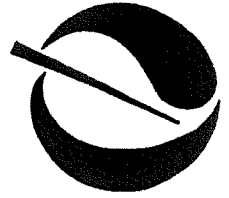


California Environmental Protection Agency  
DEPARTMENT OF TOXIC SUBSTANCES CONTROL  
ABANDONED MINE LANDS INITIATIVES



## INTRODUCTION

California has a vast legacy of economic prosperity and innovative technological development stemming from its historic mining activities beginning with the Gold Rush in 1849. Minerals recovered from California have been used to improve many facets of American life. Unfortunately, another legacy associated with historical mining is significant degradation of the environment. The Department of Toxic Substances Control's (DTSC) Abandoned Mine Lands (AML) Initiatives address hazardous substances associated with historical mining activities.

## BACKGROUND

More than a century and a half of mining in California has created thousands of AML sites with hundreds of millions of tons of mining wastes. California's rapidly growing population is encroaching on areas of historic mining activities and creating a greater potential for adverse effects to human health and the environment. It is estimated that California has over 47,000 AML sites; about 67 percent are located on federal lands, another 31 percent are on private lands and about 2 percent are on State or local lands. Sources of this information vary, but are typically based on historical records consisting of mine claims, past mining operations, plat maps and field reconnaissance. Databases have been developed from local, State and federal agencies, but only approximately 2,500 (5 percent) of these AML sites have been inventoried to date.

The increase in population has resulted in the development of properties for residential, recreational and commercial uses on and near former AML sites. Likewise, as the overall population of California grows, there is increasing pressure on the use of local, State and federal lands for recreational purposes where numerous AML sites exist. Controlling access to private, local, State and federal lands which are former AML sites is problematic. Additionally, mine wastes such as mill tailings and mine waste rock from AML sites have reportedly been exported offsite and used extensively as fill and in road construction in and around many historic mining communities.

## PROBLEM

Historical mining practices, ore processing methods, disposal practices, closure practices and surface exposure of ore deposits at AML sites have resulted in the generation and disposition of millions of tons of mine wastes, including waste

rock, mill tailings, mine drainage water, processing chemicals and other wastes to the land and waters of the State. The interaction of natural processes such as climate, hydrology, geochemistry, sediment transport and weathering on these wastes have resulted in the release of hazardous substances (chemical hazards) that may pose threats to human health and the environment. AML sites may also pose threats to public safety due to physical hazards associated with mining activities, e.g., shafts, tunnels, pits, etc.

## AML HAZARD ASSESSMENT PROCESSES

Once an AML site has been identified and evidence of mining activity is indicated by tunnels, shafts, building foundations, mill tailings and waste rock piles, discolored soil, etc., chemical hazard assessment typically begins with a site investigation (Preliminary Endangerment Assessment) to determine the nature and extent of contamination resulting from past mining activities. This includes identifying: 1) hazardous substances such as arsenic, mercury, lead, other metals and acid rock drainage; 2) sources such as mine tailings and waste rock, mine water, milling and processing areas; 3) affected media and pathways such as soil and sediments, surface water, groundwater and air; and 4) potential human and ecological receptors. Prioritization of chemical hazards includes evaluating the completeness of pathways to human receptors based on accessibility, proximity to population, land use, water use, etc., and completeness of pathways to ecosystems based on habitat.

Remediation remedies vary depending on the extent, volume and concentration of the hazardous substance, affected media and pathway, and threat to human and ecological receptors based on the current or future land use (e.g., recreational, commercial or residential use). Typical remedies to mitigate chemical hazards can include source removal, encapsulation and treatment. Because of these variables, the cost for remediation can vary widely. Remedies involving treatment and encapsulation require long term, often indefinite operation and maintenance. Examples of long term operation and maintenance needs are for remedies involving water treatment and encapsulated waste. Remedies applied to AML sites are often supplemented by Institutional Controls (ICs) which are administrative or legal controls that minimize the potential for human exposure. Examples of ICs are: 1) land use covenants which restrict land uses, including uses of water; 2) soil management plans which describe how affected soil and mine waste is to be managed on site; and 3) posting and notification

**Abandoned Mine Lands Initiatives**  
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of known chemical hazards.

Physical hazards assessment typically begins with locating physical hazard features such as tunnels, ventilation shafts, glory holes, etc. Prioritization of physical hazards includes evaluating accessibility, proximity to population and current land use. Typical remedies to mitigate physical hazards can include plugging or installing bat gates on shafts and tunnels. DTSC typically does not oversee the remediation of physical hazards at AML sites unless they are chemical hazard sources. However, as part of site investigation, DTSC identifies physical hazards and notifies the appropriate regulatory agency of physical hazards that are identified.

DTSC has prepared two AML documents used to assist in identifying and investigating AML sites: 1) "Abandoned Mine Lands Preliminary Assessment Handbook", January 1998; and 2) "Abandoned Mine Lands Site Discovery Process", June 2006. These documents can be viewed and downloaded via the internet at:  
[http://www.dtsc.ca.gov/SiteCleanup/Brownfields/index.cfm#CP\\_JUMP\\_13316](http://www.dtsc.ca.gov/SiteCleanup/Brownfields/index.cfm#CP_JUMP_13316). Look under "Guidance Documents".

Information regarding AML sites for which DTSC is providing oversight can be viewed and downloaded via the internet at: <http://www.envirostor.dtsc.ca.gov/public/>. Under the "Tools Menu", click on "Advanced Search" and select "Mines" in the category titled "Past uses that cause contamination"

#### **AML INITIATIVES**

California Abandoned Mine Lands Agency Group: DTSC is actively involved in coordinating AML site investigations and remediations with private, local, State and federal agencies. DTSC participates in the quarterly meetings of the California Abandoned Mine Lands Agency Group (CAMLAG), a workgroup of local, State and federal agencies developed to provide coordination and opportunity for discussion of the respective agencies' involvement in the oversight of AML sites. DTSC also participates in the quarterly Abandoned Mine Lands Forum meetings which consist of the agencies and private land owners, developers and consultants.

Grants: DTSC is actively involved in seeking U.S. Environmental Protection Agency (EPA) Brownfields assessment and cleanup grants and other grants; and provides support to local agencies that are seeking or that have acquired Brownfields grants for AML sites needing assessment or cleanup. DTSC also implements U.S. EPA's Preliminary Assessment/Site Investigation (PA/SI) process for conducting site screening investigations as well as supports U.S. EPA's Targeted Brownfields Assessments (TBA) and

DTSC's Targeted Site Investigation (TSI) at AML sites.

Other Federal Programs: DTSC oversees AML work on U.S. EPA National Priorities List (NPL) Sites. NPL sites are sites that the U.S. EPA has identified as having hazardous substance release(s) that could pose a significant threat to public health, ecosystems and/or water quality. For these sites, DTSC participates in technical oversight and typically pays 10% of construction and remediation costs.

Voluntary Cleanup Program: The Voluntary Cleanup Program (VCP) has been the primary Brownfields AML Initiative for DTSC. Proponents (who may or may not be responsible parties) initiate projects to undertake site investigation or other response actions under DTSC oversight. Most sites are eligible, except sites on the State Superfund list and the National Priority List (federal "Superfund" sites) and Department of Energy or Department of Defense sites. Many of DTSC's AML sites are VCP sites due to ongoing residential and commercial development in historical mining communities.

AML Team: DTSC has recently formed an Abandoned Mine Lands Initiatives Team. The objectives of the AML Team are to develop relationships with AML stakeholders; establish funding through specific projects and interagency agreements; develop a team of staff with AML expertise; develop cost-effective procedures to streamline investigation and remediation; develop green investigation and remediation protocols; develop tools to assist local agencies including water districts; and promote green technologies. The objectives of the Team will be implemented over a 30-month period.

For further information regarding AML sites and related guidance, please contact:

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916-255-3591

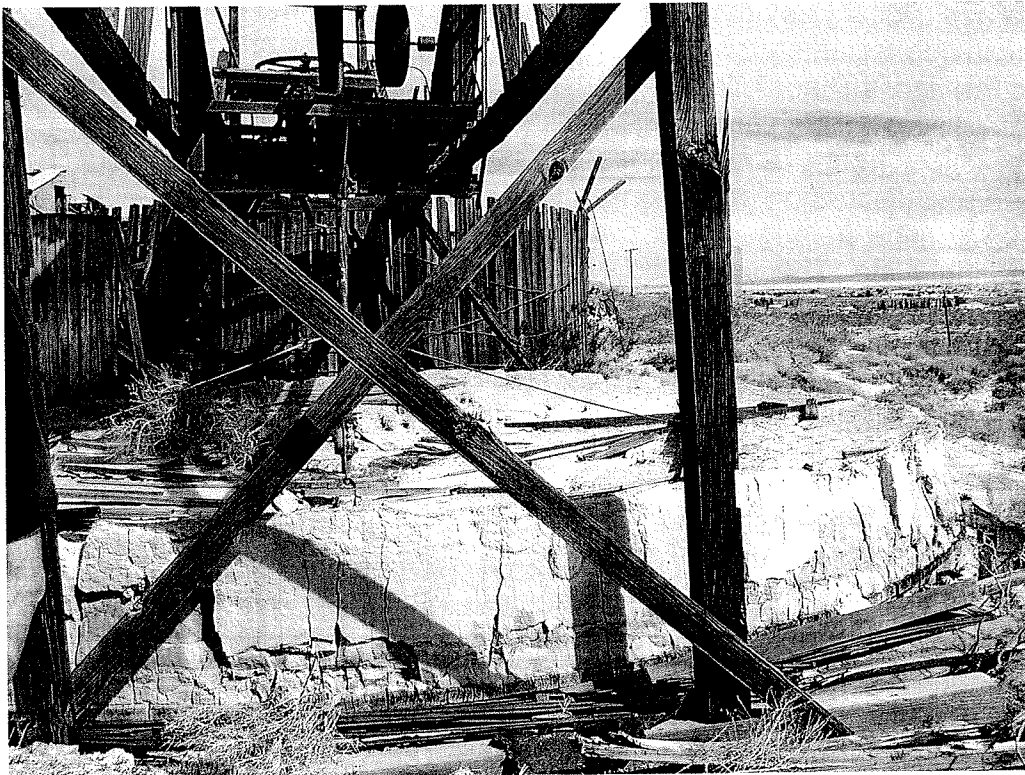
For further information regarding AML Initiatives including grants, please contact:

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# STATE ORPHAN SITE

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## Abandoned Mine Lands California



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**CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY  
DEPARTMENT OF TOXIC SUBSTANCES CONTROL  
BROWNFIELDS AND ENVIRONMENTAL RESTORATION PROGRAM**

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# Abandoned Mine Lands California

## SITE BACKGROUND

### Introduction

California has a legacy as being a major mineral producer since the days of the "Gold Rush" beginning in approximately 1849. Mining activities have occurred in all eleven of California's Geologic Provinces. These mining activities have resulted in thousands of Abandoned Mine Lands (AML) sites. Historical mining practices, ore processing methods, disposal practices, closure practices, and surface exposure of ore deposits at AML sites have resulted in the generation and disposition of millions of tons mine wastes, including mine waste rock and mine tailings; mine drainage water; processing chemicals; and other wastes to the land and waters of the state. The interaction of natural processes such as climate, hydrology, geochemistry, sediment transport, and weathering of these wastes have resulted in the release of hazardous substances (chemical hazards) that may pose threats to human health, the environment (ecosystems), and water quality. AML sites also may pose threats to public safety due to physical hazards associated with mining activities (e.g., shafts, tunnels, pits, etc.).

California's Federal and State agencies involved overseeing work on AML sites estimate that there are about 47,000 AML sites located throughout the State. About 67 percent are located on federal lands, another 31 percent are on private lands, and about 2 percent are on State or local lands. Sources of this information vary but are typically based on historical records consisting of mine claims, past mining operations, plat maps, and field reconnaissance for which databases have been developed from local, State, and Federal agencies. Approximately 2,500 (5 percent) of these AML sites have been inventoried to date.

In recent years there has been a large increase in the migration of California's population to regions of California having a high density of AML sites. An example includes the "Motherlode", a historical gold mining region in the Sierra Nevada Mountains that stretches for 300 miles along historic highway 49, where communities such as Grass Valley and Nevada City in Nevada County and Sutter Creek and Jackson in Amador County are undergoing rapid growth. The increase in population in these locations has resulted in the development of properties for residential, recreational, and commercial uses on and near former AML sites. Likewise, as the overall population of California grows, there is increasing pressure on the use of local, State, and Federal lands for recreational purposes where numerous AML sites exist. Controlling access to private, local, State and Federal lands which are former AML sites is problematic. Additionally, mine wastes such as mine tailings and mine waste rock from AML sites have reportedly been exported offsite and used extensively as fill and in road construction in many historic mining communities.

Arsenic, lead, and mercury are typical chemicals of concern (COCs) found in mine waste rock, mine tailings and site soil/sediment from former gold mining activities. The type and

concentration of COCs varies depending on the site mineralogy, the mineral being mined (e.g., gold, copper, mercury, zinc, etc) and the mining/milling processes. Surface water and groundwater can also be impacted from COCs depending on the solubility of the COCs and other factors including the presence of sulfides which can generate acid rock drainage (ARD).

**Table 1: Typical COCs for Gold Mines**

Contaminant of Concern	Contaminated Media	Preliminary Remediation Goals Residential. Parts per million (ppm)	Typical Background (ppm)	Typical Concentration (ppm)
Arsenic	Soil/Sediment	0.39	0.6 - 20	20 - 8,000
Lead	Soil/Sediment	150	12 - 97	97 - 5,000
Mercury*	Soil/Sediment	23	0.05 – 0.90	0.90 - 2000

\* Mercury Chloride

## REGULATORY HISTORY

DTSC has historically coordinated with a number of federal agencies, including the U.S. Environmental Protection Agency, the Bureau of Land Management (BLM), and other federal land management agencies, including National Parks and U.S. Forest Service, in the assessment and cleanup of AML sites. DTSC's AML coordination with the United States Environmental Protection Agency (U.S. EPA) is primarily for their National Priorities List (NPL) sites, the Preliminary Assessment/Site Investigation (PA/SI) process sites, and Emergency Response Actions and Time Critical Removal Actions. The federal land management agencies, such as Bureau of Land Management, Forest Service, and National Park Service, also use CERCLA authority to conduct emergency response actions, time critical removal actions and non-time-critical removal actions at AML sites, but rarely or ever do they establish final removal activities using a CERCLA Record of Decision.

Except for established NPL sites, U.S. EPA investigations and actions conducted by their PA/SI and Emergency Response programs are limited to time-critical responses and are intended to only address immediate health and environmental problems and are not necessarily intended to address all AML contamination, including offsite contamination associated with a site or sources of contamination originating from another site. Similarly, actions taken by the BLM and other federal land management agencies are generally limited to actions taken on federal land management agency property only, and not necessarily intended to address offsite contamination migration or sources of contamination associated with surrounding private AML or patented land. In these circumstances it may become necessary for DTSC to take appropriate actions to assure that offsite contamination migration and contamination on other property, including private

property are addressed.

DSTC also coordinates on AML sites with other state agencies, including State Water Resources Control Board, Regional Water Control Boards, Department of Conservation, State Parks, State Lands, and Fish and Game. Coordination with these agencies can also result in the identification AML sites on private lands and the need for DTSC to take appropriate actions to assure that offsite contamination migration and sources of contamination on these properties are addressed.

This orphan funding will provide the necessary funds for DTSC to coordinate with federal and state agencies in the review of AML site investigation and cleanup documents and to take necessary follow up investigations and actions on AML sites that federal and state agencies are not addressing on adjacent property, including private property and other public property.

### **SCHEDULE OF ACTIVITIES**

To address the above concerns, in FY 2008/2009, DTSC will continue its coordination with federal and state agencies. Some ongoing investigations leading to likely DTSC involvement are 1) BLM: Rand Mine Complex in Kern in the communities of Red Mountain, Randsburg and Johannesburg; Calico Mine near Barstow, San Bernardino County; 2) BLM and U.S. EPA: Tropico Mine in Rosamond, Kern County; and 3) BLM: Davis Mill and Hoge Mine in Nevada City, Nevada County.

### **COST ESTIMATE**

Investigation	\$250,000
Removal Action Workplan	\$50,000
Removal Action	\$200,000
<b>TOTAL COST</b>	<b>\$ 500,000</b>

### **PUBLIC REPRESENTATIVES**

#### **Red Mountain, Johannesburg and, Rosamond**

Roy Ashburn  
Bill Maze  
Jen Fuller

State Senator, District 18  
State Assembly Member, District 34  
State Assembly Member, District 32

**Rosamond**

Roy Ashburn  
George Runner

State Senator, District 18  
State Assembly Member, District 17

**Nevada City**

Sam Aanestad  
Dave Cox  
Rick Keen

State Senator, District 4  
State Senator, District 1  
State Assembly Member, District 3

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