

**GRANITE CREEK
PRELIMINARY ASSESSMENT REPORT
BOISE COUNTY, IDAHO**

**STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY**

December 2004

Submitted to:
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101

TABLE OF CONTENTS

TABLE OF CONTENTS	2
LIST OF TABLES	3
LIST OF ACRONYMS	3
1. INTRODUCTION	4
2. SITE BACKGROUND	5
2.1. SITE LOCATION	5
2.2. SITE DESCRIPTION/OWNERSHIP HISTORY	7
2.3. SITE OPERATIONS AND WASTE CHARACTERISTICS	8
2.4. DEQ ACTIONS	10
3. MIGRATION/EXPOSURE PATHWAYS AND TARGETS	13
3.1. GROUND WATER MIGRATION PATHWAY	13
3.2. AIR MIGRATION PATHWAY	13
3.3. SOIL EXPOSURE PATHWAY	14
3.4. SURFACE WATER MIGRATION PATHWAY	15
4.0. SUMMARY AND CONCLUSIONS	15
REFERENCES	19
APPENDIX A SITE PHOTOGRAPHS	20
APPENDIX B ANALYTICAL RESULTS	38

LIST OF FIGURES

Figure 2-1 Site Vicinity Map.....6
 Figure 2-2 Gold Hill and Iowa Mine Site Map.....9
 Figure 3-1 4-Mile Radius Map17
 Figure 3-2 15-Mile Map Total Distance Limit (TDL).....18

LIST OF TABLES

Table 1 Soil and Surface Water Sample Data39

LIST OF ACRONYMS

<u>Acronym</u>	<u>Definition</u>
amsl	above mean sea level
ATV	All Terrain Vehicle
BLM	United States Bureau of Land Management
Bgs	Below Ground Surface
DEQ	Department of Environmental Quality
EPA	United States Environmental Protection Agency
gpm	gallons per minute
MCL	Maximum Contamination Level
PA	Preliminary Assessment
PPE	Probable Point of Entry
TCLP	Toxicity Leachate Characteristic Procedure
TDL	Target Distance Limit
TMDL	Total Maximum Daily Load

1. INTRODUCTION

The Idaho Department of Environmental Quality (DEQ) was contracted by Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of a preliminary assessment (PA) of two Granite Creek area mines which are located approximately 11 miles northwest of Idaho City, Idaho in Boise County. The two mines are historically known as the Gold Hill Mine and the Iowa Mine. DEQ completed PA activities in accordance with the goals listed below.

The specific goals for the Granite Creek PA, identified by DEQ, are to:

- Determine the potential threat to public health or the environment posed by the site.
- Determine the potential for a release of hazardous constituents into the environment.
- Determine the potential for placement of the site on the National Priorities List.

Completion of the PA included reviewing existing site information, collecting receptor information within the site's range of influence, determining regional characteristics, and conducting a site visit. This document includes a discussion of site background information (Section 2), a discussion of migration/exposure pathways and potential targets (Section 3), a summary and conclusions (Section 4), and a list of pertinent references. Photographic documentation is included as Appendix A and sample lab results are included in Appendix B.

2. SITE BACKGROUND

2.1. SITE LOCATION

Site Name: Granite Creek below the Gold Hill and Iowa Mines

CERCLIS ID No.: NA

Location: Boise County, Idaho

Latitude: 43.9586 N

Longitude: 115.985 W

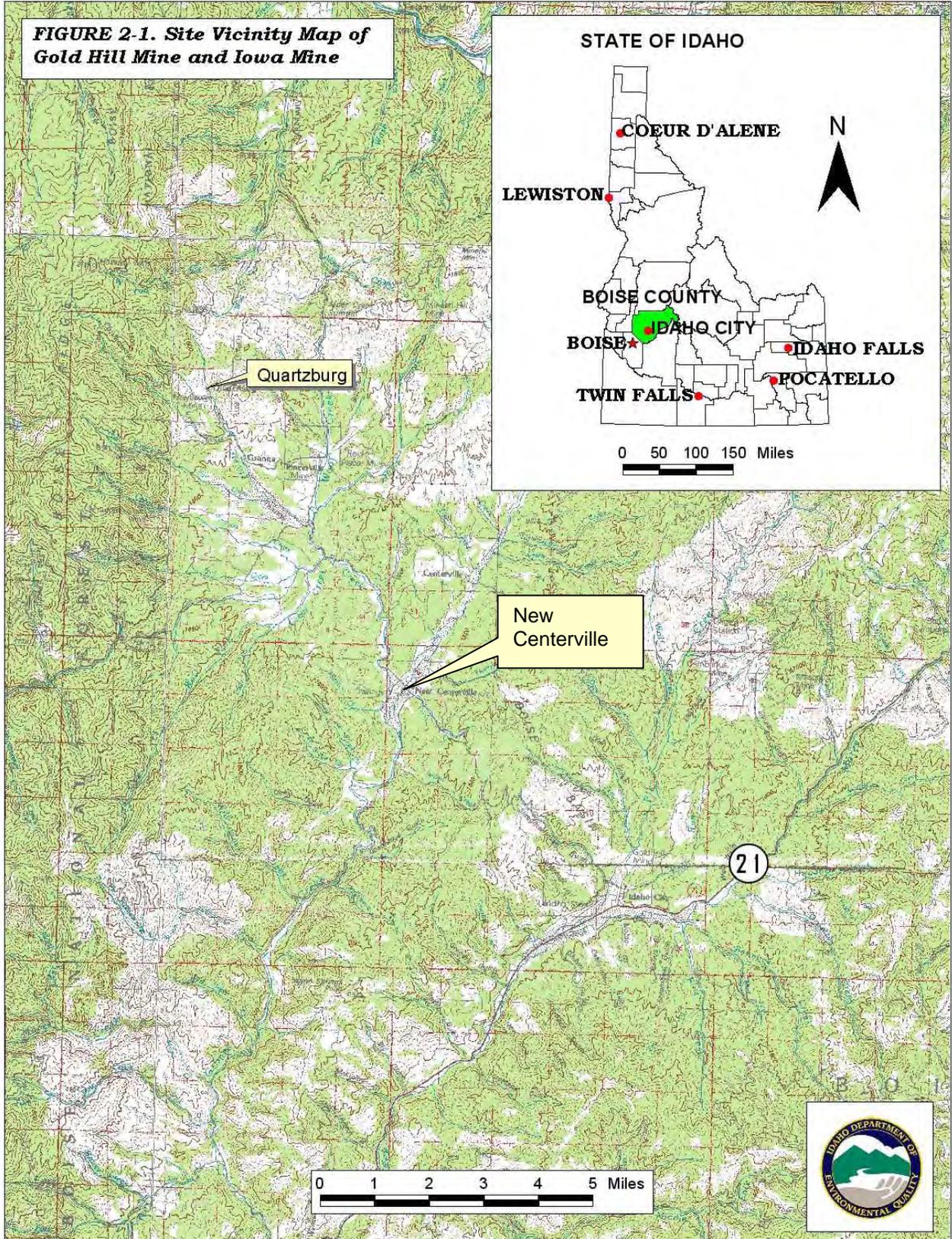
Legal Description: Section 09, Township 7N, Range 4E, Boise Meridian

Congressional District: Idaho

Site Owner: John Parrish
2327 Mountain View Drive
Boise, ID 83706

Site Contact: John Parrish
2327 Mountain View Drive
Boise, ID 83706

FIGURE 2-1. Site Vicinity Map of Gold Hill Mine and Iowa Mine



2.2. SITE DESCRIPTION/OWNERSHIP HISTORY

The Gold Hill and Iowa Mines exist on patented and un-patented land within the mountainous Boise Basin Mining District approximately 11 miles northwest of Idaho City in Boise County, Idaho. The Gold Hill and Iowa Mines are situated along Granite Creek, a tributary to Grimes Creek, near the Quartzburg townsite at approximately 4600 to 4700 feet amsl (Figure 2-1).

The former mines can be reached from Idaho City, located along State Highway 21, by driving northwest along Forest Road 307, then north along Forest Road 615, and west along Forest Road 343 to a small road that parallels Granite Creek. A locked gate on the small road leading to the mine sites controls public access.

Both the Gold Hill Mine and the Iowa Mine are located within the Boise Basin located approximately ¼ miles apart. The Boise Basin is located in the south-central part of Boise County, about 20 miles northeast of Boise. The basin is approximately 300 square miles, and is drained by Mores Creek and Grimes Creek, which are tributaries of the Boise River.

The Boise Basin was well known for its rich placer deposits, which were discovered in 1862. However, its lode deposits have also contributed more than \$10,000,000, principally in gold. The area is underlain by Mesozoic aged granitic rock of the Idaho batholith, which is cut locally by porphyritic dikes (Ross, 1934).

The Gold Hill Mine was one of the oldest and largest producing gold mines in Idaho. The Gold Hill lode deposit was discovered in 1863 and was worked almost continuously until 1938 (Anderson, 1947). By 1868, at least 10 stamp mills were treating the free-milling ores in the Boise Basin District, including a mill at the Gold Hill Mine. Increased activity at the Gold Hill Mine in the late 1920's did much to revive interest in lode mining throughout the Boise Basin. However, mining in the area received a serious setback in 1931 when a forest fire swept along the porphyry belt through Quartzburg and Grimes Pass, destroying numerous surface plants, including the plant of the Gold Hill Mine. In 1935, the Gold Hill plant and mill were re-built, however, in 1938, operations at the Gold Hill Mine were suspended and the plant was dismantled. Production of the Gold Hill Mine up to 1929 totaled \$7,500,000 and by 1938, exceeded \$8,000,000.

In 1931, Talache Mines Inc. acquired the title to the Gold Hill Mine from the Gold Hill and Iowa Mines Company. The property included 19 patented and 28 un-patented claims. John Parrish is the current property owner of the mine sites.

The Gold Hill Mine was developed principally through a 1,246-foot, 3-compartment vertical shaft with nine intermediate levels, totaling more than 40,000 feet of workings. Other mining activity in the immediate area included the older Gold Hill shaft (which extended to a depth of 400 feet below creek level) and workings of unknown extent on the Iowa, Last Chance, Sunday and Confederate, and Pioneer lodes. The Iowa lode existed approximately one-quarter mile northeast of the Gold Hill Mine and was

abandoned prior to 1900. Much work was done on the Sunday Lode, located in Confederate Gulch a short distance west of Gold Hill Mine, prior to 1906 but operations were suspended when work could not continue without draining the extensive Gold Hill and Iowa workings. An extensive pumping system was eventually installed to keep the mines free from water and flooding and was used until the mine's dismantling in 1938.

Ore was processed onsite, originally through a large mill that was located near the northern portion of the Gold Hill mine site. (Figure 2-2). The most recent mill was a 100-ton electrically driven fine-grinding amalgamation mill; however, this mill was dismantled in 1938.

2.3 SITE OPERATIONS AND WASTE CHARACTERISTICS

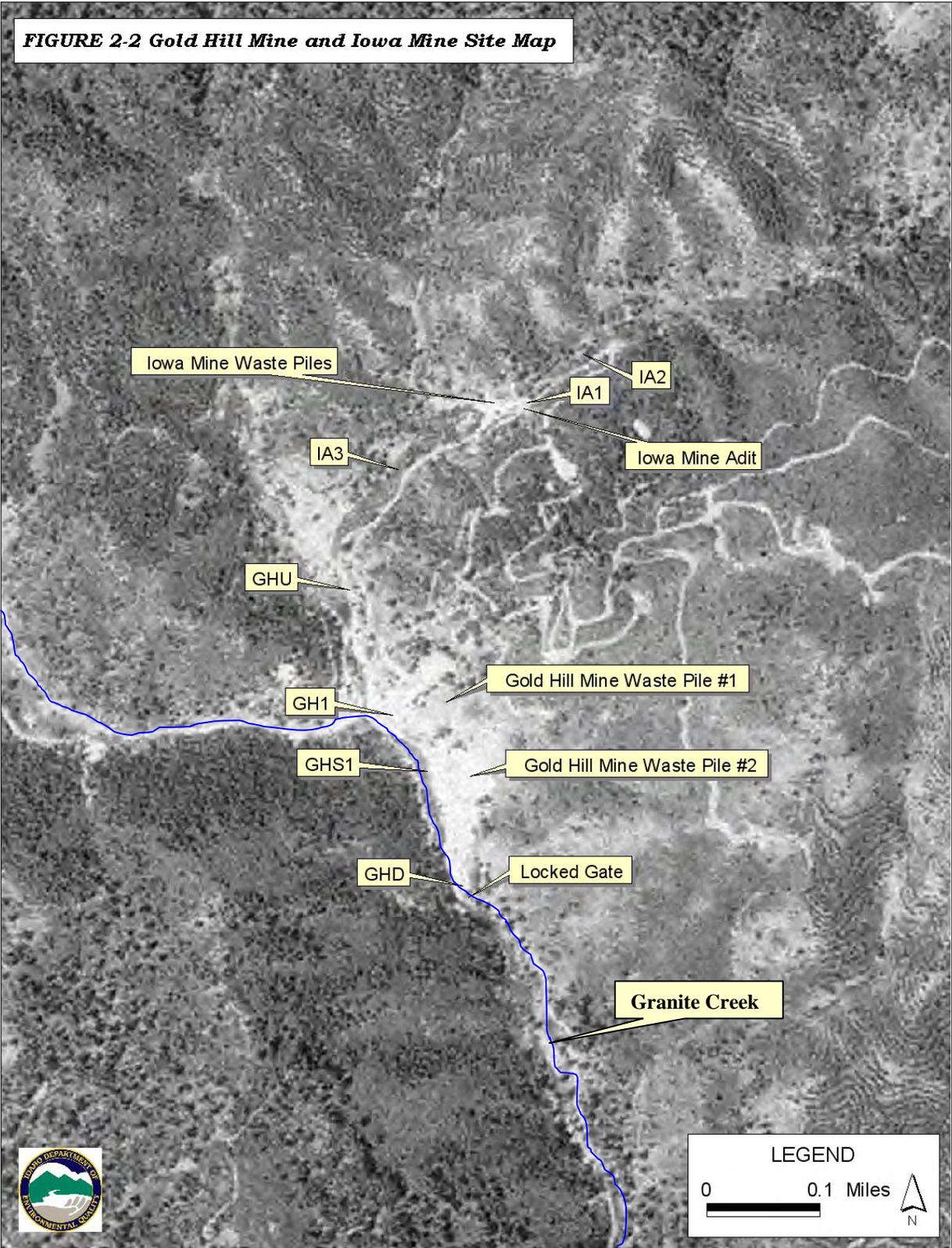
The distribution of lodes within the Boise Basin along the porphyry belt indicate that the fractures that guided the ore-forming solutions had resulted from recurrent adjustments along major zones of crustal weakness that had earlier facilitated the intrusion of the porphyritic dikes (Ballard, 1924). The lode deposits are related to early Tertiary and to early Miocene magmas (Anderson, 1947). Quartz veins within the Boise Basin consist of three types: as prominent outcrops not adjacent to porphyry zones, as quartz veins associated with acidic dikes (usually distinguished by the absence of pegmatite and the presence of pyrite), and as fissure veins related to regional shearing and subsidence which occurred during the Miocene period (Ballard, 1924). The ore deposits of the Gold Hill Mine and Iowa Mine generally occur within fissure veins associated with regional shearing.

The subsurface geology of the area is fairly complicated, containing numerous dikes, including dikes of rhyolite porphyry, dacite and quartz monzonite porphyry, and lamprophyre. In general, the dikes have slightly divergent trends to the east and northeast. Evidence exists of extensive shearing and fissuring during the general period of dike intrusion as well as during the time of ore deposition.

Most of the lode appeared to consist of recurrent quartz lenses of variable thickness. In the early days of mining, numerous stringers of rich ore were found to extend from the fissure for short distances into the hanging wall. Anderson (1947) reports that the lode had a developed length of about 3,500 feet in the main part of the mine and a maximum thickness of about 6 feet. Small crystals of pyrite with sparse amounts of calcite have been disseminated through the altered rock of the Gold Hill lode. Much of the gold appeared to be intimately mixed with the bismuth minerals within coarse-grained quartz.

Anderson (1947) reported that although much of the ore had no visible free gold, the gold appears in the native state. Approximately 95% of the gold was recovered by fine grinding and amalgamation. Geological maps of the Gold Hill mine show the locations of at least three areas known to contain sulfides throughout the Gold Hill and Pioneer shafts. Most of the ore and waste rock containing pyrite was probably mined during the

1930's, after the oxide deposits that were easily amenable to traditional methods of stamp milling and amalgamation had been mined.



Square-set stoping was the method of mining primarily used at the Gold Hill Mine. Ballard (1924) reported that the mined material was hand sorted, passed over a bar grizzly with the oversize materials going to a Blake crusher. The crushed ore was passed to rolls, then to a 4-foot by 5-foot ball mill, and finally to an 8-foot Hardinge mill with an amalgamator. The feed was passed over amalgamating plates, then to Overstrom and Wilfley tables. The concentrates were re-ground in cyanide solution in a 4-foot by 22-foot tube mill where it was agitated and allowed to settle in two Pachuca tanks. Zinc shavings were used to precipitate the gold and silver. Cyanide treatment at the Gold Hill mine and mill proved to be more profitable than shipping the concentrates to Salt Lake City smelters (Ballard, 1924).

2.4 DEQ ACTIONS

DEQ conducted a site visit on July 20, 2004, which included a visual inspection of the Gold Hill and Iowa Mines and collection of one (1) soil sample and six (6) surface water samples (Appendix B).

During DEQ's July 2004 visit, the volume of the mine waste piles within the Granite Creek drainage ranged from approximately 300,000 ft³, as in the Iowa Mine waste dump, to over 25,500,000 ft³, near the Gold Hill Mine (Pictures 3,4,9-12,15, and 16). The Gold Hill and Iowa Mines are situated adjacent to Granite Creek. Both mines operated on the eastern side of Granite Creek, and therefore on mostly open south-facing slopes, which allowed DEQ personnel the ability to make good observations and assessments. Associated with both mines are significant waste piles that can be seen throughout the area. With the exception of one living quarter or storage bunker built into a hillside, all former structures have been reduced to scattered rubble. The concrete foundations of the mill are still evident. Abandoned equipment, such as a backhoe and boiler were witnessed, as were pipes, timbers, metal roofing, and other construction materials (Pictures 1,2,5, and 8).

The Gold Hill Mine has two significant waste piles that were inspected during the DEQ site visit (Pictures 3,4, and 9-12). The waste piles were arbitrarily named Waste Pile #1 and Waste Pile #2. The two waste piles exist on steep slopes of approximately 25% (Photo #10). Waste Pile #1 is located on the northern section of the mine property. This waste pile was approximately 350 feet long, 150 feet wide and 200 feet high. Waste debris has slumped off the pile and built up along the toe of the pile. The pile currently stretches from an old access road on the northeastern hillslope down to within approximately 50 feet of the current road, which runs along Granite Creek.

Waste Pile #1 is composed of uniformly sized crushed grains approximately 3-5 mm in diameter that have weathered to a reddish brown. Almost no vegetation has reclaimed the site except the occasional Ponderosa Pine (*pinus Ponderosa*), which generally had sparse foliage and irregular and/or stunted growth habits. (Pictures 4, 9 and 10).

Water sample GH1 was collected at the toe of Waste Pile #1, where ground water seeped to the surface forming a small puddle approximately 2 inches deep. Soil sample GHS1 was collected from the marshy area created by the spring. No other surface water was visible anywhere else on the waste pile or within the vicinity of the pile. No soil samples were collected directly on this waste pile.

Waste Pile #2 is located due south of Waste Pile #1 on the same west-facing hillslope. It measures approximately 300 feet long, 250 feet high, and 200 feet wide (Pictures 3, 11, and 12). Numerous roads have been cross-cut through the waste pile and remnants of an old hoist still remain at the peak of the waste pile. No surface water was witnessed to be flowing on or across Waste Pile #2 during the site visit. The composition and color of Waste Pile #2 was very similar to that of Waste Pile #1. In addition, Waste Pile #2 also has not yet been reclaimed by a healthy stand of native vegetation (Pictures 3, 11, and 12).

A soil sample (GHS1) was also collected at the Gold Hill site, in between the toes of the two waste piles, in a marshy area created from ground water seeping out from under Waste Pile #1. The sample was taken by collecting soils at the ground surface.

The Iowa Mine was also inspected during the site visit. This site is composed of many small waste rock piles, which have been placed beside the roadway, and a spring that fills a former retention pond. The site is significantly smaller than Gold Hill Mine. Waste dumps consist of fine-grained material (2-5 mm diameter) and are organized into three (3) piles that total approximately 200 feet long, 50 feet wide, and 30 feet high (Pictures 15 and 16). Native vegetation has not yet reclaimed the site, however, a few Ponderosa pine trees and sagebrush have taken hold.

Ground water was observed to be seeping from the abandoned, collapsed adit of the Iowa Mine (Pictures 13 and 14). Water sample IA1 was collected at this point (Figure 2-2). Discharging ground water flowed beside the access road, into a marshy area resembling a former tailing pond, and finally into Granite Creek. A water sample was collected from an upgradient water source (Sample #IA2) and another was taken downstream of the retention pond (Sample #IA3).

A water sample was collected downgradient of all of the mining activity in Granite Creek (Sample #GHD) to investigate the overall impacts of the upstream mining activities within the drainage.

Figure 2-2 shows sampling locations for all samples collected during the site visit and Appendix B summarizes the analytical results.

Human activity is present around Granite Creek. The Boise National Forest is a popular ATV riding area due to the amount of public land and number of trails. Although some of the access points are gated, vehicles with short axles, such as 4-wheelers, have driven around them. In addition, it is expected that hunters visit the area, who potentially might use the area for camping.

Another popular activity within the Boise National Forest is snow machining, and the area surrounding the mines could potentially be used for this recreational activity as well.

Many game animals appear to use the area, which may be consumed by humans. The Granite Creek area is optimal mule deer and elk habitat with open south-facing slopes and timbered north-facing slopes. Both elk and deer were observed at the site, and many hoof prints of animals were seen at all locations visited during the site visit. Wild turkeys were also seen in the area during the site visit. Although none were witnessed during the site visit, it is expected that game birds, especially grouse (blue, forest, and ruffed) inhabit the area. Snowshoe hares are present and could also be pursued by hunters.

The presence of edible varieties of berries and mushrooms would attract wildlife and be available for human consumption as well.

3 MIGRATION/EXPOSURE PATHWAYS AND TARGETS

The following sections describe migration/exposure pathways and potential targets within the range of influence of the site (Figures 3-1, 3-2 and 3-3).

3.1 GROUND WATER MIGRATION PATHWAY

Ground water flow is expected to primarily follow faults and brecciated zones within the country rock and be expressed as springs. In the Granite Creek drainage, no springs were witnessed. One adit, the Iowa Adit, had water flowing from it that drained into a marshy area resembling a tailing pond. Ground water was also seen seeping from underneath Waste Pile #1 at the Gold Hill mine. This water surfaced and flowed into a marshy area before crossing the access road and flowing into Granite Creek. Another marshy area was seen in between the toes of the two waste piles at the Gold Hill mine, but no obvious discharge point was determined.

Contributions to the aquifer in close proximity to the Granite Creek mines will predominantly be as a direct result of precipitation or surface water. Granite Creek is an influent stream that flows into Grimes Creek and eventually the Boise River. Annual precipitation for Idaho City, Idaho, located approximately 15 miles to the southeast, is 24 inches, predominately during the winter months, with a maximum 24-hour rainfall event of 3.8 inches (WRCC, 2002).

Dry-season rainfall occurs almost exclusively in relatively short bursts, usually related to thunderstorm activity. It is expected that except for flash flood-type events, almost all dry-season rainfall events would be completely absorbed by the soils and plants, without much, if any, contribution to the ground water. However, because the waste rock piles have limited soil, and exist adjacent to Granite Creek, a higher percentage of this rainfall would be expected to drain into the stream.

According to Idaho Department of Water Resources July 2002 records, 81 private drinking water wells are reported to be located within a 4-mile radius of the site. No public drinking water systems are located within a 4-mile radius of the site (Figure 3-1). The nearest downgradient well is located approximately 1.5 miles from the mine sites, with a static water level of 10 feet bgs, measured on September 20, 1991.

No irrigation wells were identified within a 4-mile radius of the site, and the site is not located within a wellhead protection area (DEQ, 2003).

3.2 AIR MIGRATION PATHWAY

The nearest permanent residence to either Gold Hill Mine or Iowa Mine is approximately 0.5 miles south of the site, however hunters/campers could potentially frequent the area during the summer/fall months.

The mining sites are comprised of unconsolidated tailing piles varying in degrees of compaction. The waste rock is primarily confined to dumps. The fine-grained waste within some of the waste piles could be subject to wind dispersal within the immediate area; however, no significant dispersion is expected.

Natural aerial dispersal from the dumps is expected to be a very rare occurrence, however dust from ATVs and the occasional ground-moving activities, are a definite possibility for airborne potential contaminants.

No reclamation or other activities to establish plant growth have occurred, however natural plant succession is beginning to take place in some of the affected areas.

3.3 SOIL EXPOSURE PATHWAY

Access to the mine site is restricted by a posted and locked gate across the main access road. The general public cannot drive around the gate. The area behind the gated road cannot be accessed by other non-gated roads. Some signage indicating that private land is present and other signage warning of potential mining activity exists, but only in select locations. All of the private land access points surrounding the mine are posted with trespass information. The mines exist within 1 mile of the public corridor Forest Road 343.

Potential receptors include local residents, hunters, fishermen, cattlemen, trail riders (motorized and non-motorized), campers, and rarely, tourists. Cattle activity surrounding and within the mine site is minimal. Residents and outdoor enthusiasts remain the highest percentage of potential receptors, as they reside nearby or use surrounding land for recreational activities.

The land within a two (2) mile radius of the site is primarily private, however minor amounts of federal and state land exist. The parcels of land occupied by the mines and waste dumps are leased or owned by private parties.

There are no schools, day-care facilities, or private residences within 200 feet of the site, however, BLM or Forest Service workers, in addition to the outdoor recreation enthusiasts, may occasionally be within 200 feet of the site.

Soil sample GAS1 contained total arsenic at concentrations of 129 mg/kg, lead at concentrations of 197 mg/kg, chromium at concentrations of 5.71 mg/kg, mercury at concentrations of 0.660 mg/kg, and selenium at concentrations of 1.5 mg/kg (Appendix B). TCLP results were below RCRA standards indicating the elevated concentrations in the soil sample do not pose an immediate threat to the environment (Appendix B). No reclamation or other activities to establish plant growth have occurred.

Soil exposure at the mines is expected to be low for all receptors.

3.4 SURFACE WATER MIGRATION PATHWAY

The Gold Hill Mine and Iowa mining area drains westward towards the south flowing Granite Creek. Potential Probable Point of Entry (PPE) exist at the waste piles located at the Gold Hill Mine site and at the Iowa Adit. Overland flow across or in the vicinity of the waste piles would flow directly into Granite Creek. Granite Creek is not currently listed on the EPA §303(d) list of impaired streams.

Water is discharging from the former Iowa Adit at a rate of approximately 0.5 gpm. Water from Waste Pile #1 at the Gold Hill Mine is barely a trickle, and returns to the soil within about 20 feet of coming to the surface. During high flow season, it appears this discharge flows across the road into Granite Creek. The water located between the two waste piles at the Gold Hill mine is a minor seep, too small to locate the exact discharge point.

Commercial or subsistence fishing does not occur within the 15-mile downstream distance, but sport fishing does. As camping occurs in many places along Granite Creek, it is expected that fishing occurs. Redband Rainbow trout [*Oncorhynchus mykiss gairdneri*] are present within Granite Creek (IDFG, 2000), while whitefish and brown trout may also be present.

No plant species in the area were listed as a species of concern (F&G, 2002) within a 4-mile radius of the mining sites (Figure 3-1).

The use of surface water for watering of livestock and wildlife is expected. Crop irrigation is not considered a significant use locally, however, in the lower reaches of Granite Creek, water may be diverted to fields.

Primary targets for surface water include residents and outdoor enthusiasts along Granite Creek. It is expected that Granite Creek's water is not utilized for domestic activities such as bathing, cooking, and drinking. Secondary targets include livestock, wildlife and fish. No sensitive environments were noted during the site visit, however some potential wetland areas may exist along Granite Creek.

Surface water sample results (Appendix B) from this investigation indicate that the mines are not contributing total elevated metal concentrations in this drainage.

4.0 SUMMARY AND CONCLUSIONS

The mines in the Quartzburg area were operated in the late 1800's and early 1900's, mining primarily gold. Approximately \$10 million was extracted from the mines around Quartzburg, which entailed approximately 40,000 feet of tunneling.

Most structures relating to mining activity have fallen, burned or been covered. Waste rock piles, abandoned machinery, a few standing structures, some decommissioned

structures, and the remains of a few collapsed adits can be seen in the area. No adits remain open and the majority of the existing structures are properly restricted with locking gates and warning signs (Picture 17). A soil sample taken from the toe of the tailings pile at the Gold Hill Mine did not contain elevated concentrations of any constituents of concern. All but one of the water samples (GH1) collected throughout the drainage showed no significant signs of overall water quality degradation.

One water sample (GH1) contained elevated levels of arsenic at 0.841 mg/L. The MCL for arsenic is 0.010 mg/L. However, this concentration occurred near the toe of Waste Pile #1 at the Gold Hill Mine, and water quality samples down gradient in Granite Creek meet the MCL criteria. Based on the limited sampling of this investigation, it appears risk to potential receptors is limited to the small area in which the sampled water is exposed at the surface. This area is relatively small and confined to the toe of Waste Pile #1 which is located within a fenced drainage where human access is limited. The receptors of greatest concern are wildlife, as they may drink the water that showed elevated arsenic concentrations and later be consumed by humans.

FIGURE 3-1 Gold Hill Mine and Iowa Mine 4-Mile Radius Map

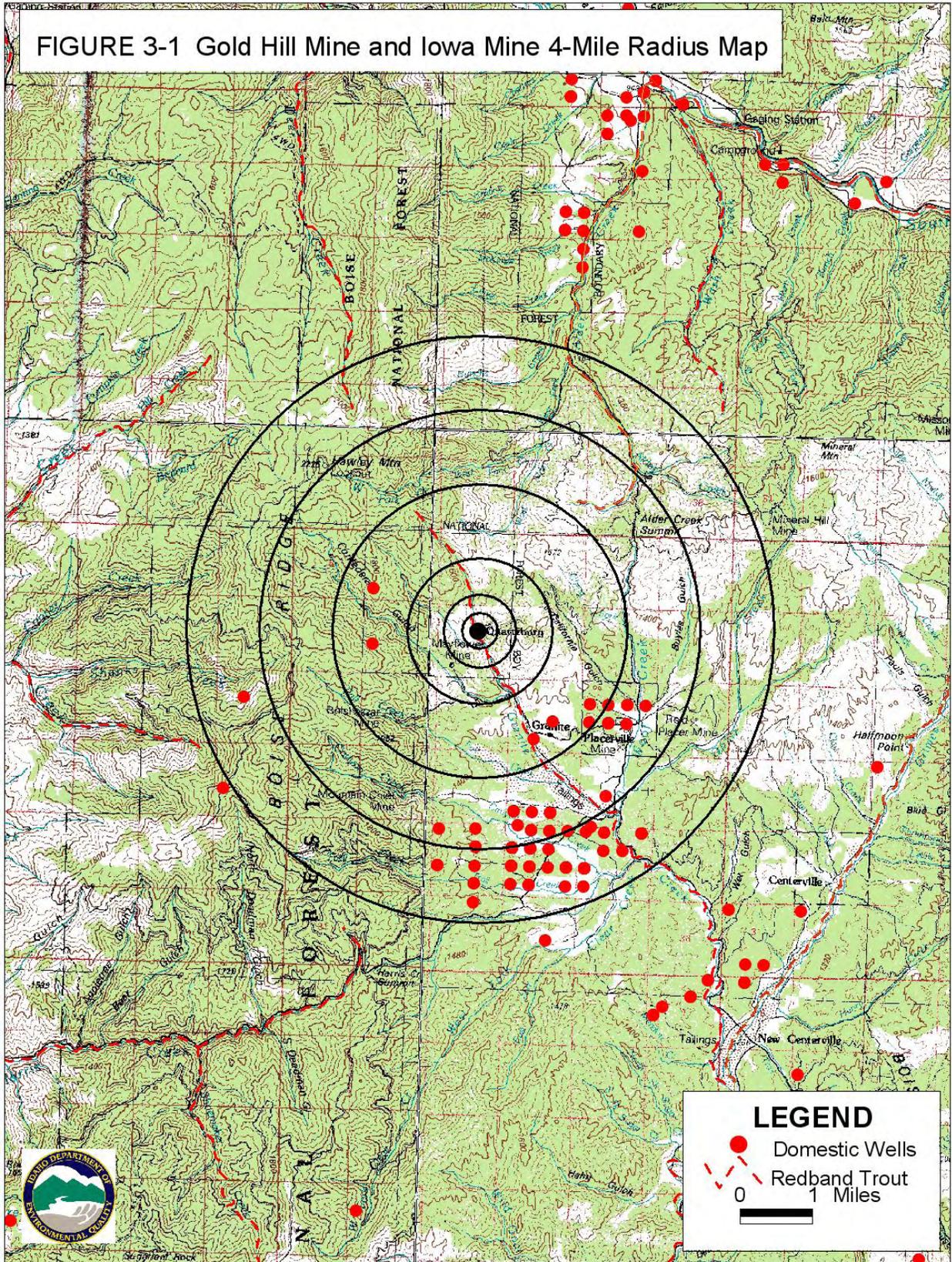
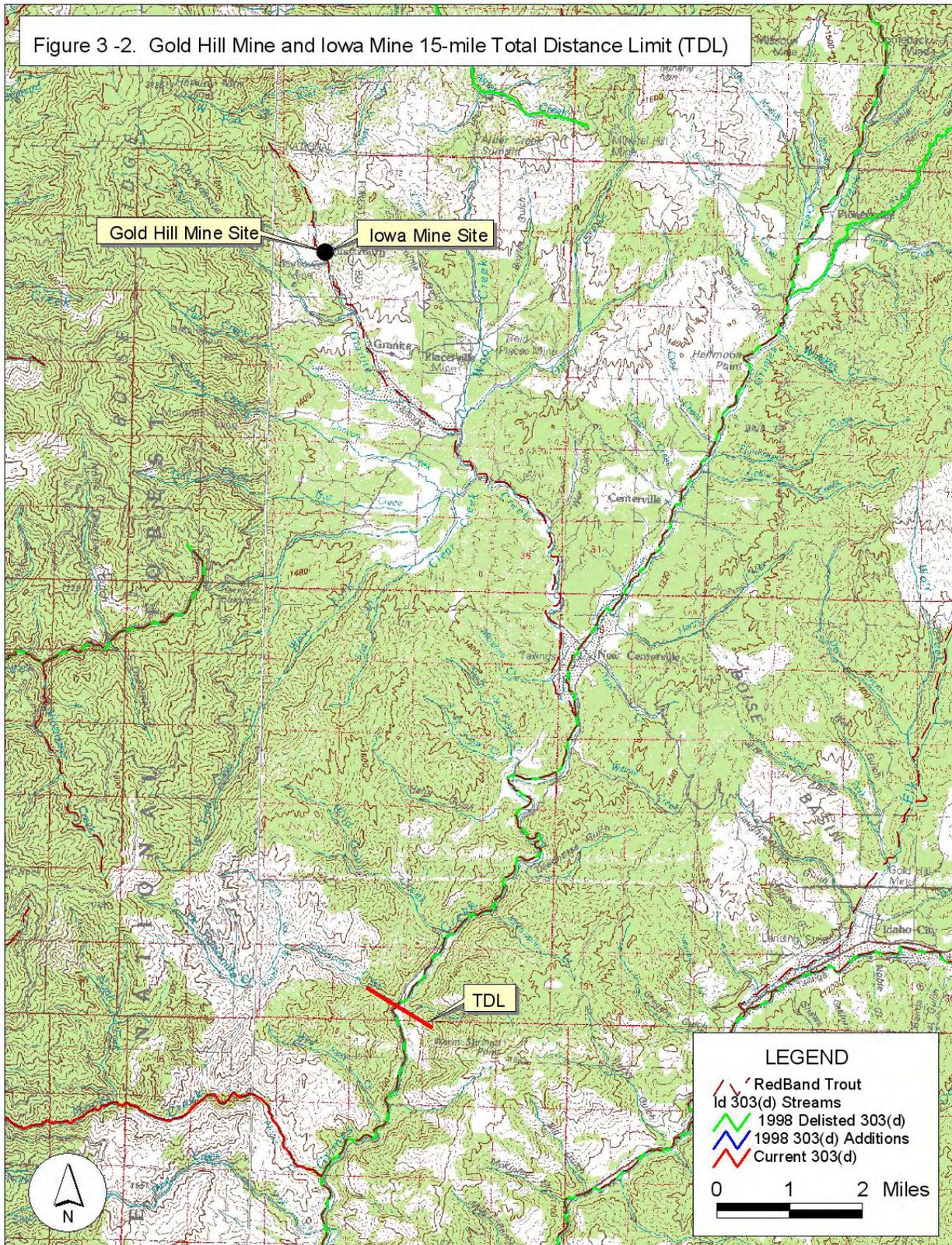


FIGURE 3-2



REFERENCES

- Anderson, A.L., 1947. Geology and Ore Deposits of Boise Basin, Idaho, Idaho Bureau of Mines and Geology, U.S. Department of Interior, Bulletin No. 944-C.
- Ballard, S.M., 1924. Geology and Gold Resources of Boise Basin, Boise County, Idaho, Idaho Bureau of Mines and Geology, U.S. Department of Interior, Bulletin 9.
- Boise County Tax Assessor's Office and County Clerk.
- Environmental Protection Agency (EPA), 2002. Preliminary Remediation Goals. <http://www.epa.gov/region9/waste/sfund/prg/index.htm>
- Idaho Department of Fish and Game (IDF&G), 2002. http://www2.state.id.us/fishgame/info/cdc/plants/vasc_plants&status_n-r.htm
- Idaho Department of Fish and Game (IDF&G), 2000. Redband Trout Distribution.
- Idaho Department of Environmental Quality (DEQ), 2000. 1998 303(d) list.
- Idaho Department of Water Resources (IDWR), 1997. COVERAGE IDOWN -- Idaho Surface Ownership.
- IDWR², 2002. GIS shapefile of well database.
- Ross, C.P., 1934. Some Lode Deposits in the Northwestern Part of the Boise Basin, Idaho. Idaho Bureau of Mines and Geology. U.S. Department of Interior, Bulletin No. 846-D.
- United States Geological Survey (USGS), 1991. Digital map file of major land uses in the United States.
- United States Department of Commerce (DOC), United States Census Bureau, 2000, General Housing Characteristics, Boise County, Idaho.
- Western Regional Climate Center (WRCC), 2002. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?idsily>

APPENDIX A

SITE PHOTOGRAPHS

GRANITE CREEK

Photo #1



Abandoned machinery observed during the Granite Creek site visit. This machinery was located in between the Gold Hill Mine and the Iowa Mine along the main access road.

Photo #2



Scrap metal found at the bottom of the Gold Hill Mine. Appears to be the remnants of an old boiler.

Photo #3



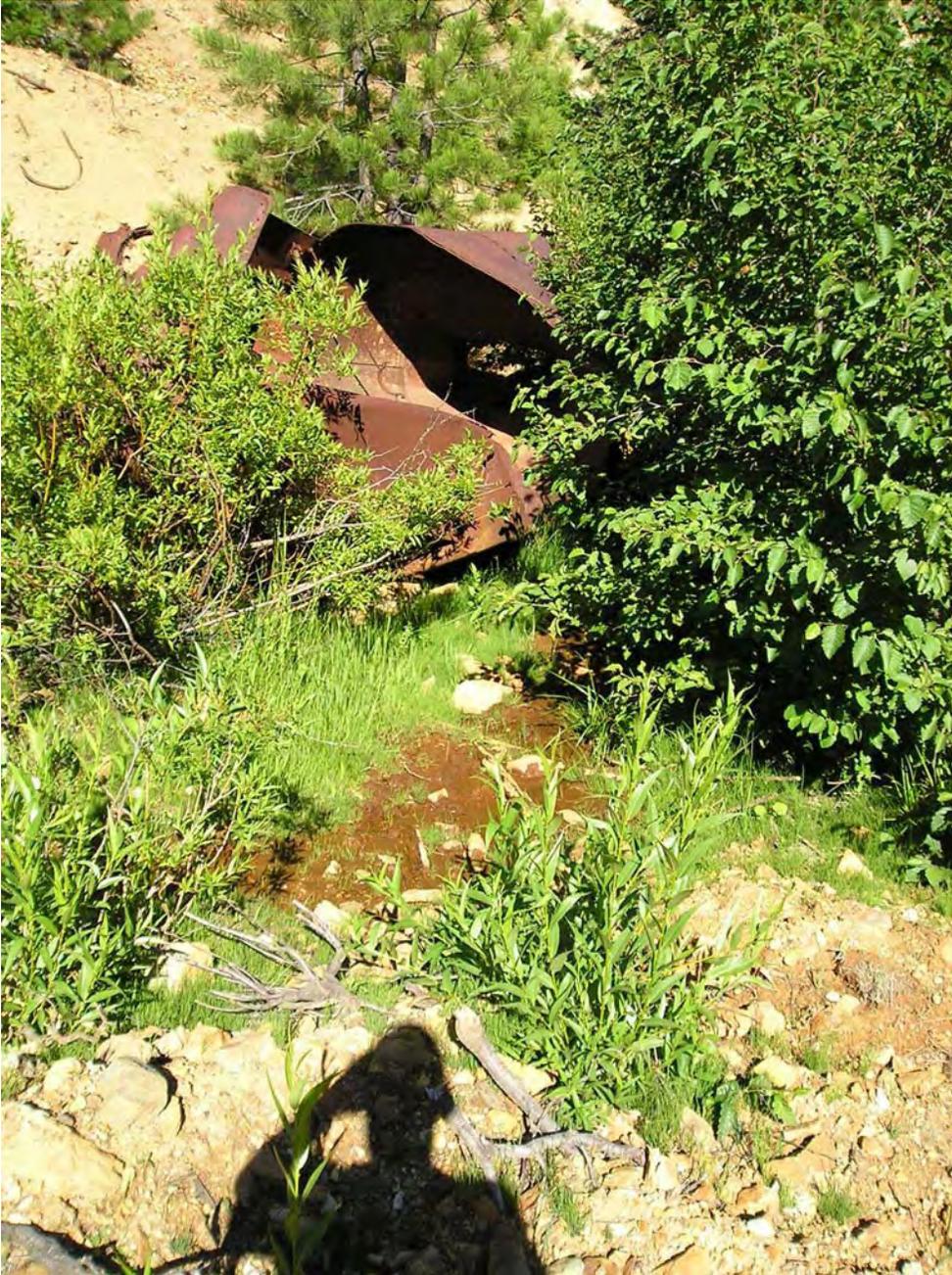
View looking southeast of Waste Pile #2 (distant) and the toe of Waste Pile #1 (close) at the Gold Hill Mine.

Photo #4



View looking from the bottom of Waste Pile #1 uphill to the Gold Hill Mine. Various bricks, wood debris, and metal scraps can be seen in the toe of the waste pile.

Photo #5



Another view of ground water seeping from the toe of Waste Pile #1 at the Gold Hill Mine.

Photo #6



Water sample (GH1) location. The toe of Waste Pile #1 of the Gold Hill Mine can be seen in the upper left corner of this photograph.

Photo #7



View of the ground water seepage coming from the toe of Waste Pile #1 at the Gold Hill Mine. Note the discolored sediments surrounding the flowing water.

Photo #8



Another view of the foundation remnants of the structure at the Gold Hill Mine. The toe of Waste Pile #1 can be seen in the bottom left corner of this photograph.

Photo #9



View looking downhill (west) from the top of Waste Pile #1, at the Gold Hill Mine. Notice the lack of vegetation and the unhealthy trees on the waste pile.

Photo #10



View at the Gold Hill Mine looking north at Waste Pile #1 from the top of Waste Pile #2.

Photo #11



View at the Gold Hill Mine looking south at Waste Pile #2 from the top of Waste Pile #1.

Photo #12



View looking southwest from the main access road showing the lateral extent (approximately 300 feet) of Waste Pile #2.

Photo #13



Sampling location for sample IA1. This ground water is seeping from the buried adit at the Iowa Mine.

Photo #14



Another view of sampling location for sample IA1 from the collapsed Iowa adit. Note the ponding water directly adjacent to the seepage location.

Photo #15



Iowa Mine waste dump. View from the western side of the waste dump looking east across the waste dump's toe.

Photo #16



View looking north on the Iowa Waste dump from the center of the Iowa waste dump. Several similar piles of waste rock were nearby that created the present waste dump.

Photo #17



Existing structure observed during the site visit. This structure is located just north of the Gold Hill and Iowa Mines.

APPENDIX B
ANALYTICAL RESULTS

Table 1
Soil and Surface Water Sample Data for Granite Creek,
Boise County, Idaho

Analyte	Surface Water Sample IA1 (mg/L)	Surface Water Sample IA2 (mg/L)	Surface Water Sample IA3 (mg/L)	Surface Water Sample GH1 (mg/L)	Surface Water Sample GHU (mg/L)	Surface Water Sample GHD (mg/L)	Soil Sample GAS1 (mg/kg)	Soil Sample GAS1 TCLP (mg/L)
Arsenic	0.014	<0.010	<0.010	0.841	<0.010	<0.010	129	0.026
Barium	0.0310	0.0359	0.0611	0.535	0.0907	0.0758	116	0.302
Cadmium	<0.002	<0.002	<0.002	0.0087	<0.002	<0.002	4.10	0.0324
Chromium	<0.006	<0.006	<0.006	0.0927	<0.006	<0.006	5.71	<0.006
Copper	NA	NA	NA	NA	NA	NA	29.2	NA
Lead	<0.005	<0.005	<0.005	4.02	<0.005	<0.005	197	0.0642
Mercury	<0.0002	<0.0002	<0.0002	0.0109	<0.0002	<0.0002	0.660	<0.0002
Selenium	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	1.5	0.015
Silver	<0.005	<0.005	<0.005	0.0686	<0.005	<0.005	3.87	<0.005
Zinc	NA	NA	NA	NA	NA	NA	802	NA

NA = not analyzed