372450

CLEAR CREEK/CENTRAL CITY SUPERFUND SITE

EXPLANATION OF SIGNIFICANT DIFFERENCES
ARGO & BIG FIVE MINE WASTE PILES

INTRODUCTION

The Clear Creek/Central City Superfund Site (the Site) is located on the east slope of Colorado's Front Range, approximately 30 miles west of Denver (Figure 1). The Site was placed on the National Priorities List in September 1983 because of impacts to Clear Creek from historic mining activities. EPA and the Colorado Department of Public Health and the Environment (CDPHE) refer to the Clear Creek basin as the Clear Creek/Central City Superfund Study Area. Within this broad study area, several discrete draining mines and mine dumps have been identified as the Site. Currently included in the Site are 23 properties - six mine tunnels and 17 mine waste piles. The Argo and Big Five mine waste piles are two of these properties and are the subject of this document. They are both located in Idaho Springs, Colorado (Figure 2).

EPA selected a remedy for the Argo and Big Five mine waste piles in the Operable Unit #2 Record of Decision (OU#2 ROD) which was signed March 31, 1988. This document explains the significant difference between the remedy selected in the OU#2 ROD and the one now planned for the Argo and Big Five mine waste piles.

CDPHE is the lead agency for the Site and is conducting the remedial design and remedial action for these properties with funds provided by EPA via cooperative agreements.

Under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. §9617(c), EPA is required to publish an Explanation of Significant Differences (ESD) when significant, but not fundamental changes, are proposed to the previously selected site remedy. The National Contingency Plan (NCP) at Section 300.435(c)(2)(i) sets forth the criteria for issuing an ESD and requires that an ESD be published if a remedial action is taken which differs significantly in either scope, performance, or cost from the remedy selected in the ROD.

The circumstances that lead to the need for this ESD include additional analysis of aquatic impacts, information gained from supplemental sampling at the Big Five and Argo mine waste piles and a revised risk assessment, all indicating that additional action is necessary at these two mine waste piles.

This ESD will be incorporated into the Administrative Record. The Administrative Record file is available for public review at the following locations:

1) Clear Creek Watershed Advisory Group
2060 Miner Street, Suite 201
Idaho Springs, Colorado 80452
(303) 567-4324

2) U.S. Environmental Protection Agency
EPA Records Center
999 18th Street
Denver, Colorado 80202
(303) 312-6473

3) Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246
(303) 692-3300

For additional information contact:

- Holly Fliniau, EPA Region VIII, (303) 312-6535
- Doug Jamison, CDPHE, (303) 692-3404

SITE HISTORY

The Site was nominated for listing on the National Priorities List in 1982 and added to the list in September 1983. Three RODs have been signed for the Site. The OU #1 ROD was signed September 30, 1987 and called for passive treatment of the acid water draining from five mine tunnels. The five tunnels include the Big Five and Argo Tunnels in Idaho Springs, the Gregory Incline and National Tunnel in Black Hawk, and the Quartz Hill Tunnel in Central City. Acid mine drainage has been identified as the principal threat at the Site. Pursuant to the NCP at Section 300.430(a)(1)(iii)(A), "principal threats" can include liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials. EPA's preference is to use treatment to address the principal threats at Superfund sites.

The OU #2 ROD was signed on March 31, 1988 and it selected a remedy for the mine waste piles associated with the five tunnels identified in OU #1. Mine waste has been identified as a "low-level threat" relative to the principal threat for the Site. Pursuant to the NCP at Section 300.430(a)(1)(iii)(B), EPA expects to use engineering controls such as containment for low-level threat wastes at Superfund sites. The OU #2 ROD, which will be discussed in more detail later in this document, reflected this preference.

In September, 1990, CDPHE completed the Phase II Remedial Investigation of the Site which identified additional sources of contamination. A Baseline Risk Assessment was conducted as part of this study. The OU #3 ROD, sometimes referred to as the Phase II ROD, selected remedies for the additionally identified properties and modified the OU #1 remedy. The ROD was signed September 30, 1991.

The purpose of the planned remedial actions for the Site is to protect human health and the environment. The specific remedial action objectives for the Site are to protect humans from the potentially harmful effects of metals, especially lead and arsenic, to which they can be exposed via contact with tailings and waste rock material. A second objective is to protect humans from exposure to harmful levels of metal in contaminated private drinking water supplies. Finally, EPA and CDPHE seek to restore the water quality of Clear Creek to a condition which protects aquatic species.

SITE CONTAMINATION

Clear Creek and its tributaries receive drainage from several mine tunnels and are in contact with numerous mine waste dumps. The mine waste dumps and the drainage from the tunnels contain heavy metals and are often acidic. As a result, Clear Creek and some tributaries have elevated metal concentrations in certain stream reaches. The Colorado Water Quality Control Commission has classified the main stem of Clear Creek as a Class I cold water stream, capable of protecting and maintaining a diversity of cold water biota. However, the impacts of acid mine drainage and mine waste dumps have considerably reduced the abundance and diversity of aquatic biota in the basin. Stream standards for metals are exceeded in several sections of the river.

Environmental risks associated with the Argo and Big Five mine waste piles are summarized in the OU#2 ROD and discussed in detail in the Public Health Evaluation, Section 10 of the Remedial Investigation (April 1987). The Argo and Big Five mine waste piles are located along the banks of the main stem of Clear Creek and are contributors to the degradation of water quality from storm water run-off.

"Run-off" water includes "run-on" water and water that falls directly onto the mine waste pile in the form of rain or snow. Run-on water is storm water which washes over the mine waste pile from the hillside above. Run-off water can soak into the mine waste, dissolve metals, and then carry those metals to groundwater or directly to the stream via seeps. In addition, run-off water can erode the mine waste pile causing contamination of stream sediments and creating unstable slopes. Instability is also created when the mine waste pile is near the stream bank where high flows undercut the toe of the pile as is the situation at the Big Five mine waste pile.

The Big Five and Argo mine waste piles show evidence of erosion. Storm water sampling of Clear Creek indicate that ambient water quality criteria are exceeded during storm events. A geotechnical analysis of the Argo mine waste pile revealed that a portion of the pile was marginally unstable and an estimated 11,200 cubic yards of mine waste would collapse during a slope failure. The area of instability is not directly adjacent to Clear Creek so the material would not immediately be introduced into Clear Creek during a slope failure, but it would be more easily eroded into the river because of the slope failure. A geotechnical analysis of the Big Five waste mine pile revealed that portions of the pile were marginally stable to unstable. Under worst case, realistic conditions, slope failure of the Big Five mine

waste pile would result in a concentration of zinc at 23 times the ambient water quality criteria. The zinc concentration of Clear Creek at the town of Golden, Colorado, 20 river miles downstream, would be 20 times the ambient water quality criteria.

Human health risks from the Argo and Big Five mine waste piles are summarized in the OU #2 ROD and discussed in detail in the Public Health Evaluation. Sampling that has been conducted of the Big Five and Argo waste material indicates elevated levels of lead and arsenic. These metals pose risks to human health through inhalation and ingestion. Additional information about lead and arsenic levels for the Big Five and Argo mine waste piles will be provided later in the "Basis for Document" section.

SUMMARY OF THE RECORD OF DECISION

As mentioned, the OU #2 ROD was signed March 31, 1988. The ROD selected remedies for five mine waste piles. Two of the five mine waste piles - the Gregory Incline tailings and the National Tunnel mine dump - were cleaned up in 1994 and 1996, respectively. The Quartz Hill tailings pile is also part of OU #2, but is not subject to this ESD since there is no reason at this time to change the remedy. The selected remedy for the Argo and Big Five mine waste piles, as described in the OU#2 ROD, was to provide run-on control at both mine waste piles and slope stabilization of the Big Five mine waste pile.

Run-on control at the Argo mine waste pile was implemented in 1990. Run-on controls divert storm water around the mine waste pile so that the storm water does not become contaminated with mine waste and so that the mine waste is protected from erosion. A run-on collection structure diverts the flow from Rosa Gulch, the principal contributor to run-on flow, and conveys it beneath the surface of the Argo mine waste pile directly to the main stem of Clear Creek. This prevents the uncontaminated Rosa Gulch flow from eroding the mine waste pile or leaching metals from the mine waste pile and carrying the contaminants to the creek.

The slope stabilization and run-on control measures have not been implemented at the Big Five mine waste pile at this time. Remedial action of the Big Five mine waste pile is set to begin in the Fall, 1999, and will take approximately four months to complete.

The OU #2 ROD did not select an action to address human health risks from inhalation and ingestion of mine waste because the risks were considered minor for how the properties were being used at the time - periodic, short-term visits. The ROD expressed reservations about not taking an action to address human health stating that, for a potential future use scenario, the risks were of concern and that the decision would be revisited when the final remedy is selected for the Site. The ROD also stated that the decision would be revisited at the time of the statutorily-required five-year review of the Site.

BASIS FOR DOCUMENT

The primary purpose of the remedy selected in the OU #2 ROD was to prevent degradation of downstream surface water quality through slope stabilization and construction of run-on controls at the mine waste piles. Human health risks from the OU #2 mine waste piles were to be re-evaluated at a future date. The reasons that have led to the need to modify the OU #2 remedy are discussed below.

Establishment of Human Health Action Levels for Lead and Arsenic

Since the signing of OU#2 ROD in March 1988, a Baseline Risk Assessment was completed for the Site, and human health action levels were established for lead and arsenic in soils. The Baseline Risk Assessment was a more detailed analysis than the Public Health Evaluation which was performed in 1987. The Baseline Risk Assessment from which the action levels were derived is contained in Chapter 9 of the Phase II Remedial Investigation for the Site (September 21, 1990), and summarized in the OU #3 ROD. These documents are part of the Administrative Record.

The action levels which were established through the risk assessment process are 500 ppm lead and 130 ppm arsenic in soils. Supplemental sampling conducted at the Big Five and Argo mine waste piles in January 1992 confirm that lead and arsenic levels exceed the established action levels. (See Table 1.)

In addition, at the Big Five mine waste pile, the expected use of the property is expected to change in the near future. The property is currently relatively isolated. The City of Idaho Springs, however, plans to build a bike and pedestrian path along the top of the mine waste pile, spanning Clear Creek with a bridge. This path is a portion of a planned bike path that will extend the length of the watershed, from the South Platte to the Continental Divide, and is expected to be heavily used.

Exceedance of Stream Water Quality Standards due to Direct Precipitation

The OU #2 ROD included run-on controls as part of the selected remedy for the mine waste piles. This decision was based on a qualitative examination of storm events in the April 1987 Remedial Investigation. (See Section 6.2.12). Later, during the Phase II Remedial Investigation, a more quantitative analysis of metals loading to streams resulting from surface erosion was performed. This analysis estimated metals loading to receiving streams for storms with return periods ranging from 0.05 to 100 years. Although the Argo and Big Five mine waste piles were not specifically evaluated, the data show that for nearly all mine waste piles, direct precipitation and run-off cause total metals concentration in receiving streams to exceed existing water quality standards for storm return periods as low as 0.05 years (Phase II RI Table 3-17).

Inspection of the Argo and Big Five mine waste piles shows obvious signs of erosion. A section of fence on the Big Five mine waste pile delineating highway right-of-way has fallen into an erosional gully. Erosion at the Argo is occurring in spite of the storm water run-on controls that were implemented in 1990. Therefore, ongoing erosion must be due to direct precipitation onto the mine waste pile.

In conclusion, the ESD is based on three items: (1) establishment of human health action levels resulting from the Baseline Risk Assessment, (2) additional data showing high levels of arsenic and lead in surface soils of the Argo and Big Five mine waste piles, and (3) an evaluation showing that direct precipitation and run-off from mine waste piles led to releases of heavy metals and exceedances of water quality standards. It is evident that the OU #2 ROD did not sufficiently address all potential impacts to human health and the environment and, for these reasons, the OU #2 ROD for the Argo and Big Five mine waste piles is being modified.

DESCRIPTION OF SIGNIFICANT DIFFERENCES

At the Argo mine waste pile, the original remedy called for storm water run-on controls. The original remedy will be supplemented to include additional storm water controls - regrading to remove the toe of the mine waste pile from Clear Creek, capping a portion of the toe and constructing a short retaining wall along a different portion of the toe, constructing run-off controls along the toe, and capping the top of the mine waste pile. Detailed costs for this additional work will be developed during remedial design.

At the Big Five mine waste pile, the original remedy called for storm water run-on controls and a retaining wall. The storm water controls will be strengthened by adding a cap to the mine waste pile at an additional cost of approximately $340,000. The overall cost of the Big Five remedy is $1,500,000.

SUPPORT AGENCY COMMENTS

CDPHE is the lead agency for the Site. EPA supports implementation of the revised remedy as presented in this ESD.

STATUTORY DETERMINATIONS

The changes to the remedy selected in the OU #2 ROD were made in accordance with all applicable regulatory and statutory requirements as required by Section 121 of CERCLA. A comprehensive evaluation of applicable or relevant and appropriate requirements (ARARs) was conducted as part of the OU #3 remedy selection. For the purposes of this ESD, the most current versions of the ARARs identified in the OU #3 ROD that apply or are relevant and appropriate to the remedies for the Argo and Big Five mine waste piles are the ARARs that will be used. In addition to those ARARs, storm water regulations promulgated in 1994 are applicable requirements and will be met by this remedial action.

Considering the new information that has been developed and the changes that have been made to the selected remedy, CDPHE and EPA believe that the revised remedy is protective of human health and the environment, complies with federal and state requirements, and is cost effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

PUBLIC PARTICIPATION ACTIVITIES

For the last two years, CDPHE and EPA have discussed these changes to the cleanup plans with key stakeholders involved in the Clear Creek community, including the City of Idaho Springs, the Upper Clear Creek Watershed Advisory Group, the Colorado Department of Transportation, and various landowners. A public notice of changes to the remedy was included in two local newspapers and a fact sheet describing the changes was mailed to approximately 200 people on the Clear Creek mailing list. These activities prompted one inquiry and that was from a vendor.

CDPHE and EPA will continue to meet with stakeholders as the remedial design of cleanup plans for the Argo mine waste pile is developed.

SIGNATURE

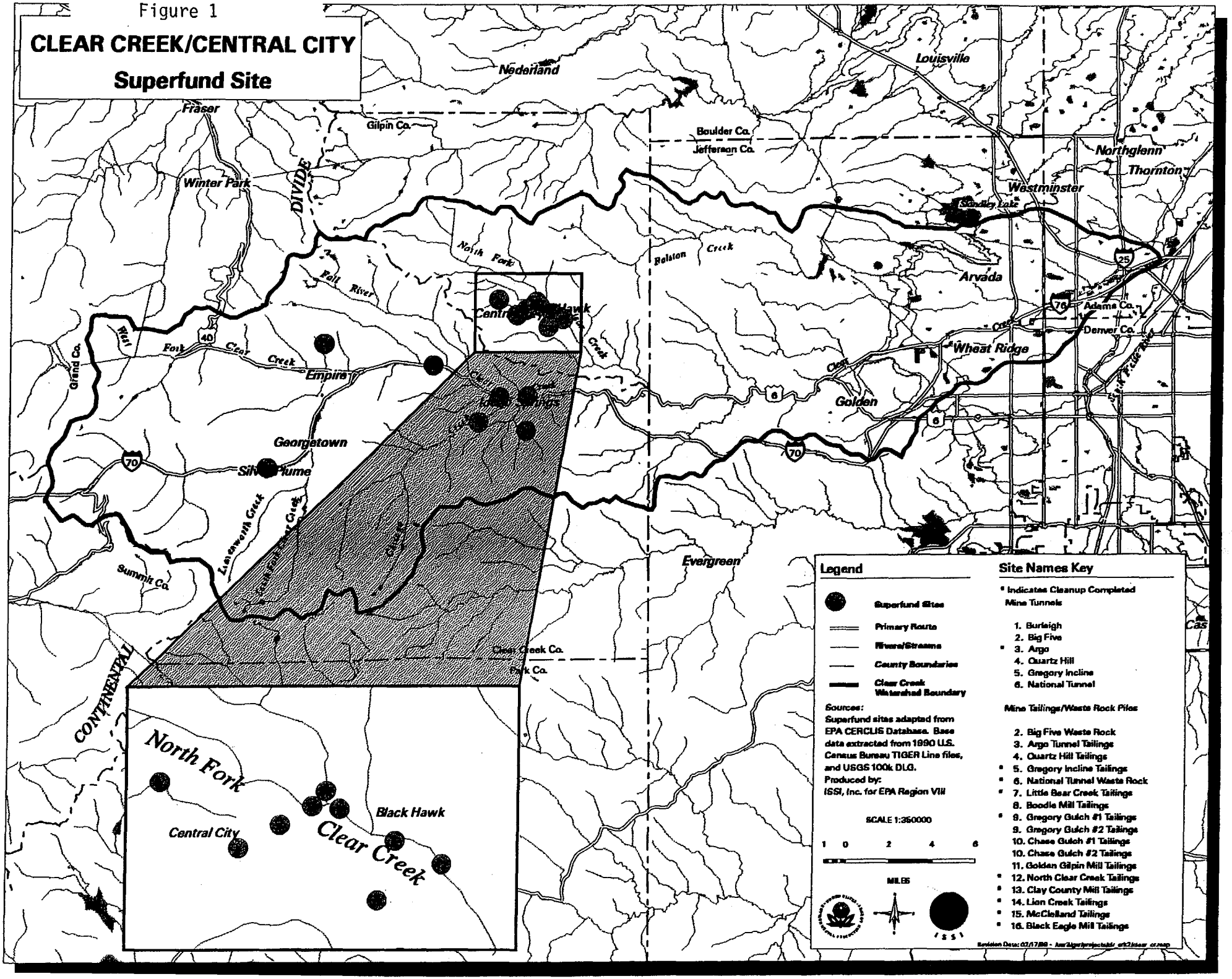
Signed by:

Max H. Dodson
Assistant Regional Administrator
Ecosystems Protection and Remediation
EPA Region 8

9/1/99
Date

Figure 1

CLEAR CREEK/CENTRAL CITY
Superfund Site



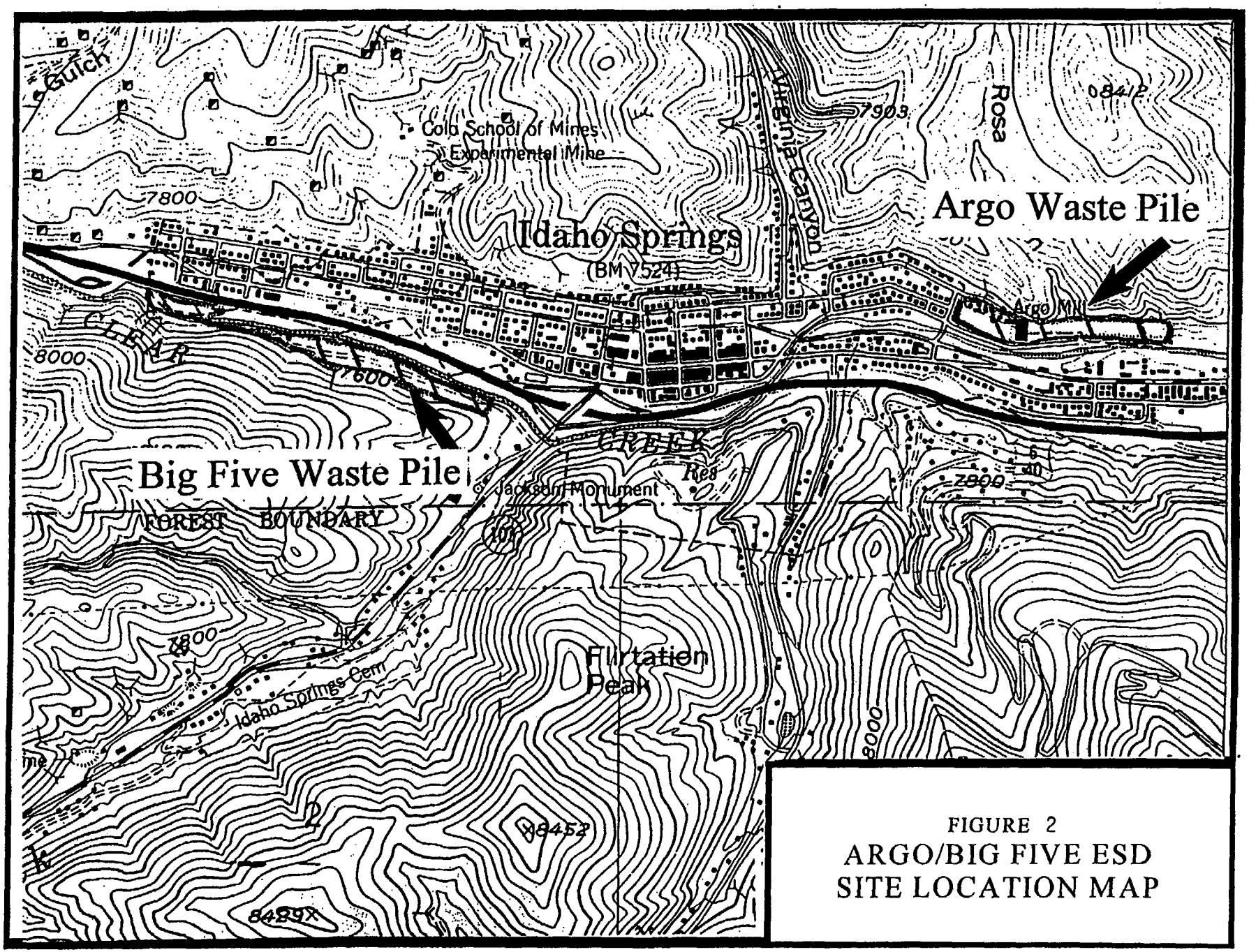


FIGURE 2
ARGO/BIG FIVE ESD
SITE LOCATION MAP

TABLE 1
SOIL LEAD AND ARSENIC CONCENTRATIONS
Argo and Big Five Mine Waste Piles

	Phase I Data			Supplemental Data		
Tailings/ Waste Rock Pile	Sample Depth	Arsenic Conc. mg/kg	Lead Conc. mg/kg	Sample Number	Arsenic Conc. mg/kg	Lead Conc. mg/kg
Big Five	Comp #1	783	197	BF-SO-15	39	86
	Comp #2	80	735	BF-SO-16	63	2448
	0'-0.5'	160	186	BF-SO-17	868	1817
	0'-2.5'	79	273	BF-SO-18	421	8519
	0'-1.0'	9.7	18	BF-SO-19	1515	452
	0-1.0	20	307	BF-SO-19	1192	425
	0'-2.0'	240	1710	BF-SO-20	113	839
				BF-SO-20	67	1253
				BF-SO-20	32	1244
Argo	0'-2.0'	85	394	AT-SO-10	518	851
	0'-2.0'	285	1820	AT-SO-11	613	2211
	0'-2.0'	175	2310	AT-SO-12	413	2092
	Comp #1	352	2390	AT-SO-13	193	1057
				AT-SO-14	588	2176

Shaded cells indicate arsenic or lead concentrations that exceed the health based guidance levels established in the OU #3 ROD (Lead = 500 mg/kg) (Arsenic = 130 mg/kg)