Administrative Record for the Site.

- **Site Activities Coordinating Committee.** The Consent Decree between the responsible parties at the Site recognized that different groups would be working on various remediation projects at the same time. The parties doing remediation want to ensure that their work does not interfere with the numerous civic and tourism events in town. In order to coordinate these work efforts with civic events, a Site Activities Coordinating Committee (SACC) was formed. The members of the committee meet with representatives from the City and County monthly (or as-needed) to coordinate all on-going and pending Site activities and to minimize disruption to the community.

- **Kids First Work Group.** The Kids First Work Group, formed in 1994, provides direction for the Kids First Program. Public health officials and representatives of the City of Leadville, Lake County, State of Colorado, ASARCO, and EPA each have membership in the Kids First Work Group. The Work Group oversees the development of informational materials and plans, and monitors and evaluates the progress of activities being implemented under the Kids First Program.

Extensive outreach efforts by both the Lake County Health Department and ASARCO have played a key role in the implementation of the Kids First Program. The program began with a public meeting on May 25, 1995. Newspaper advertising introduced the program and continues with weekly lead education "tips" for residents and encouragement for blood lead testing of children under 72 months and pregnant/nursing women. Information to promote safe remodeling tips is displayed at local hardware stores. Door to door contacts were made to recruit families in areas with soil lead concentrations estimated at or above 3,500 ppm in 1995, 1996 and 1997. Presentations have been made to community groups to explain the Kids First Program.

Educational sessions have also been conducted at public daycare centers, private licensed day care centers and at the elementary school. Periodic updates continue at these facilities and educational brochures are available both for the child-care providers and the families they serve. The program has also worked with other preschool groups to combine efforts. The Health Department works with the immunization program and the Head Start and Women, Infants and Children (WIC) organizations to recruit children for blood lead testing. Reminder cards are mailed to families to encourage annual blood lead screening.

The LCCHP will continue similar outreach efforts and may pursue alternate outreach approaches as new ideas develop or as needed to maintain awareness and participation.

All of the information upon which selection of this remedy is based is included in the Administrative Record. The Administrative Record is available for review at both the Lake County Public Library and the Colorado Mountain College Library in Leadville and at the EPA Superfund Records Center in Denver.

The public reviewed the Proposed Plan associated with this ROD. Public comments and EPA's responses are included as Attachment A.

IV. SCOPE AND ROLE OF OPERABLE UNIT

The California Gulch Superfund Site is divided into twelve media and geographically-based operable units (OUs) within the Site. These OU's are designated as:

OU1 - Yak Tunnel/Water Treatment Plant
OU2 - Malta Gulch Fluvial Tailing/Leadville Corporation Mill/Malta Gulch Tailing
OU3 - Denver & Rio Grande Railroad Slag Piles/Railroad Easement/Railroad Yard
OU4 - Upper California Gulch
OU5 - ASARCO Smelters/Slag/Mill Sites
OU6 - Starr Ditch/Penrose Dump/Stray Horse Gulch/Evans Gulch
OU7 - Apache Tailing Impoundments
OU8 - Lower California Gulch
OU9 - Residential Populated Areas
OU10 - Oregon Gulch
OU11 - Arkansas River Valley Floodplain
OU12 - Site Water Quality

This Selected Remedy for OU9 addresses concentrations of lead in soil, dust, paint and water that exceed a specified set of trigger criteria. Exceedance of these criteria could pose a threat to human health, specifically in children age 0-72 months. The purpose of this response is to reduce the risk of lead exposure to children in Leadville and surrounding areas. Remedial actions undertaken within OU9 are intended to be consistent with the remedial action objectives and goals identified for the entire California Gulch Superfund Site and other OU investigations.

This decision document makes no determination on whether surface water or groundwater within OU9 requires remediation. Pursuant to the August 25, 1994 Consent Decree at this Site, it was agreed that the decision on remediation of surface water and groundwater site-wide (Operable Unit 12) would be made only after records of decision for source remediation were selected and implemented at each operable unit. As a result, specific water quality goals for surface streams and groundwater have not been established at this time.

V. SUMMARY OF SITE CHARACTERISTICS

1. Climate and Meteorology

The Leadville area has an alpine climate that is of the semi-arid, continental type. The average annual precipitation is 17.53 inches with the wettest months being July and August and driest months being December and January. The normal temperature extremes range from 86°F to -30°F with an average annual air temperature of 36.2°F. The lowest temperatures occur in January, and the highest temperatures are in July and August. Based on RI data, the maximum hourly average wind speed ranges from a minimum of 9 miles per hour (mph) in October to a maximum of 20.4 mph occurring in December; however, wind gusts in excess of 50 mph do occur. Wind is predominantly from the northwest.

2. Surface Water Hydrology

The California Gulch drains approximately 7,400 acres of watershed into the Arkansas River. The main stream of the Gulch receives water from several ephemeral drainages that include Stray Horse Gulch, Starr Ditch, Upper California Gulch, Oregon Gulch, Georgia Gulch, and Pawnee Gulch (CH2M Hill, 1987). Discharges are also received from the Yak Tunnel through the Yak Water Treatment Plant, and from the Leadville Sewage Treatment Plant.

3. Geology

The geology of the Leadville Mining District and surrounding area is complex and well documented. The elevations in the study area range from 9,350 feet at the lower Arkansas River floodplain to over 14,000 feet at the eastern edge of the Leadville Mining District drainage (crest of the Mosquito Range). In general, the topography is rugged on the western slope of the Mosquito Range. Timberline is approximately 11,850 feet. The region bears the geomorphological features resulting from Pleistocene glacial activity.

Bedrock in the Leadville area consists of Precambrian granite and metamorphic rocks overlain by quartzite, limestone, dolostone, siltstone, sandstone, and shale of Paleozoic, Mesozoic, and Cenozoic age. Intrusive rocks include porphyry dikes and sills of Tertiary age. The upper Cambrian Sawatch quartzite unconformable overlies the Precambrian rocks. This quartzite is approximately 60 feet thick. It is overlain by 45 feet of shaley beds of late Cambrian Peerless formation. Ordovician age Manitou Dolomite uncomformably overlays the Peerless formation. Above this is the Devonian Chaffee formation. These rocks are exposed in the upper reaches of the Mosquito Range as well as in the hills east of Leadville. The Leadville limestone (dolomite) of Mississippian age is exposed in Leadville and along some sections of lower California Gulch.

A system of major and minor faults cause significant displacement (100 to 1,000 feet) and fracturing of bedrock in the area. Faults in the bedrock are generally high-angle northerly-striking fracture zones. Blocks of bedrock between major faults are commonly broken by numerous minor faults and fissures (Emmons et al., 1927). The Pendery Fault marks the boundary between upper and lower California Gulch. The Pendery Fault, which trends north–south across California Gulch, has caused the lower gulch to be filled with thicker deposits of alluvium. These alluvial deposits are interspersed with thin, interglacial, silty clay lake bed deposits.

The Leadville area is underlain by alluvial deposits and unconsolidated glacial outwash materials of Pleistocene age. These materials include porphyry, rhyolite, granite, and other igneous rocks, quartzite, dolomite, limestone, and sandstone. These materials were transported and redeposited by glacial and fluvial processes. The vertical and lateral extent of these alluvial deposits is not well defined. The Arkansas River Valley is composed of Holocene stream terrace, stream channel, and flood plain deposits.

4. Hydrogeology

Groundwater in the Leadville Mining District occurs in both bedrock and alluvial aquifers. The bedrock aquifer consists of Precambrian granite overlain by quartzite, porphyry dikes, sandstone, dolostone, and limestone of Paleozoic age. Groundwater movement is facilitated by permeable highly-fractured zones adjacent to major interconnections minor faults, intergranular rock porosity, and mine workings. Permeability is generally low.

Groundwater in the alluvial aquifer is contained in Tertiary and Quaternary lake bed, glacial outwash deposits, and stream and terrace deposits. The alluvial aquifer occurs in two stratigraphic units, an upper unit and a lower unit. The alluvial deposits are considered to be hydraulically connected with the bedrock aquifer through contact, faulting, fracturing, and extensive mining activities. Recharge to the bedrock and alluvial aquifers results from infiltration of precipitation and surface water.

5. Land Use and Demography

The California Gulch Superfund Site, including the town of Leadville, is located in Lake County, Colorado. Lake County is a relatively small (380 square miles), predominantly rural county with a 1990 population of 6,007 (U.S. Bureau of the Census, 1990). Persons residing within the Leadville city limits account for approximately half of the county's total population.

The population of Lake County has fluctuated with the mining industry. Population peaked at 18,054 in 1890, declined to below 7,000 in 1920, and remained generally at that level until 1960.

During the years between 1960 and 1981, population gradually increased to approximately 9,000 and then declined throughout the 1980s. The closure of AMAX's Climax molybdenum mine in 1981 and its reduced level of operations upon reopening were major factors contributing to the decline. Leadville's population trends have been similar to those of Lake County.

Approximately two-thirds of the land in Lake County is federally owned. Most of the federal land is within the San Isabel National Forest, with the Bureau of Land Management managing most of the remainder. However, most land in the Leadville Mining District is privately owned.

Land uses surrounding California Gulch are predominantly mining, commercial, and residential. A small area of rangeland in the Leadville area is directly upstream from the confluence of California Gulch and the Arkansas River.

Human receptors, potentially exposed to Site contaminants, include the residential population. Recreational/commercial exposures in OU9 have been determined to be insignificant (WESTON, 1996c).

6. Results of the Remedial Investigations

Soils are the primary pathway of exposure to the residential population at the site. Lead has been determined to be the only contaminant of concern in OU9. This discussion will focus on soils in the 0- to 6-inch depth interval on which the risk assessment is based.

The extreme heterogeneity of surface soils (0- to 1-inch) in Leadville and Stringtown is also characteristic of soil lead concentrations in the 0- to 6-inch near-surface composite soils found in the Leadville and Stringtown communities and in the Lake Fork Trailer Park (Figure 2). This variability in lead concentrations can be attributed to the fact that these soils have been impacted to varying degrees by historical smelter emissions and mining wastes.

In all soils, the lead concentrations typically decrease with soil depth (Walsh, 1992a). However, lead concentrations in deep disturbed soils that are higher than the concentrations in the overlying disturbed surface soil have been reported in some locations (CDM, 1994; Walsh, 1993). This is most likely due to the intermixing of soils with mine wastes of highly variable lead content. The lead concentrations in surface soils and the concentrations of lead at specific soil depth intervals are discussed in the *Soils Investigation and Mapping Report* (Walsh, 1992a). There is a lead concentration gradient observed in near-surface soil within Leadville that has an east–west orientation, with the maximum lead concentrations appearing in the east, due to historical mining activities, and dropping in the westward direction.

The old Downtown Leadville Mining District (Emmons, 1907) located in the eastern part of Leadville, was found to contain the highest lead concentrations. The soil-lead concentrations in this area and in the southeastern part of Leadville are likely to exceed 3,500 ppm. Soil-lead concentrations are also likely higher in Stringtown, where lead concentrations in the 0- to 6-inch depth interval typically range from 2,000 ppm to greater than 3,500 ppm. In addition, some areas at the north and south ends of the Lake Fork Trailer Park are likely to contain soil with elevated lead concentrations.

VI. SUMMARY OF SITE RISKS

During the soils remedial investigation, a baseline human health risk assessment was performed to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to hazardous substances associated with the Site. The human health risk assessment followed a four-step process:

1. **Contaminant Identification,** which identified those hazardous substances of potential health concern;

2. **Exposure Assessment,** which identified actual or potential exposure pathways (routes where people contact the chemicals), characterized the potentially exposed populations, and determined the extent of possible exposure;

3. **Toxicity Assessment,** which considered the types and magnitude of adverse health effects associated with varying amounts of the hazardous substances of concern; and,

4. **Risk Characterization,** which integrated the three previous steps to summarize the actual current and future potential risks posed by exposure to hazardous substances at the Site.

Part A of the human health risk assessment (WESTON, 1996a) examined risks to residents from lead, focusing specifically on risks to young children (age 0 to 6 years). Children were selected as the focus of this risk assessment because children typically have higher intake rates per unit body weight of environmental media than adults, children tend to absorb a higher fraction of ingested lead from the gastrointestinal tract than do adults, and children tend to be more susceptible to some of the adverse effects of lead than adults (especially impairment of the nervous system).

Part B of the human health risk assessment (WESTON, 1996b) concluded that there are no locations on site where antimony, barium, cadmium, beryllium, chromium, copper, mercury, nickel, silver, thallium, or zinc are of significant concern in soil. The risk assessment also

concluded that based on the fact that risk exceedances are small for arsenic and manganese and occur only in the most conservative risk calculations, combined with the recognition that the assumed uptake (bioavailability) of metals used in the calculations may be higher than actual, that non-lead metals (including arsenic and manganese) in surface soils do not pose a significant health risk to residents. Thus, the only contaminant of concern is lead.

Risk Assessment Approach for Lead

The risk assessment for lead was supported by a large body of site-specific data that included not only extensive measurements of lead in soil and dust in residential locations, but also an extensive demographics survey, data on lead levels in water and paint (both interior and exterior), data on the physical and chemical forms of lead at various locations around the community, and an informative community-wide blood lead study involving 314 children (about 65% of the total population of children at the site). These data were used to support two parallel lines of investigation and assessment. The first of these employed EPA's Integrated Exposure Uptake and Biokinetic (IEUBK) model to calculate the expected impact of lead levels in soil and dust on blood lead levels in area children. The second approach compared the measured blood lead values in area children with relevant national blood lead statistics in order to help evaluate the current effects of actual site exposure to lead.

The main findings of the lead risk assessment for residential children are summarized below:

1. In 1991, geometric mean blood lead levels in children living within the site boundaries were typically around 5-6μg/dL, which was about 1-1.5 μg/dL higher than reported geometric mean values for children of similar age and sex living in other areas across the nation.

2. In 1991, the site-wide frequency of children exceeding the CDC's health-based blood lead target of 10 μg/dL was about 8%, which is slightly higher than the target of no more than 5% above 10 μg/dL. This was indicative of a situation which exceeded EPA's goal of no individual child or group of similarly exposed children having a greater than 5% chance of exceeding a blood lead level of 10 μg/dL. In some sub-areas of the site, the risk of exceeding 10 μg/dL appeared to be substantially higher (10%-25%) than the site-wide average. Additional blood lead data collected by county health agency from more than 100 children per year for each year between 1991 and the present suggests that the incidence of children in the community with blood lead levels above 10 μg/dL is continuing to fluctuate between 6% and 9%.

3. There is a statistically significant correlation between lead levels ranging from 3,000ppm to 3,500 ppm in soil and dust and elevated blood lead levels in children.

4. Both interior and exterior leaded paint contribute to risk of elevated blood lead levels in children, mainly by adding to the concentration of lead in soil and/or dust in those homes where lead-based paint is a potential source of lead exposure.

5. The results of the IEUBK model run using default soil and dust ingestion rates predicted blood lead levels that were higher than observed. It was concluded that soil and dust ingestion rates in this community were probably somewhat lower than the national average values, possibly because the ground is frozen or snow-covered approximately eight months out of the year. Local efforts to minimize lead exposure through an extensive education and intervention program might also explain some of the variation in predicted versus currently observed blood lead levels.

6. Based on the analyses conducted, the risk assessment reached the conclusion that soil lead is a relatively minor source of exposure at locations where lead levels were less than about 1,000 ppm. Exposure via soil probably did not become a dominant source of exposure until lead levels were above the range from 3,000ppm to 3,500 ppm. Other sources of lead contributing to current exposure included interior and exterior paint and indoor dust. Lead levels in the water supplied by the municipal water system are not of concern, but lead levels in some portions of the shallow aquifer are high enough that it would not be safe to use that groundwater as a routine source of drinking water.

VII. REMEDIAL ACTION OBJECTIVES

EPA guidance (EPA 1994) statesthat EPA should:

> ...limit exposure to soil lead levels such that a typical (or hypothetical) [potentially exposed] child or group of similarly exposed children would have an estimated risk of no more than 5% of exceeding the 10 μg/dL blood lead level.

In accordance with this policy recommendation, the ***Remedial Action Objectives*** (RAOs) at this Operable Unit agreed to in the Consent Decree (U.S. District Court, 1994) are as follows:

- RAO-1: "No more than five percent of all children (age 0 to 72 months) who live at this site, either now or in the future, will have blood lead values higher than 10 μg/dL blood lead level."

- RAO-2: "Health will be adequately protected if the highest risk level at any sub-location (e.g., a yard or home) is a probability no higher than one percent that a population of children (age 0 to 72 months) residing at that sub-location will exceed a blood lead value of 15 μg/dL."

RAO-1 and RAO-2 were used to guide the risk management process for OU9. Based upon the Part A human health risk assessment (WESTON 1996a), which considered both measured and predicted blood lead levels, it was determined that RAO-1 and RAO-2 may not be satisfied unless remedial actions are implemented to reduce exposure and risk. Accordingly, a Feasibility Study (FS) was conducted to develop and evaluate appropriate remedial action alternatives.

The FS then added the following additional RAO:

- Reduce the direct exposure of lead incurred by children, which will result in optimal risk reduction through effective use of resources.

VIII. DESCRIPTION OF ALTERNATIVES

A Screening Feasibility Study (SFS) was prepared by EPA, for the purpose of identifying and screening potentially applicable technologies, as well as general remedial alternatives for each source. Potential technologies/process options were screened on the basis of effectiveness to achieve remedial objectives, technical and administrative feasibility, and cost. Those technologies or process options that were retained are: no action, deed restrictions, fencing and posted warnings during construction, information and educational programs, diversion ditches, channelization, in-site mixing, revegetation, simple cover, mechanical excavation, truck hauling, on-site repository, and on-site consolidation. An additional remedial alternative, the Lake County Community Health Program (LCCHP), proposed by Lake County, was also retained for consideration in the Feasibility Study. Two options were eliminated in the initial screening analysis. These were soil washing and in situ stabilization. Soil washing was not retained as an option because implementation time would be lengthy, and capital and operation/maintenance costs would be high. In situ stabilization was not retained as an option because of high capital and high operation/maintenance costs.

Seven remedial alternatives were analyzed for OU9 (ASARCO, 1998). A description of each of these alternatives is provided below. In each case, 12 years of implementation was identified to simplify cost comparison between alternatives. The discount rate is equivalent to the rate of escalation of future costs, or the inflation rate. It is anticipated that most of the expense will occur in the first twelve years. In each case (with the exception of No Action) the remedy will be implemented until performance standards have been satisfied. The duration of a remedy may exceed 12 years in order to meet performance standards. For example, institutional controls would be on-going.

Alternative 1: **NO ACTION.**

Capital Cost: $0
Operation & Maintenance: $0
Years of Implementation: None

The Superfund program requires that the "no action" alternative be evaluated to establish a baseline for comparison. Under this alternative, EPA would take no further action at the Site to reduce the risk of exposure to lead.

Alternative 2: INSTITUTIONAL CONTROLS

Capital Cost: $128,940
Operation & Maintenance: $0
Years of Implementation: 12

Institutional controls (ICs) may include zoning/deed restrictions, permitting requirements, temporary access restrictions, and community awareness education. Deed restrictions could legally limit or prohibit future land use in the source area. ICs alone may be an appropriate remedial action alternative for some residential area soils source sites. This alternative may also be an element of other alternatives; if so, temporary access restriction such as fencing and posted warnings would only be used to physically control access to the residential area soils during construction activities.

Alternative 3: CONTAINMENT (SURFACE WATER CONTROL)/ICS

Capital Cost: $432,180
Operation & Maintenance: $187,020
Years of Implementation: 12, or until performance standards are achieved

Alternative 3 for the residential area soils includes the ICs described in Alternative 2 combined with surface water containment. The containment component of this alternative includes surface water control methods such as diversion ditches and culverts. The diversion ditches would be constructed to divert surface water flow and run-on away from and around the source areas. Covered culverts would be constructed to conduct surface water flow through more populated areas. These controls would reduce the potential for transport of metals away from the source area and, therefore, reduce metals impacts to surface water or other areas. Operation and maintenance requirements would include maintenance of ditches and culverts, modification of deeds, permit processing, and educational activities.

Alternative 4: CONTAINMENT (SOURCE SURFACE CONTROL)/ICs

Capital Cost: $868,640
Operation & Maintenance: $308,220
Years of Implementation: 12, or until performance standards are achieved

This alternative includes the ICs described in Alternative 2 combined with methods for source surface containment. The containment component of this alternative would be based on source surface control options including soil covers, *in situ* mixing, and revegetation. Soil cover involves adding additional fill to isolate the impacted surface soil. *In situ* mixing involves tilling surface soil with deeper soil to reduce surface soil lead concentrations to acceptable levels. Revegetation involves planting appropriate cover vegetation to lessen infiltration, leaching, and erosion. Operation and maintenance requirements would include maintenance of vegetation, ditches and culverts, modification of deeds, permit processing, and educational activities.

Alternative 5: CONTAINMENT (SURFACE WATER CONTROL, SOURCE SURFACE CONTROL)/ICs

Capital Cost: $1,291,450
Operation & Maintenance: $308,220
Years of Implementation: 12, or until performance standards are achieved

Alternative 5 for the residential area soils sources includes the ICs described in Alternative 2 combined with containment of both surface water and source surfaces. Surface water control may be implemented through diversion ditches and culverts as discussed in Alternative 3. The source surface control element of containment involves *in situ* mixing, revegetation, or a soil cover as discussed in Alternative 4. Operation and maintenance requirements would include maintenance of vegetation, ditches and culverts, modification of deeds, permit processing, and educational activities.

Alternative 6: REMOVAL/TRANSPORTATION/DISPOSAL/ICs

Capital Cost: $6,029,894
Operation & Maintenance: $281,760
Years of Implementation: 12, or until performance standards are achieved

This alternative includes the ICs described in Alternative 2 combined with removal, transport, and disposal of residential area soils where mean lead levels are greater than 3,500 . The residential area soils would be excavated by hand with the aid of small conventional earth-moving equipment and replaced with clean fill. Excavated materials would be hauled by truck to an on-site

repository, consolidated in an existing on-site tailings pile, or removed to some other designated area. Upgradient areas might also require remediation to prevent re-contamination. Operation and maintenance requirements would include maintenance of vegetation, ditches and culverts, and educational activities.

Alternative 7: **LAKE COUNTY COMMUNITY HEALTH PROGRAM**
(Selected Alternative)

Capital Cost: $3,106,800	
Operation & Maintenance:	$1,732,450
Years of Implementation:	12, or until performance standards are achieved

Alternative 7 is implementation of the Lake County Community Health Program (LCCHP). The program combines blood lead monitoring, education, community awareness, and residence-specific response actions to reduce lead exposure to children in Leadville and surrounding areas. This program will address lead from soil and dust, interior and exterior paint, leaded plumbing fixtures, and other potential sources beyond an individual residence. Alternative 7 will also include institutional controls to ensure effectiveness of the LCCHP. Operation and maintenance activities would include LCCHP administration and the blood lead monitoring program.

IX. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The following section of the ROD compares the selected alternative and the other alternatives using the nine evaluation criteria as described in the Feasibility Study (ASARCO, 1998).

Overall Protection of Human Health and the Environment

Alternative 7 will provide the most comprehensive protection of human health and the environment from lead, since it addresses not only lead in soil but also lead in other sources such as dust, interior and exterior paint, and drinking water. Alternatives 5 and 6 provide less protection since they do not address all lead sources. Alternatives 3 and 4 provide fair protection since they address surface water contamination, but do not address multiple sources of lead. Alternative 2 would provide fair to poor protection. Institutional controls may be sufficient in some cases to protect human health, but this alternative would not manage surface water. Alternative 1 provides no protection.

Compliance with ARARs

Applicable requirements are defined by the NCP as those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a site. It should be noted that while a requirement may not be applicable as a matter of law, a requirement may still be "relevant and appropriate" if it regulates or addresses problems or situations sufficiently similar to those encountered at the subject site that its use is well-suited to the particular site. ARARs are grouped into three categories: chemical-specific, action-specific and location-specific. Alternative 1 does not satisfy selected ARARs except in areas with an acceptably low risk for lead exposure. Location-specific ARARs would be addressed under Alternative 2. Institutional controls would provide some protection to the community from direct exposure. Under Alternatives 3, location-specific and chemical-specific ARARs would not be addressed where sources remain in their existing condition. Action-specific ARARs would be partially satisfied through storm water controls. For alternative 4, chemical-specific and location-specific ARARs would be addressed. Action-specific ARARs would be partially addressed except for storm water control. Alternatives 5, 6, and 7 would comply with all ARARs.

Long-Term Effectiveness and Permanence

Alternative 1 does not reduce residential risk, while Alternative 2 could be somewhat effective by controlling/limiting future use. Alternatives 3, 4, and 5 provide a moderate degree of long-term effectiveness, but recontamination is likely and these alternatives do not address all lead sources. Alternative 6 would provide the highest degree of long-term effectiveness and permanence for soils; however, it does not address other potential lead sources and would require long-term operation and maintenance of an on-site repository. Alternative 7 would provide long-term effectiveness for many lead sources.

Reduction of Toxicity, Mobility, or Volume Through Treatment

None of the alternatives reduce toxicity, mobility or volume through treatment.

Short-Term Effectiveness

Alternative 1 has no short-term effectiveness. Alternative 2 would be somewhat effective by controlling use of some source areas. Alternative 3 could have good short-term effectiveness in reducing the potential for surface water impacts. Alternatives 4, 5, and 6 pose higher relative

short-term risks to residents and workers compared to other alternatives by virtue of disturbing contaminated surface soils. Alternative 7 would have the greatest overall short-term effectiveness by prioritizing intervention and remediation in cases of children with elevated blood lead levels coupled with proactive identification and abatement of the most significant sources of lead exposure in residential areas.

Implementability

Alternative 1 does not require implementation. Community Protective Measures (Alternative 2) would be easy to implement; however, the administrative aspects such as deed restrictions could pose difficulties in enforcement. Alternative 3 would be relatively simple to implement since most of the surface water controls could be implemented on public land or easements. Alternatives 4 and 5 would be relatively easy to implement except for access and space limitations. Alternative 6 would be difficult to implement due to space constrictions in most residential yards. Alternative 7 could be more easily implemented because the framework for the Lake County Community Health Program (LCCHP) is currently in place, a trust fund has been established to pay for its operation, and the implementation would be an extension of the current Kids First Program.

Cost

Alternative 1 has no associated cost. Alternatives 2 and 3 have a relatively low cost, but do not satisfy the remedial objective. Alternatives 4 and 5 are moderately priced, but do not satisfy the remedial objective. Alternative 6 is the highest cost alternative, but does not address all the sources of lead. Alternative 7 would satisfy the remedial objective at a moderate cost as compared to other alternatives.

Support Agency Acceptance

The Colorado Department of Public Health and the Environment has participated in the decision-making process and concurs with the implementation of Alternative 7 since residential soils and additional sources of lead would be controlled.

Community Acceptance

Based on public comments received on the LCCHP proposal, the Community appears to accept the preferred alternative. (See Appendix B for public comments and EPA's responses.) Alternative 7 (LCCHP) has the support of Lake County public health officials and the CDPHE, as well as elected representatives from both the City of Leadville and Lake County. Community participation in, and strong support for the Kids First Program also indicates community acceptance.

X. SELECTED REMEDY

Based upon consideration of CERCLA requirements, the detailed analysis of alternatives and public comments, EPA has determined that the LCCHP alternative presented in the Final Feasibility Study (ASARCO, 1998), as modified below, is the appropriate remedy for residential populated areas in OU9.

Alternative 7: Lake County Community Health Program

Description

Alternative 7, the LCCHP (similar to the Lead Risk Reduction Program defined in the WAMP [ASARCO 1994]), integrates a variety of lead intervention methods. The LCCHP combines blood lead monitoring, education, community awareness, and residence-specific response actions to reduce the risk of lead exposure to children in Leadville and surrounding residential areas. This program will address lead from soil and dust, interior and exterior paint, leaded plumbing fixtures, and other potential sources beyond an individual residence.

An extensive education and intervention program to manage lead exposure at the site is an integral part of the remedy. The education program will focus on raising public awareness about risks from lead and encourage participation in the Lake County Community Health Program. Education will include individual face-to-face consultations with residents and customized recommendations for specific actions that will reduce the residents' risk to lead exposure. The recommendations made to each resident are based on the results of environmental lead sampling at their homes and specific information collected by the program about their daily habits and activities. Follow-up education, consultation, and intervention will continue to be provided to families with young children by the Lake County Health Department through their blood-lead monitoring program, Women, Infants, and Children (WIC) program and Head Start.

Residential property owners within OU9 may request an investigation of lead levels in soil, dust, paint and water on the property. Property owners may request a re-investigation if conditions change.

The LCCHP includes voluntary blood lead monitoring (with financial incentives, as appropriate) for all children age 6-72 months and voluntary blood lead monitoring for pregnant and nursing women.

If the concentration of lead in blood of a child or for a pregnant or nursing woman exceeds the blood lead criterion, or if the concentration of lead exceeds a specified set of trigger criteria for

one or more of the environmental media at a residence, then appropriate actions will be taken to address the exceedance. The trigger criteria were selected by considering the initial triggers used for the Kids First Program in addition to new information obtained through the baseline human health risk assessment. These trigger criteria are summarized below:

Blood Lead	greater than or equal to 10 micrograms/deciliter
Soil	greater than or equal to 3,500 parts per million
Dust	greater than or equal to 2,000 parts per million
Paint	Interior or exterior paint, in poor condition, with the following lead levels:
	greater than or equal to 1 milligram/centimeter^2 - Education
	greater than or equal to 6 milligram/centimeter^2 - Active Remediation
Tap Water	greater than or equal to 15 micrograms/liter

When one or more of the trigger criteria are exceeded, a work group will evaluate a range of different response actions. The work group, to be established and managed by Lake County, will evaluate all environmental and blood lead data for a property and provide opinions on appropriate response actions. Membership of the work group will include representatives of Lake County, the Colorado Department of Public Health and Environment, and ASARCO. The opinions of the work group, as approved by EPA, shall constitute the response action under CERCLA.

The most appropriate response actions will be determined by evaluating the nature and extent of the exceedance, overall protectiveness of the action, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, short-term effectiveness, implementability, cost effectiveness, and community impacts. The work group also will consider the views of the property owner. No response action will be taken without the permission of the property owner. An extensive education and intervention program to manage lead exposure at the site will be an integral component of each action considered.

The selected Remedy also includes the following institutional controls, to be developed during design of the remedy, to ensure effectiveness of the LCCHP. ASARCO and Lake County will be responsible for implementing and maintaining these institutional controls.

1. The creation of an overlay district to provide notification and information regarding the LCCHP, including requirements that specify excavation activities or other uses would result in referral of the property owner to the LCCHP.

2. A data management and tracking system such as a computer database, to maintain sampling, response action and other information related to individual lots or properties within OU9. This information would be available to interested parties subject to notification through the overlay district. The data management system will be accessible by all parties of the LCCHP work group.

Since the LCCHP is a "pilot project" that involves a number of innovative approaches, it includes ongoing review to ensure that the program is operating as intended and that human health is being adequately protected. The review shall include:

- Evaluation of participation of area residents in the blood lead monitoring and environmental media sampling programs.
- Special effort to ensure collection of paired blood lead and environmental lead data whenever possible.
- Creation and application of a well-documented quality assurance plan to ensure that blood lead and environmental data are collected and analyzed in the proper manner, and that the data are accurately entered into an ongoing database suitable for scientific evaluation.
- Annual reporting of summary statistics.

Given that hazardous substances will remain onsite under the selected remedy, EPA also will conduct a five-year review pursuant to Section 121 of CERCLA to ensure that the remedy is protective of human health and the environment.

In addition, the remedy will be evaluated by a group of outside scientists. Details on how this group will be selected, operate, and evaluate the program will be included in the work plan for the Lake County Community Health Program.

EPA shall establish performance standards to define the process and criteria by which the remedy will be terminated. The performance standards will be identified in an addendum to the remedial design. The CDPHE will be provided an opportunity for consultation and concurrence in accordance with the National Contingency Plan. ASARCO and local officials will also be consulted in the development of the performance standards.

The following sections discuss response actions associated with each of the trigger criteria. Response actions would be evaluated on a case-by-case basis by the work group and may be combined to form the most effective remedial solution.

Blood Lead

The blood lead trigger level is independent of trigger criteria for soil, dust, paint, and water. In the event that a child or pregnant or nursing woman has a blood lead level greater than or equal to 10μg/dL, appropriate response actions will be taken, regardless of whether media trigger criteria have been exceeded, to reduce that exposure. The LCCHP will provide for continued monitoring of children with elevated blood lead concentrations beyond the age of six, although those children would be beyond the age group at highest risk from exposure to lead. The response actions to be considered for identified potential sources of lead exposure, resulting in blood lead concentrations greater than or equal to 10μg/dl, shall include any of the actions described below for soils, dust, paint, and water. In addition, other potential lead sources beyond an individual residence, and within OU9, may be considered by the LCCHP work group for remediation and/or education to address exposure.

Residential Soils

The trigger criterion for residential soil remediation under the LCCHP is: soil-lead concentration greater than or equal to 3,500 ppm. The following response actions could be taken for residential soils.

- No Action: This response may be implemented if soil-lead concentrations are less than 3,500ppm.

- Containment: This option includes the following installation alternatives to contain soils. Alternatives listed here may be used in combination on any given property. For example, sod placement could replace existing yard and a concrete cap may be used to replace a dirt driveway.

  Soil cap: Borrow soil placed over impacted areas.

  In situ mixing: Mixing of surficial soils having lead concentration above 3,500 ppm with underlying unimpacted soils could be performed to reduce lead concentrations to acceptable levels. Homes with soil-lead concentrations greater than 3,500 ppm in the 6-12 inch depth interval are not considered amenable to this alternative due to the difficulty in mixing to the depths required to achieve the objective.

  Sod placement: Sod placed over impacted soils.

  Compacted clay cap: Compacted clay placed over impacted areas with a minimum one-foot silty or sandy protective layer to maintain cap integrity.

Sprayed asphalt: Sprayed asphalt placed over impacted areas and covered with soil or opaque reflective paint to protect the asphalt from ultraviolet light and retard oxidation.

Asphaltic concrete: Asphalt for paving grades or special blends mixed with well graded, crushed aggregate, placed over impacted areas.

Concrete cap: Concrete placed over prepared impacted areas.

Multilayered cap: Cap composed of some combination of natural soils, soil admixtures, clay, spray-on asphalt, asphaltic concrete, or Portland cement and placed over impacted areas.

- Diversion ditch construction: Construction of diversions and/or culverts may prevent run-on to source areas and reduce both erosional and leaching release of the metals from a source.

- Removal: Removal of soil would be accomplished through hand excavation with the aid of mechanical excavation equipment. The removal depth would be decided on a case-by-case basis based on site-specific information, but would be no more than 12 inches. During excavation and transport, dust suppression may be necessary. After excavation, borrow material would be transported to the residence and placed. Yards would be revegetated, generally with sod. In instances where remaining soils may exceed the trigger criterion, such soils would be subject to institutional controls.

  Excavated material could be put to beneficial re-use as non-surficial fill material or could be removed to a suitable on-site repository.

In-Residence Dust

Potential sources of lead for in-residence dust are: lead-based paint in poor condition, bare soil areas, gardens, streets and alleys, tailings, and mine waste. Dust is transported into the home by wind or on items taken outside and then returned inside. The trigger level for in-residence dust is lead concentrations greater than or equal to 2,000 ppm. Response actions would be:

- No Action: Residences with dust-lead levels between 500 and 2,000 ppm will be informed about lead dust abatement methods and offered use of a High Efficiency Particulate Air (HEPA) vacuum.

- Physical Protective Measures: This response action include sealing off unfinished basements, attics, or crawl space areas to limit exposure to interior lead-dust.

- Education Program: This response may be enacted to educate residents on how to effectively reduce lead-dust when cleaning. Demonstrations or brochures may be used.

- Removal and Disposal by Means of Decontamination or Replacement: One or a combination of the following methods may be considered for removing interior lead-dust: Vacuum all interior living spaces with a HEPA vacuum. Dust can be disposed of in a RCRA Subtitle D landfill as it is household waste. Damp mop all floors, window wells, and other wood work with a trisodium phosphate (TSP) cleaning solution; clean furnace ducts using the EPA-approved program for duct cleaning; and placement of mats at entryways so that shoes may be appropriately shaken or wiped before entering, reducing the amount of soil entering the residence.

Interior and Exterior Paint

Residences may have interior and/or exterior paint that is lead-based. Lead-based paint in poor condition may contribute to lead exposure through inhalation and ingestion of dust, or direct consumption of paint chips. Depending on the paint's lead concentration and condition the following response actions may be considered:

- No Action: This response action will be implemented if lead levels are less than 1 mg/cm^2 or if no lead-based paint is identified.

- Education, Containment, Covering, or Removal: If paint contains lead above 1 mg/cm^2 and is in poor condition (peeling, chipping, chalking) or coating a friction-surface, education, risk counseling, and information on actions they may take themselves will be provided to residents. If paint has lead levels greater than or equal to 6 mg/cm^2, and is in poor condition, active remediation would be recommended. If either encapsulation or removal is chosen for remediation, the remediated areas will have a surface paint-lead level no greater than 1 mg/cm^2.

- Community Protective Measures: HUD disclosure requirements for lead-based paint will be relied upon to notify potential future buyers of any potential lead-related risks.

Drinking Water

Residences may have drinking water that contains lead. Lead in drinking water may be associated with lead solder, lead plumbing, or lead alloy fixtures. The action level for lead in drinking water is lead concentrations greater than or equal to 15 µg/L. Lead concentrations in drinking water can be measured and the following response actions may be considered:

- No Action: This response action could be implemented if the lead concentration in drinking water is less than 15 µg/l.

- Alternative Water Supply: This response action could provide the replacement of unsuitable drinking water with bottled water, municipal water, or a household water treatment system could be installed.

- Replacement: The removal and replacement response could be appropriate for residences with lead in drinking water from lead piping or soldering.

XI. STATUTORY DETERMINATIONS

Under CERCLA Section 121, EPA must select a remedy that is protective of human health and the environment; that complies with ARARs; is cost effective; and utilizes permanent solutions, and alternative treatment technologies, or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that include treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The following sections discuss how the Selected Remedy meets statutory requirements.

Protection of Human Health and the Environment – The selected remedy is protective of human health and the environment by addressing additional sources of lead in conjunction with soil remediation (if required). Treatment is not practical and therefore is not used.

Compliance with ARARs – The selected remedy will comply with all ARARs identified in Appendix C to this ROD. No waiver of ARARs is expected to be necessary.

Cost Effectiveness – EPA has determined that the Selected Remedy is cost effective in mitigating the principal risks posed by contaminated residential soils. Section 300.430 (f)(ii)(D) of the NCP requires evaluation of cost effectiveness. Overall effectiveness is determined by the following three balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost effective. The Selected Remedy meets the criteria and provides for overall effectiveness in proportion to its cost. The estimated cost for the Selected Remedy is $4.84 million.

To the extent that the estimated cost of the Selected Remedy exceeds the cost for other alternatives, the difference in cost is reasonable when related to the greater overall effectiveness achieved by the Selected Remedy.

Utilization of Permanent Solutions and Satisfies the Preference for Treatment that Reduces Toxicity, Mobility, or Volume – The selected remedy utilizes permanent solutions to the maximum extent practicable but does not satisfy the preference for alternatives that involve treatment to reduce the toxicity, mobility, or volume of contamination.

Long Term Effectiveness and Permanence – Risk to residents would be reduced due to selection of this remedial action for the reduction of total lead exposures. This remedy would result in waste being left in place.

Reduction of Toxicity, Mobility or Volume through Treatment – The selected alternative does not involve treatment; however, the total lead exposure for a given residential living environment will be reduced.

Short-Term Effectiveness – Short-term risks to workers and residents are acceptable.

Implementability – Implementation of the selected remedy is expected to be successful based on the support of Lake County officials and the CDPHE, as well as elected representatives from both the City of Leadville and Lake County. Community support for the Kids First Program also indicates that implementation of the selected remedy will be successful. This alternative utilizes common construction, home improvement, cleaning equipment, and procedures defined in HUD guidance. This alternative allows for flexibility in selecting the most appropriate response actions on a case-by-case basis, while considering resident needs and preferences.

Cost – The estimated cost for the LCCHP is $4,839,250. The cost for this alternative is mid-range with respect to other alternatives.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

EPA distributed a Proposed Plan outlining the preferred alternatives in November 1998. The Proposed Plan identified Alternative 7, the LCCHP, as the preferred alternative for the Residential Populated Areas Operable Unit. No significant changes have been made to the Alternative 7 decision described in the Proposed Plan. Public comment generally supported implementation of the LCCHP. Public comments and EPA's responses to those comments are attached as Appendix A.

The remedy will be continually monitored for effectiveness. Any problems with the program will be identified and adjusted as necessary.

XIII. REFERENCES

References:

1907. The Downtown District of Leadville, Colorado, Samuel Franklin Emmons and John Duer Irving, Government Printing Office, Washington, D.C.

1927. Geology and Ore Deposits of the Leadville Mining District, U.S.G.S., S. F. Emmons and J. D. Irving.

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1993. Final Smelter Remedial Investigation Report, California Gulch Site, Leadville, Colorado, Walsh and Associates, April.

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1994, Consent Decree between the United States, State of Colorado, ASARCO and Resurrection, Lodged in U.S. District Court in Denver, May 17, 1994.

ASARCO, 1994. Work Management Plan for ASARCO Inc. at the California Gulch NPL Site, Leadville CO. Prepared by Woodward Clyde. Appendix B to the Consent Decree.

ASARCO, Incorporated, 1994. Engineering Evaluation/Cost Analysis for Parks and Playground Areas, Operable Unit 9, California Gulch, Leadville, Colorado. Prepared by Woodward Clyde Consultants, November.

ASARCO, Incorporated, 1995. Engineering Evaluation/Cost Analysis for Mine Waste Piles, Operable Unit 9, California Gulch Superfund Site, Leadville, Colorado. Prepared by Golder Associates. December.

Environmental Protection Agency (EPA). 1993. Final Screening Feasibility Study for Remediation Alternatives at the California Gulch NPL Site, Leadville, Colorado. September.

Environmental Protection Agency (EPA). 1996a. Baseline Human Health Risk Assessment California Gulch Superfund Site, Leadville, Colorado, Part A -- Risks to Residents from Lead, p. 8-6. Prepared by Roy F. Weston, Inc. January 1996.

Environmental Protection Agency (EPA). 1996b. Baseline Human Health Risk Assessment California Gulch Superfund Site, Leadville, Colorado, Part B -- Risks to Residents from Contaminants Other than Lead. Prepared by Roy F. Weston, Inc. January 1996.

Environmental Protection Agency (EPA). 1996c. Baseline Human Health Risk Assessment California Gulch Superfund Site, Leadville, Colorado, Part C -- Evaluation of Worker and Recreational User Scenarios. Prepared by Roy F. Weston, Inc. January 1996

Environmental Protection Agency (EPA). 1996d. Interim Status Report, Consolidated Findings of Soil-Lead Investigations at the California Gulch NPL Site. Prepared by Roy F. Weston, Inc. June.

Woodward Clyde Consultants, 1994. Final Work Plan for Kids First Program, California Gulch NPL Site, Leadville, Colorado. Prepared for ASARCO, Incorporated, Denver, Colorado.

Golder Associates, 1998. Final Residential Soils Feasibility Study, California Gulch Superfund Site, Leadville, Colorado. Prepared for ASARCO, Incorporated, Denver, Colorado.

Appendix A

SITE LOCATION MAP

Operable Units and Areas of Responsibility

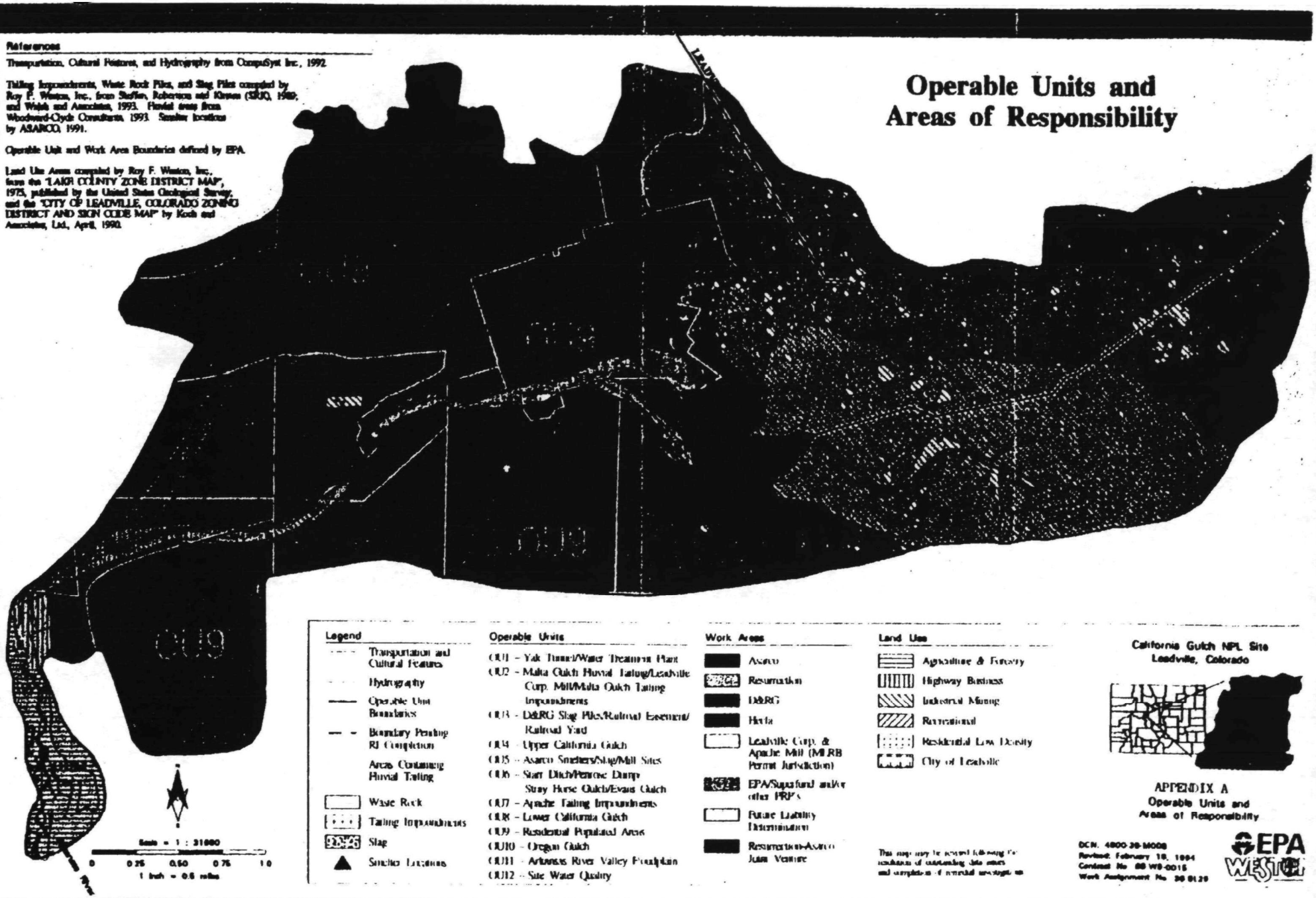
References

Transportation, Cultural Features, and Hydrography from CompuSyst Inc., 1992.

Tailing Impoundments, Waste Rock Piles, and Slag Piles compiled by Roy F. Weston, Inc., from Steffen, Robertson and Kirsten (SRK), 1989; and Walsh and Associates, 1993. Flooded areas from Woodward-Clyde Consultants, 1993. Smelter locations by ASARCO, 1991.

Operable Unit and Work Area Boundaries defined by EPA.

Land Use Areas compiled by Roy F. Weston, Inc., from the "LAKE COUNTY ZONE DISTRICT MAP", 1975, published by the United States Geological Survey; and the "CITY OF LEADVILLE, COLORADO ZONING DISTRICT AND SIGN CODE MAP" by Koch and Associates, Ltd., April, 1990.



Appendix B

RESPONSIVENESS SUMMARY

Responsiveness Summary

In November 1998, the Environmental Protection Agency issued a Proposed Plan describing the Agency's preferred alternative to address risks to residents from lead in soils and other sources within Operable Unit 9 of the California Gulch Superfund Site in Leadville, Colorado. A public meeting to discuss the Proposed Plan was held in Leadville on November 19, 1998. Public comment on the Proposed Plan was accepted from November 12, 1998 through December 14, 1998.

The purpose of this Responsiveness Summary is to provide all comments received on the Feasibility Study, Proposed Plan, or during the public meeting and provide the Agency's response to those comments. All comments are included in the Administrative Record for this project.

FEASIBILITY STUDY

Following are comments from the Colorado Department of Public Health and Environment (CDPHE) on the Feasibility Study. Each CDPHE comment is followed by EPA's response.

CDPHE Comment 1

The text for Alternative 7 should be revised to more accurately reflect the current Kids First Program's practice of accommodating the homeowner's preferences as part of the Kids First Work Group deliberative process of remedy selection. Typically, the deliberative remedy selection process associated with Alternative 7 should be in accordance with the property owner's preference. In addition, the property owner should fully understand any institutional controls that would be associated with leaving wastes on his/her property.

Response 1

Alternative 7 is based on the Kids First Program and has been designed to fully consider the views of the property owner. No response action will be conducted without the permission of the property owner. An extensive education and intervention program to manage lead exposure at the site will be an integral component of each action considered.

CDPHE Comment 2

Section 3.4.3.5 of the FS mentions various institutional controls such as land use controls, deed restrictions, permitting, etc., that could be used as a separate remedial alternative or as a component of various other remedial alternatives. However, the FS fails to present an in-depth discussion of this issue. A more detailed discussion of all the potential institutional controls is needed, especially a discussion of how they would apply to remedial Alternative 7 (see previous comment). Such specifics as: which institutional controls will be employed for the various

alternatives, how they will be employed, and by whom they will be employed should be fully discussed. In order for the FS to adequately evaluate effectiveness, implementability and cost, this crucial issue should not be deferred until the design phase of the remedial process. (Also see: CDPHE General Comment #2 in correspondence to EPA dated May 28, 1996, on the Draft residential Soils FS and General Comment #7 in correspondence dated January 8, 1997, on the Redraft of Alternative 7a and 7b.) Also, please refer to EPA's Draft Reference Manual on Institutional Controls, March 1998, for early integration of institutional control considerations.

Response 2

Alternative 7, the Selected Remedy, includes the following institutional controls, to be developed during design of the remedy, to ensure effectiveness of the Lake County Community Health Program (LCCHP). ASARCO and Lake County will be responsible for implementing and maintaining these institutional controls.

1. The creation of an overlay district to provide notification and information regarding the LCCHP, including requirements that specify excavation activities or other uses would result in referral of the property owner to the LCCHP.

2. A data management and tracking system such as a computer database, to maintain sampling, response action and other information related to individual lots ro properties within OU9. This information would be available to interested parties subject to notification through the overlay district. The data management system will be accessible by all parties of the LCCHP work group.

CDPHE Comment 3

An on-site repository for the disposal of residential soils is mentioned, however, there is no discussion of where the repository will be located. The specific location, including size and a discussion of siting criteria, should be included. Accordingly, State Solid Waste Regulations pertaining to Solid Waste Disposal Site and Facilities (6CCR1007-2) Sections 2 & 3 should be included as a potentially relevant and appropriate ARAR.

Response 3

Any excavated soils will be removed to a suitable on-site repository. The specific location and size of an on-site repository will be addressed during remedial design. Please refer to Appendix C to the Record of Decision for a complete listing of all applicable or relevant and appropriate requirements. Specific State Solid Waste Regulations are identified as ARARs.

CDPHE Comment 4

The CDPHE, APCD, Regulation 19 is currently being evaluated as potentially applicable or relevant and appropriate (ARAR) for lead-based paint abatement (i.e., remediations). The CDPHE, as you know, is currently actively working with EPA Region VIII lead-based paint

program representatives to determine which elements of this regulation may affect remedial activities in OU9. Any issues in this context will be resolved as soon as possible.

Response 4

Comment noted. The agreed upon provisions from Regulation 19 have been included in the ARARs table, Appendix C.

CDPHE Comment 5

In their Comment 5, CDPHE identified a number of ARARs for inclusion in the summation of ARARs for Operable Unit 9.

Response 5

Please see Appendix C to the Record of Decision for a complete listing of all applicable or relevant and appropriate requirements. CDPHE has concurred with the compilation of ARARs.

PROPOSED PLAN

Following are comments from CDPHE on the Proposed Plan. Each CDPHE comment is followed by EPA's response:

CDPHE Comment 1

CDPHE's support that the ROD be revised to conform with CDPHE's understanding of the Kids First Program's practice of accommodating the homeowner's preferences and concerns in the Kids First Workgroup's deliberative process of remedy selection.

Response 1

Please see EPA's response to CDPHE's Comment 1 on the Feasibility Study.

CDPHE Comment 2

To the extent possible, and in conformance with EPA Institutional Control (IC) guidance, likely ICs associated with the selected remedy should be identified and discussed in the ROD. This would facilitate a better understanding by the parties (and participating property owners) of any duties, obligations, or potential liabilities that may be associated with the implementation of the selected remedy.

Response 2

Please see EPA's response to CDPHE's Comment 2 on the Feasibility Study.

Following are comments from ASARCO on the Proposed Plan. Each ASARCO comment is followed by EPA's response.

ASARCO General Comment 1

Throughout the Proposed Plan it states that **all** sources of lead will be addressed. Generally, Asarco supports addressing all sources of lead, but as we have discovered through the implementation of the Kids First Program this is impractical, if not impossible. The LCCHP will address primary sources of lead exposure to children (i.e., soil, dust, paint, and water) and attempt to identify other potential pathways of lead exposure.

Response 1

EPA recognizes soil as the primary pathway of exposure to the residential population at the site. Dust, paint and water are other pathways of exposure. Other potential lead sources beyond an individual residence, and within OU9, may be considered by the LCCHP work group for remediation and/or education to address exposure.

ASARCO General Comment 2

As there has been some concern raised regarding the accuracy of the Superfund Site and Operable Unit boundaries on the map attached to the Proposed Plan, ASARCO supports using the Operable Unit boundary map included in the Consent Decree, Appendix C, Attachment 1 (also presented as Figure 2-1 in the Feasibility Study).

Response 2

The map included as Appendix C to the Consent Decree will be used to identify Operable Unit and Site boundaries for the Record of Decision.

ASARCO Specific Comment 1

The proposed plan states, "The second approach compared the measured blood lead values in area children with relevant national blood lead statistics in order to help evaluate the current impacts of actual site exposures to lead."

The comparison to national blood lead statistics was a minor part of the way in which EPA used the measured blood lead levels in the risk assessment. It would be more accurate to emphasize that the blood lead levels were analyzed along with corresponding environmental data for soil, dust, water, paint and other factors to help evaluate the current impacts of actual site exposures to lead.

Response 1

Comment noted.

ASARCO Specific Comment 2

The proposed plan states, "In 1991, geometric mean blood lead levels in children living within the site boundaries were typically around 5-6 μg/dl..."

The geometric mean blood lead level is a single value for a specific group, not a "typical" value in a range. The geometric mean blood lead level for the 284 children age 0-72 months who were living within the site in 1991 was 4.7 μg/dl, as reported on page 5-3 of the Baseline Human Health Risk Assessment (BHHRA), Part A. The range of 5-6 μg/dl does not correspond with the values reported for subareas from the University of Cincinnati study used in the BHHRA. Geometric mean blood lead levels within the subareas designated A-G ranged from 3.9 to 6.6 μg/dl; geometric mean blood lead levels for the two subareas within Lake County but outside of the Superfund Site boundaries were 3.1 and 6.0 μg/dl.

Response 2

Comment noted.

ASARCO Specific Comment 3

Item 2 states in part that "Additional blood lead data collected by [the] county health agency from more than 100 children per year for each year between 1991 and the present suggests that the incidence of children in the community with blood lead levels above 10 μg/dl is continuing to fluctuate between 6% and 9%." This statement appears to overstate the current community blood lead levels observed in Leadville. Using the guidelines for data reduction established in the memo to EPA from Dr. Bill Brattin, EPA's toxicology consultant (December, 1997), we find that in 1997 5.8% (14 children) of all 240 children tested and living within the site had blood lead levels over 10 μg/dl.

Response 3

Comment noted.

ASARCO Specific Comment 4

In the proposed plan it states, "It was concluded that soil and dust ingestion rates in this community were probably somewhat lower than national average rates possibly because the ground is frozen or snow covered approximately eight months out of the year."

While ASARCO agrees with this conclusion, we would like to clarify that national average rates for soil and dust ingestion are not known and that the precise amount of soil ingested anywhere is not well understood. The assumptions used in the IEUBK model reflect results from a very limited number of soil ingestion studies along with modifications to estimated soil ingestion rates by age group so that the predicted blood lead levels appear to match the observed values. No soil ingestion studies specifically support the age-specific soil ingestion rates used in the IEUBK model. Other possible reasons why the IEUBK model predictions and the blood lead observations did not match is that the model may fail to accurately predict true "background" blood lead levels due to non-soil sources, which may lead to a failure to accurately predict blood lead increases due to soil exposure; and the model may overestimate the importance of soil lead exposure in predicting blood lead levels.

Response 4

Comment noted.

ASARCO Specific Comment 5

With respect to the proposed trigger criteria for interior and exterior paint with lead concentrations above 1 mg/cm^2 and in poor condition, Asarco would like to reiterate its desire to implement a tiered approach where: 1) paint remediation abatement is performed if lead paint concentrations are found to be greater than 6 mg/cm^2 and paint is in poor condition; 2) education, and property owner requirements (based on applicable federal laws), would be the measures taken for homes where lead paint concentrations are found to be below 6 mg/cm^2 and above 1 mg/cm^2, or where lead paint concentrations are above mg/cm^2 and paint is in good condition; and 3) no action is taken if lead paint concentrations are 1 mg/cm^2 or lower. Education will be performed on issues such as: encapsulation, avoidance, care and maintenance of painted surfaces, and precautions to be taken during future remodeling projects by homeowner.

Asarco believes that the 6 mg/cm^2 and poor condition action criteria currently being used under the Kids First Program for remediation of paint is protective of human health and the environment, and upholds the original intent of the Consent Decree. As indicated in the Work Area Management Plan (WAMP), the concept of community-based lead reduction program such as the LCCHP was developed as an alternative to wholesale soil removal to address sources of lead exposure to young children besides soil. Asarco voluntarily agreed to remediate homes that pose significant lead paint risks (i.e., 6 mg/cm^2 or greater and paint in poor condition) as part of the overall lead risk reduction program, even though lead paint abatement is not a CERCLA action. The voluntary nature of the agreement to include lead paint in a community program attests to Asarco's support for reduction of lead risks in young children.

Response 5

The selected remedy includes a tiered approach to lead-based paint remediation. If lead levels are less than 1 mg/cm^2, no action will be taken. If paint contains greater than or equal to 1 mg/cm^2 and is in poor condition (peeling, chipping, chalking) or coating a friction-surface, education, risk counseling, and information on actions they may take themselves will be provided to residents. If paint has lead levels greater than or equal to 6 mg/cm^2, and is in poor condition, active remediation would be recommended. If either encapsulation or removal is chosen for remediation, the remediated areas will have a surface paint-lead level no greater than 1 mg/cm^2.

ASARCO Specific Comment 6

Asarco feels that "and accessible" should be added to the trigger criteria for soil. The LCCHP is a risk based program, thus, Asarco feels that the condition of soils or more specifically the accessibility to soil is an important part of the trigger criteria for soil. The exposure pathway for soils is greatest when poor vegetative conditions exist such as a bare area in the yard or a garden area where bare soils can be exposed for part of the year. If there is a good year round vegetative cover the pathway is blocked. The LCCHP Work Group should have the opportunity to recommend, and residents should have the opportunity to select, education and

possibly some type of voluntary institutional controls and not destroy an existing vegetative cover. Also for open areas, the Work Group could recommend vegetative enhancement without destroying the native vegetation that exists.

Response 6

The selected remedy offers a wide range of options to address potential exposure from soils greater than or equal to the trigger criteria for soil. Containment is one of the options and could rely upon vegetation as a barrier to any exposure.

ASARCO Specific Comment 7

The following reference is missing as referred to on page 4 for (U.S. District Court, 1994).

"In the United States District Court for the District of Colorado (U.S. District Court). 1994. Consent Decree with ASARCO, Incorporated, Resurrection Mining Company, Newmont Mining Corporation, and the Res-ASARCO Joint Venture. August 25."

Response 7

Reference to the Consent Decree is made in the Record of Decision selecting the remedy for Operable Unit 9 of the California Gulch Superfund project.

EPA received a number of comments from the general public during the public comment period. Following are comments from the general public on the Proposed Plan. The complete text of each public comment is available in the Administrative Record. Each comment is followed by EPA's response. In addition to the comments presented below, EPA received 21 post cards from community residents in support of Alternative 7, the Lake County Community Health Program. No post cards were received in opposition to the preferred alternative.

Comment 1

As long as actual blood lead levels are used as the initial trigger for further action, I strongly support this proposal.

Response 1

Blood lead levels in children are not the only trigger for remedial actions. Residents may elect to participate in the environmental testing and remediation program without blood lead testing or to participate without releasing information on their blood lead levels.

Demonstration of attainment of the performance standards for OU9 will, however, be based on actual blood lead levels in children residing in Leadville. The overall effectiveness of the LCCHP will be demonstrated through attainment of performance standards.

Comment 2

Institutional controls should, for the most part, be included as part of the Record of Decision regarding this matter to assure that Lake County and other entities are not burdened with inappropriate long range liabilities. These controls should be developed with the input of all interested parties to assure that they are reasonable and science based.

Response 2

Institutional controls are discussed further in the Record of Decision (ROD) and will be finalized during the design phase of the program with local community involvement. EPA and ASARCO are prepared to work cooperatively with Lake County and the City of Leadville to develop institutional controls. Discussions regarding the manner in which the LCCHP will be implemented and additional actions, if any, required or desired once performance standards are met will be integral to the development of an appropriate institutional controls program at this site. For this reason, institutional controls will be developed as part of the remedial design and presented in detail within the Work Plan for the LCCHP.

Comment 3

The City of Leadville should also be included as an entity to be consulted in the review and approval process (re: changes or variances to Standard Operating Procedures included in the LCCHP work plan).

Response 3

We agree that the City of Leadville should be involved with any changes made to the Standard Operating Procedures for the LCCHP.

Comment 4

Institutional controls which include zoning changes or deed restrictions may have little community support. In addition, use of lead concentration contour maps to delineate areas where institutional controls would be implemented is likely to be disputed by home owners.

Response 4

EPA and Asarco are prepared to work directly with Lake County and the City of Leadville to identify institutional controls that will be both effective and implementable. Several diverse groups, which include members from the Leadville community, currently provide opportunities for citizens to take an active role in the consultation and decision-making process for the site. These groups include the Site Activities Coordinating Committee and Kids First Work Group.

EPA does not intend to identify areas for institutional controls based on concentration contour maps previously presented in the Feasibility Study. Instead, appropriate institutional controls will likely be tied to the status of remediation at individual properties. For example, if

environmental lead sources have been tested but none of the trigger levels was exceeded, then no institutional controls would be required specific to that property (such as land use restriction or deed notice).

Comment 5

It might be reassuring to the community to extend blood lead monitoring beyond the children presently tested in the voluntary program, so as to evaluate the potential effects of residential properties not presently housing children.

Response 5

The LCCHP will be open to all residents in the site regardless of whether or not a child under 6 years old resides at the property. Environmental testing at properties both with and without children under 6 insures the protection of children who may reside at a property in the future.

Comment 6

A sampling program involving the testing of domestic cats might provide a pioneering avenue of study...This might be a far less expensive and more effective program than resulted from the inconclusive effort involving swine testing.

Response 6

Several lead researchers have suggesting using cats or dogs as monitors of lead exposure. Unfortunately their use is still quite experimental, and unsuitable for our purposes. For example, Philip Berny studied pets living in homes of children in Granite City, IL. While dogs and cats had blood lead levels more or less in the range of childrens' levels, there was no reliable correlation. If a pet had a blood lead level over 10 μg/dl, then there was a chance that a child living in the house did, as well, but the association was not reliable enough to use the pet's measurement instead of the children's. Also, it is not really understood what lead exposure is reflected in a dog's or cat's blood lead level. Dogs kept tied outside are not exposed to house dust like children are, and cats kept inside are not exposed to yard soil. Cats that go outside may roam away from the home and may not represent exposure at the home itself. Finally, pets will not be exposed to direct sources of lead such as old toys or lead-based paint on staircases or window ledges in the same way that children may be. In conclusion, we now feel that although pets may be somewhat useful in the future as a screening tool in conjunction with other environmental data, it will always be more effective to look at lead in the environment from the child's point of view.

Although the first swine-feeding test using Leadville soil was inconclusive on its own, EPA has done many swine tests and other extraction tests since then to study bioavailability of lead from many different sites, including recent tests using soils from other sites in Leadville. EPA is hopeful that the new test results for Leadville will help explain some of the unusual (higher or lower) blood lead results in different neighborhoods of Leadville and will contribute to our understanding of the bioavailability of lead in soils from residential areas of Leadville.

Comment 7

I believe that people are being bribed into testing blood lead levels [with savings bonds and gift certificates]. Is this typical nationwide?

Response 7

There are other communities in the United States, both CERCLA and non-CERCLA sites, that offer incentives to encourage participation in blood lead testing programs and to increase the accuracy and effectiveness of those monitoring programs. The incentives currently used in Leadville appear to have been effective in maintaining a high level of community participation in the county's blood lead monitoring program. It is important to note that the blood lead program is voluntary under the CERCLA action. Blood lead testing is not and will not be a requirement for environmental lead testing or, if necessary, remediation.

Comment 8

I wish I could believe that all of this site work is needed and that it does pose an imminent and substantial endangerment to public health and welfare. I prefer Alternative 1: No Action as the preferred alternative for the residential area.

Response 8

EPA agrees that the risk to the citizens of Leadville is moderate as demonstrated by the on-going blood lead program being conducted by Lake County. EPA prefers the LCCHP, because it will cause the least amount of disturbance to the community while being protective to current and future residents at the site.

In addition to written comments received during the public comment period, EPA also received some verbal comments during the public meeting conducted on November 18, 1998. Following are each of the comments made during the public meeting followed by EPA's response.

Comment 1

Are there areas in the Site where children's blood lead levels are higher? Do you see any clustering of children with elevated blood lead levels?

Response 1

Areas of the Site where children are more likely to have an elevated blood lead concentration include the east side of Leadville near the historic mining district, Stringtown, and the Lake Fork trailer park near the confluence of California Gulch and the Arkansas River.

Comment 2

What are the community protective measures, how are they being developed, and is the local community going to have input on the community protective measures?

Response 2

Alternative 7, the Selected Remedy, includes the following institutional controls, to be developed during design of the remedy, to ensure effectiveness of the Lake County Community Health Program (LCCHP). ASARCO and Lake County will be responsible for implementing and maintaining these institutional controls.

1. The creation of an overlay district to provide notification and information regarding the LCCHP, including requirements that specify excavation activities or other uses would result in referral of the property owner to the LCCHP.

2. A data management and tracking system such as a computer database, to maintain sampling, response action and other information related to individual lots ro properties within OU9. This information would be available to interested parties subject to notification through the overlay district. The data management system will be accessible by all parties of the LCCHP work group.

Comment 3

The County is opposed to using the 0-6 inch lead in soils distribution map as shown in the Feasibility Study (Figure 2-2). This map was developed using samples from streets and alley ways instead of actual yards.

Response 3

Any soil response actions will be based on property-specific data, not the lead in soils distribution map presented in the Feasibility Study.

Comment 4

How will institutional controls be implemented as a voluntary program?

Response 4

EPA and ASARCO are prepared to work directly with Lake County and the City of Leadville to identify institutional controls that will be both effective and implementable. Several diverse groups, which include members from the Leadville community, currently provide opportunities for citizens to take an active role in the consultation and decision-making process for the site. These groups include the Site Activities Coordinating Committee and Kids First Work Group. Appropriate institutional controls will likely be tied to the status of remediation at individual properties.

Comment 5

The County is opposed to institutional controls. Why are they listed in the feasibility study?

Response 5

Institutional controls are listed in the Feasibility Study to investigate these options further. EPA understands that the County supports implementation of institutional controls as described in the ROD.

Comment 6

How may properties will need soil remediation?

Response 6

The estimate is 150 homes.

Comment 7

I am opposed to sweeping zoning restrictions. How will vacant lots and new development be addressed?

Response 7

The selected remedy will not influence zoning. In the event that development disturbs contaminated soils, appropriate measures to manage the soils would have to be taken. Appropriate measures would depend on eventual land use.

Comment 8

How were trigger levels established?

Response 8

Risk assessments were relied upon to establish trigger levels.

Comment 9

In the feasibility study it says that the program will last for 12 years. After that time, does the County have to bare the cost?

Response 9

ASARCO is responsible for implementing the LCCHP until performance standards have been met.

Comment 10

Once the blood lead levels goals are met, how many years does the program have to continue?

Response 10

The Program will continue until performance standards have been met. EPA will conduct five year reviews of the Site to ensure that the remedy remains protective.

Comment 11

What happens 10 years down the road when the program loses momentum, how will the remediation be ensured?

Response 11

Incentives will be offered to ensure adequate participation in the program. EPA will conduct five year reviews to ensure that the remedy remains protective.

Comment 12

Could the Site be delisted even if all properties do not have sampling/remediation conducted?

Response 12

Once performance standards have been met, EPA will proceed with delisting.

Comment 13

How long until the LCCHP can be implemented?

Response 13

We anticipate that the program will begin in 1999.

Comment 14

If a property owner refuses to participate, will fences be put around the property?

Response 14

No.

Appendix C

APPLICABLE OR RELEVANT & APPROPRIATE REQUIREMENTS

SUMMARY OF POTENTIAL ARARS
Residential Populated Area (Operable Unit No. 9)

Standard, Requirement, Criteria, or Limitation	Citation	Potentially Applicable	Potentially Relevant and Appropriate	Description	Comments
SUMMARY OF POTENTIAL CHEMICAL-SPECIFIC ARARs/TBCs					
1. Clean Air Act, National Primary and Secondary Ambient Air Quality Standards	42 USC Sect. 7401-7642, 40 CFR Part 50	Yes	---	National ambient air quality standards (NAAQS) are implemented through the New Source Review Program and State Implementation Plans (SIPs). The federal New Source Review Program addresses only major sources. See Colorado Air Pollution Prevention and Control Act concerning applicability of requirements implemented through the SIP.	Emissions associated with proposed remedial action at individual properties will be limited to fugitive dust emissions associated with earth moving activities during soil removals. These activities will not constitute a major source. Federal NAAQS more stringent than State standards may be applicable. Compliance with these standards will be addressed in the Fugitive Emissions Dust Control Plan. (See #10)
2. Colorado Ambient Air Quality Standards	5 CCR 1001	Yes	---	Primary and secondary standards for PM10 in ambient air. Federal and State TSP standards have been replaced with PM10 and PM2.5 standards.	Compliance with ambient air standards will be achieved by adhering to a Fugitive Emissions Dust Control Plan prepared in accordance with Regulation No. 1 (see #10). This plan will discuss monitoring requirements, if any, necessary to achieve these standards.
3. Colorado Air Pollution Prevention and Control Act, Regulation 8	5 CCR 1001-14; 5 CCR 1001-10 Part C (I), Regulation 8	Yes	---	Regulation No. 8 sets emission limits for lead. Applicants are required to evaluate whether the proposed activities would result in an exceedance of this standard.	Fugitive dust emissions are expected to be of limited nature, occur in isolated areas and for short periods of time. Lead emissions may occur but are not expected to exceed the emission levels for lead. Compliance with Regulation No. 8 will be achieved by adhering to a fugitive emissions dust control plan prepared in accordance with Regulation No. 1 (see #10). This plan will discuss monitoring requirements, if any, necessary to achieve these standards.

Standard, Requirement, Criteria, or Limitation	Citation	Potentially Applicable	Potentially Relevant and Appropriate	Description	Comments
SUMMARY OF POTENTIAL LOCATION-SPECIFIC ARARs					
4. Resource Conservation and Recovery Act (RCRA), Subtitle D	40 CFR Part 258.10-15	No	Yes	Facilities where treatment, storage or disposal of solid waste will be conducted must meet certain location standards. These include location restrictions on proximity to airports, floodplains, wetlands, fault areas, seismic impact zones, and unstable areas.	May be relevant and appropriate if interim disposal is conducted or if an onsite repository is necessary.
5. Executive Order 11593 - Protection and Enhancement of the Cultural Environment	16 USC 470	Yes	---	Federal agencies directed to institute procedures to ensure programs contribute to the preservation and enhancement of non-federally owned historic resources. Consultation with the Advisory Council on Historic Preservation required.	See #6 below.
6. National Historic Preservation Act (NHPA)	16 USC § 470 et seq.; 40 CFR § 6.301(b); 36 CFR Part 63, Part 65, Part 800	Yes	---	Expands historic preservation programs to minimize harm to National Historic Landmarks; requires preservation of resources included in or eligible for listing on the National Register for Historic Places (NRHP).	This Act is applicable within the Leadville National Historic Landmark District. A Programmatic Agreement exists between the EPA, the Advisory Council on Historic Preservation, and the Colorado State Historic Preservation Officer in accordance with Section 106 and 110(f) of NHPA.
7. The Historic and Archaeological Data Preservation Act of 1974	16 USC 469 40 CFR § 6.301(c)	Yes	---	Establishes procedures to preserve historical and archeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity program.	Remedial Activities may affect historical and/or archeological data. A cultural resources survey will be performed to identify and evaluate all historic properties which may be affected by remedial activities.

Standard, Requirement, Criteria, or Limitation	Citation	Potentially Applicable	Potentially Relevant and Appropriate	Description	Comments
8. Colorado Historical, Prehistorical, and Archaeological Resources Act	Colorado Revised Statutes (CRS) §§ 24-80-401 to 411, 24-80-1301 to 1305	No	Unknown	Establishes procedures and requires a permit for investigation, excavation, gathering, or removal from the natural state of any historical, prehistorical, or archaeological resources on state lands for the benefit of recognized scientific or educational institutions. Also requires an excavation permit and notification if human remains are found on state land.	May be relevant and appropriate if archaeological resources are removed or human remains discovered during remedial activities; coordination with state archaeologist required, but no permit is needed within the Superfund site.
9. Colorado Register of Historic Places	CRS §§ 24-80-101 to 108	Unknown	---	Establishes requirements for protecting properties of historical significance.	May be applicable if remedial actions impact any property listed on the Register of Historic Places.
SUMMARY OF POTENTIAL ACTION-SPECIFIC ARARs/TBCs					
10. Colorado Air Pollution Prevention and Control Act, Fugitive Dust Control Plan/Opacity, Regulation No. 1	5 CCR 1001-3; § III.D.1.b,c,d. § III.D.2.a,b,c,e,f,g Regulation 1	Yes	---	Regulation No. 1 provisions concerning fugitive emissions for construction activities, storage and stockpiling activities, haul roads, haul trucks, and tailing ponds.	Only provisions under Regulation 1 concerning fugitive emissions for construction activities, including soil removal, storage, transport and stockpiling (5 CCR 1001-3; Sections III.D.2.b,c,e,f,g.), are applicable.
11. Colorado Air Pollution Prevention and Control Act, APENs Regulation No. 3	5 CCR 1001-5, Regulation 3	Yes	---	Establishes emissions control regulations for construction or modification of stationary sources.	Substantive requirements of an Air Pollution Emission Notice (APEN) are applicable if the removal actions disturb contaminated soil. An APEN will be filed, although permitting requirements such as this are not typically required under CERCLA.
12. Colorado Air Pollution Prevention and Control Act, Odors, Regulation No. 2	5 CCR 1001-4	Yes	---	Applies to any remedial action that may create regulated odors.	Planned remedial actions are not expected to create regulated odors.

SUMMARY OF POTENTIAL ARARS (Continued)

Standard, Requirement, Criteria, or Limitation	Citation	Potentially Applicable	Potentially Relevant and Appropriate	Description	Comments
13. Colorado Air Pollution Prevention and Control Act, Requirements for Lead-Based Paint Abatement Regulation No. 19	Colorado Revised Statutes §§ 25-7-1101 - 1107, Regulation 19	Yes	---	Establishes procedures and requirements for lead-based paint abatements greater than 2 square interior feet and 10 square exterior feet, including training and accreditation of individuals and firms engaged in lead-based paint activities and work practice standards for performing such activities.	Applicable when lead-based paint abatement activities are performed. On-site CERCLA actions are exempt from administrative and fee requirements. Subject to project-specific variance per Sections IV.G and V.M of Regulation 19.
14. Solid Waste Disposal Act (SWDA) as amended by RCRA, Criteria for Classification of Solid Waste Disposal Facilities and Practices (Subtitle D)	42 USC Sect. 6901-6987, 40 CFR Part 257	Yes	---	Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health.	Substantive requirements may be applicable or relevant and appropriate to the consolidation of soil removed from residential areas in an on-site repository.
15. SWDA as amended by RCRA Subtitle C	42 USC Sect. 6901-6987, 40 CFR Part 264	Yes	---	Regulates handling, transportation, storage and disposal of hazardous wastes.	Potentially applicable for lead-based paint waste debris resulting from remediation.
16. Hazardous Materials Transportation Act, Regulations	49 USC Sect. 1801-1813, 49 CFR Parts 107, 1710177	Unknown	---	Regulates transportation of hazardous materials.	Applicable only if the remedial action involves off-site transportation of hazardous materials. The regulations affecting packaging, labeling, marking, placarding, using proper containers, and reporting discharges of hazardous materials would be potential ARARs.
17. Colorado Noise Abatement Act	CRS §§ 25-12-101 to 108	Yes	---	Establishes maximum permissible noise levels for particular time periods and land use zones.	Applicable if construction activities occur in residential areas.
18. Colorado Water Quality Control Act Stormwater Discharge Regulations	5 CCR 1002.2	Yes	---	Establishes stormwater control requirements for construction activities.	Potentially applicable if construction activities occur as part of the remedial action.

Standard, Requirement, Criteria, or Limitation	Citation	Potentially Applicable	Potentially Relevant and Appropriate	Description	Comments
19. Colorado Solid Waste Disposal Sites and Facilities Act	6 CCR 1007-2	Yes	---	Establishes standards for licensing, locating, constructing and operating solid waste facilities.	Substantive requirements may be applicable or relevant and appropriate to the consolidation of soil removed from residential areas in an on-site repository.
20. Colorado Hazardous Waste Regulations	6 CCR 1007-3, Part 264: Section 264.301, (g), (h), (i) and (j); Section 264.310 (a)(1) through (a)(4); Section 264.310, (b)(1) and (b)(5)	No	Yes	Specific provisions of Section 264.301 concern run-on control, run-off control, management of run-on and run-off control systems and wind dispersal. Specific provisions of Section 264.310 concern placement of a cover to minimize infiltration, minimize maintenance, promote drainage and minimize erosion and accommodate settling.	These specific provisions of the hazardous waste regulations may be relevant and appropriate in certain circumstances depending on site specific conditions. The determination of whether such requirements will be both relevant and appropriate to the activities to be undertaken in OU9 will be based on best professional judgement and is conducted on a site specific basis taking into account the physical nature and location of the media involved, whether the requirements are well suited to the site conditions, and other factors.
21. Colorado Mined Land Reclamation Act	CRS 34-32-101 to 125; Rule 3 of Mineral Rules and Regulations	No	Yes	Regulates all aspects of land use for mining, including the location of mining operations and related reclamation activities and other environmental and socio-economic impacts.	No mining or reclamation activities are planned as part of remedy. If mining activities are performed, then substantive requirements of selected portions of Rule 3 regarding Reclamation Measures, Water-General Requirements (except portions relating to sitewide surface and groundwater), wildlife and revegetation may be applicable. However, certain provisions of these regulations may be relevant and appropriate to the OU9 remedial action.
22. Colorado Primary Drinking Water Regulation	5 CCR 1002, CRS 25-1-107, Section 7.3.2	No	Yes	Requirements to control lead and copper concentrations in tap water.	Tap water sampling requirements are relevant and appropriate.

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