

MEMORANDUM

DATE: April, 10, 2006

TO: Patrick Madigan, Tucson Field Manager

FROM: Tucson Field Office HazMat Coordinator

SUBJECT: ACTION MEMORANDUM
Request for Non-Time-Critical Removal Action at Saginaw Hill

I. PURPOSE

This Action Memorandum documents the proposed Non-Time Critical Removal Action for the Saginaw Hill abandoned mine site, Pima County, Arizona. The proposed removal action is based on the Engineering Evaluation and Cost Analysis dated February 11, 2006.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

Removal Site Evaluation

The BLM conducted a removal preliminary assessment in 2003, a removal site investigation in 2005, and an Engineering Evaluation/Cost Analysis (EECA) that was prepared in 2006. These studies show that elevated levels of toxic metals exist in the soil, arroyo sediment and in the groundwater. Concentrations of these metals exceed all risk-based criteria and pose a risk to human health and the environment. The BLM parcel is frequently used by hikers, All Terrain Vehicle (ATV) riders, and the public for general recreation. The waste dump at the Palo Verde mine was frequently driven on by ATV riders before it was fenced in 2005.

The principal targets of concern are visitors who may come into contact with the mine wastes and ingest them through airborne transmission of dust created by ATV activity or direct contact to the skin. The primary contaminants of concern (COC) are arsenic and lead and secondary COCs are antimony, copper, mercury, and thallium. These are found in greatest concentration in the mine wastes but have migrated to surrounding soils, sediment and groundwater.

Physical Location

The site consists of two areas of contamination: the Saginaw Mine and the Palo Verde Mine, both of which are located within a 540 acre parcel of BLM-managed land 10 miles southwest of downtown Tucson (Figure 1). The site is located within T. 15 S., R. 12 E., NE1/4 section 11 and 0.5 miles northwest of the intersection of Valencia and Mark Roads. The BLM parcel is on the edge of the City of Tucson and is surrounded by private land with a high density of residential development on the north and east sides, a casino on the south side, and an elementary school on the east side. The Saginaw Mine covers five acres and contains mine waste and smelter slag, while the Palo Verde Mine covers one acre and contains mine waste.

Site Characteristics

Saginaw Hill is drained by an ephemeral arroyo that flows into the Avra Valley, a sub-basin of the Santa Cruz River. Saginaw Hill is an arid environment that receives less than 12 inches of rainfall annually and where the water table is more than 100 feet below the surface. The area is characterized by steep bedrock hills surrounded by gently sloping pediment.

Saginaw Hill is part of the Amole District, which was mined for lead, zinc, copper, silver, and gold in the late 19th and early 20th centuries. Mining at the Saginaw Mine commenced in 1895 when shafts were dug and ore was concentrated by gravity methods and smelted on site. Underground mining took place at the Palo Verde Mine in the 1920s and the ore was processed offsite. Saginaw Hill has been dormant, except for exploration work, since the 1950s. Oxidation of the sulfide minerals in the mine wastes has caused acid mine drainage to leach toxic metals out of the wastes and sediment transport has moved the metal into the surrounding environment.

Rapid expansion of Tucson has now encompassed this abandoned mine area with homes, casinos, and schools. Pima County has proposed making Saginaw Hill a trails park when the clean up is completed.

Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant

Mine tailings and waste dumps were placed on the public lands and abandoned. The waste piles are eroding causing metal contaminants to spread to surrounding soil and drainage sediment by surface runoff and wind dispersion. The groundwater below the Palo Verde mine is contaminated with arsenic at 900 ppb, probably from the underground workings or mineralization or both.

National Priorities List Status

Saginaw Hill is not currently on nor proposed for the NPL.

Maps, Pictures, and Other graphic Representations

Figure 1. Shows the site location and land status as well as surrounding features.

B. Other Actions

Previous Actions

In 2003, BLM constructed a barbed wire fence around the Palo Verde waste dump and one around the Saginaw Mine. In March of 2005, after the barbed wire fence was repeatedly vandalized, a chain link fence was constructed around the Palo Verde dump. Finally, in summer of 2005, a perimeter fence was constructed to enclose 290 acres to further control access. A land closure order was published in the Federal Register to provide BLM the authority to keep people away from the affected land. In April 2005, BLM backfilled 27 mine shafts that also posed a risk to public safety.

Current Actions

There are no current actions other than the non-time critical action

C. Role of State and Local Authorities

BLM has coordinated and regularly met with representatives of the Tucson Unified School District, Pima County Board of Supervisors, Arizona State Mine Inspector, Arizona Department of Health Services, Arizona Department of Mine Inspector, Pima County Department of Environmental Quality, Pima County Health Department, and Pima County Department of Parks and Recreation.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

A. Threats to Public Health and Welfare

Saginaw Hill is located on the outskirts of the City of Tucson and is surrounded by dense and rapidly growing residential areas. A large number of people use this parcel for recreation. The concentration of lead and arsenic in the waste piles exceeds the site specific Risk Management Criteria (RMC) by 10 to 100 times creating a high risk to human health. Antimony, mercury, thallium, and copper exceed the site specific RMC by 1 to 10 times and pose a moderate health risk. Arsenic, lead, and mercury are a moderate health risk in the surrounding soils and arroyo sediments. Table 1 summarizes the maximum concentrations of contaminants of concern.

Table 1. Maximum Concentrations of Contaminants of Concern

Soil Criteria	arsenic	lead	antimony	copper	mercury	thallium
RMC	389	2000	185	20,863	152	33
Background	30.6	81	2.4	375.3	39.65	ND
XRF						
Palo Verde Waste	5,348.3	21,373.2	0	715.64	0	0
Saginaw Waste	30,426.2	49,538.7	0	23,040.5	0	0
Auxillary Waste Piles	47,301.0	22,295.1	0	5,224.8	118.7	0
Surrounding Soil	2,142.3	15,339.2	0	8,728.7	35.3	0
Arroyo	1,175.2	2,012.7	0	506.2	24.5	0
Laboratory						
Palo Verde Waste	3,140	111,000	331	4,270	1.8	85.9
Saginaw Waste	37,400	76,100	238	24,700	15.8	11.4
Auxiliary Waste Piles	45,000	25,000	93	3,000	2,300	1.6
Surrounding Soils	2,100	4,600	81	570	1,300	1.4
Arroyo	2,300	3,700	60	510	1,300	0.9

B. Threats to Environment

The soil concentrations shown in Table 1 exceed BLM risk criteria for wildlife. Contaminant pathways consisting of inhalation of dust, direct contact with soil, and ingestion of surface runoff put wildlife at high risk of contamination.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Action

Proposed Action Description

The goal of the removal action is to reduce human and environmental exposure to arsenic and lead and other metals of concern found in the waste piles at Saginaw Hill. This will be accomplished by preventing or reducing human and ecological exposure through inhalation, ingestion, and skin contact to metal-contaminated soil and groundwater, and by preventing or reducing migration of metals of concern via surface runoff, erosion, and wind dispersion.

The Palo Verde and Saginaw waste piles, auxiliary waste piles, and arroyo sediment will be excavated and consolidated into an onsite repository. The repository will be built into the side of the hill next to the Saginaw Mine, capped and re-vegetated to stabilize the wastes and form an effective barrier to prevent exposure to and migration of the contaminants. A fence will be constructed around the repository to protect it from ATV and other traffic that might cause erosion. Surrounding soils that exceed the risk criteria of 389 mg/kg arsenic will be capped with a six-inch gravel cover which will form an effective exposure barrier between the soil and public land users.

The four existing monitoring wells will be supplemented by drilling three additional wells. Together, these wells will be monitored to determine if the groundwater contamination plume below the Palo Verde Mine is migrating toward offsite domestic wells. The wells will be sampled quarterly for five years and semiannually for 10 years after that and annually for the next 15 years. In addition, administrative actions will be taken to prevent use of groundwater from the 540-acre Saginaw Hill parcel. These actions will prevent exposure of the public to contaminated groundwater.

Contribution to Remedial Performance

No further action will be required for the tailings and waste rock if the proposed removal action is implemented at the site. This alternative eliminates the principal threats posed by the mine wastes by creating a barrier between potential human and ecological targets and applicable exposure pathways. Further groundwater remediation will depend upon the results of the monitoring.

Description of Alternative Technologies

Alternative treatments for the mine wastes include capping in place without consolidation; solidification/fixing technologies that change the physical characteristics of the contaminated material to reduce mobility of the contaminants; and placement in an offsite commercial landfill. Alternative treatments of groundwater include metal

precipitation via chemical addition technology; stripping heavy metals by chelation onto a ligand; technologies that fix sulfur to metals and precipitate metal sulfides including the use of sulfate reducing bacteria.

Engineering Evaluation/Cost Analysis (EE/CA)

A formal public comment period for the EE/CA was held from November 14, 2005, to December 29, 2005, which included a 15-day extension. A web site was created and fact sheets were distributed to the public, which outlined the findings of the site characterization and the alternatives presented in the EE/CA. Two public meetings were held, one prior to release of the draft EE/CA and one on the middle of the comment period to present the findings. The draft EE/CA was made available in the southwest branch of the Tucson – Pima County Library and the EE/CA and Administrative Record are available in the BLM Tucson Field Office.

Applicable or Relevant and Appropriate Requirements (ARARs)

The site exceeds Arizona non-residential Soil Remediation Levels (SRL) for arsenic and lead. BLM Risk Management Criteria for soil are exceeded for all visitors and wildlife. Arizona SRL's are superseded by site-specific risk management criteria. The groundwater below the Palo Verde Mine exceeds Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ) Maximum Contaminant Levels

Project Schedule

Design of the removal action will take place in FY 06. Implementation of the removal action will be dictated by funding levels but is expected to start in FY06 and be completed in FY08.

B. Estimated Costs

The total cost of soil remediation is estimated to be \$1.8 million. Long-term monitoring of groundwater is estimated to cost \$476,000.

IV. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

The site is closed and fenced to prevent access as a temporary means of preventing exposure to the public. However, maintaining the fence is problematic and will only become more difficult over time. The fence is breached periodically, allowing the potential for people to be exposed to hazardous substances. Exposures to the environment will continue unabated. Without monitoring the groundwater, BLM will not be able to determine if contamination is spreading toward domestic wells.

VII. OUTSTANDING POLICY ISSUES

Pima County has applied for a Recreation & Public Purpose lease to make Saginaw Hill into a trails park. Saginaw Hill contains 15 active lode mining claims.

VIII. ENFORCEMENT

A Potentially Responsible Party (PRP) search and report was generated. The BLM Solicitor is investigating the mining claimant as a possible PRP.

IX. RECOMMENDATION

This decision document represents the selected removal action for the Saginaw Hill Site in Pima County, Arizona. This document was developed in accordance with CERCLA as amended, and is consistent with the NCP. This decision is based on the Administrative Record for the site.

Conditions at the site meet criteria found in the 40 CFR 300.415(b) (2) of the NCP for a removal action. It is recommended that this Action Memorandum be approved for implementation of the proposed remedy by the authority delegated to the Bureau of Land Management.

Approved by:
Signed Patrick Madigan

Date: *4.11.06*

Patrick Madigan
Field Manager

Disapproved by:
Patrick Madigan
Field Manager

Date: