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**Preliminary Assessment and Site Investigation  
For  
Bassett Gulch Mill Site  
Ketchum, Idaho**

**Submitted By:**   
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**USDA-Forest Service**  
**Sawtooth National Forest**

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# Preliminary Assessment and Site Investigation For Bassett Gulch Mill Site

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- A Ecology and Environment Bassett Gulch Mill Site, Site Inspection Report Contract 53-84N8-6-007 February 2000

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## **1.0 INTRODUCTION**

This Preliminary Assessment/Site Investigation (PA/SI) is for the Bassett Gulch Mill Site, CERCLIS number ID0001766815. This report was prepared by the USDA-Forest Service (FS). The Site Investigation was performed by Ecology and Environment (E&E) under contract with the FS. The purpose of the PA/SI is to collect information concerning conditions at the Bassett Gulch Mill Site sufficient to assess the threat posed to human health and environment and to determine the need for additional CERCLA actions.

The report is based on information in the FS files, previous reports, and site sampling that are cited through the report. The report will consist of six sections including Introduction; Background, Pathways, Sampling Program, Sampling Results, and References.

## **2.0 BACKGROUND**

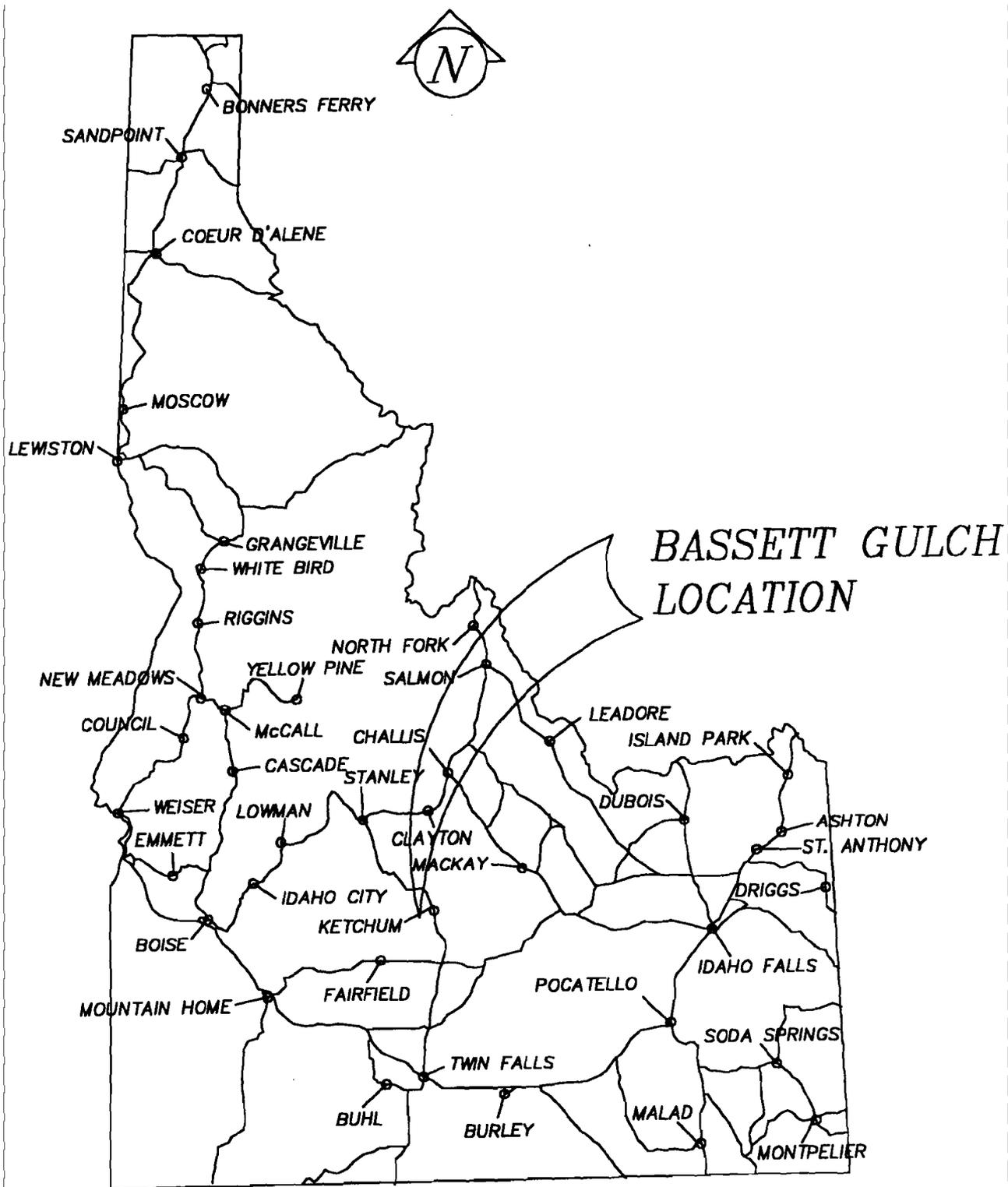
### **2.1 Site Location and Description**

The Bassett Gulch Mill Site can be reached by driving from Ketchum, Idaho west about 5 miles on FS Road 227 (Figure 1). The site has been operated since 1950 as a custom mill site for mine ore in the general area. Mine ore was hauled to the site and processed. The site is located in a rural area, with several residences within ½ mile to the north of the site. The adjacent area also includes campgrounds and Sun Valley Ski Resort, located about 3 miles east of the site.

The term "site" describes the area consisting of the aggregation of sources, the area between the sources, and areas that may have been contaminated because of migration of sources. The site is located in Township 4 North, Range 17 East, SE of NE section 20. The latitude-longitude coordinates are latitude 43° 40' 00" and longitude 114° 27' 30". The site encompasses about 25 acres (Figure 2) and is entirely on public lands administered by the USDA-Forest Service, Sawtooth National Forest, Ketchum Ranger District.

The site is situated in the Warm Springs Creek drainage and consists of a mill building, house, empty drums and debris from various operations, and tailing ponds with exposed tailings.

The site is located in a confined small valley at an elevation of 6300 ft with very harsh, long winters and cold summers. The mean annual precipitation is 19.08 inches (WRCC 1999) based on 85 year of recorded data by USDA - Ketchum Ranger District. The 2 year, 24 hour precipitation is 2.4 inches (NOAA 1973).



VICINITY MAP - IDAHO

FIGURE 1

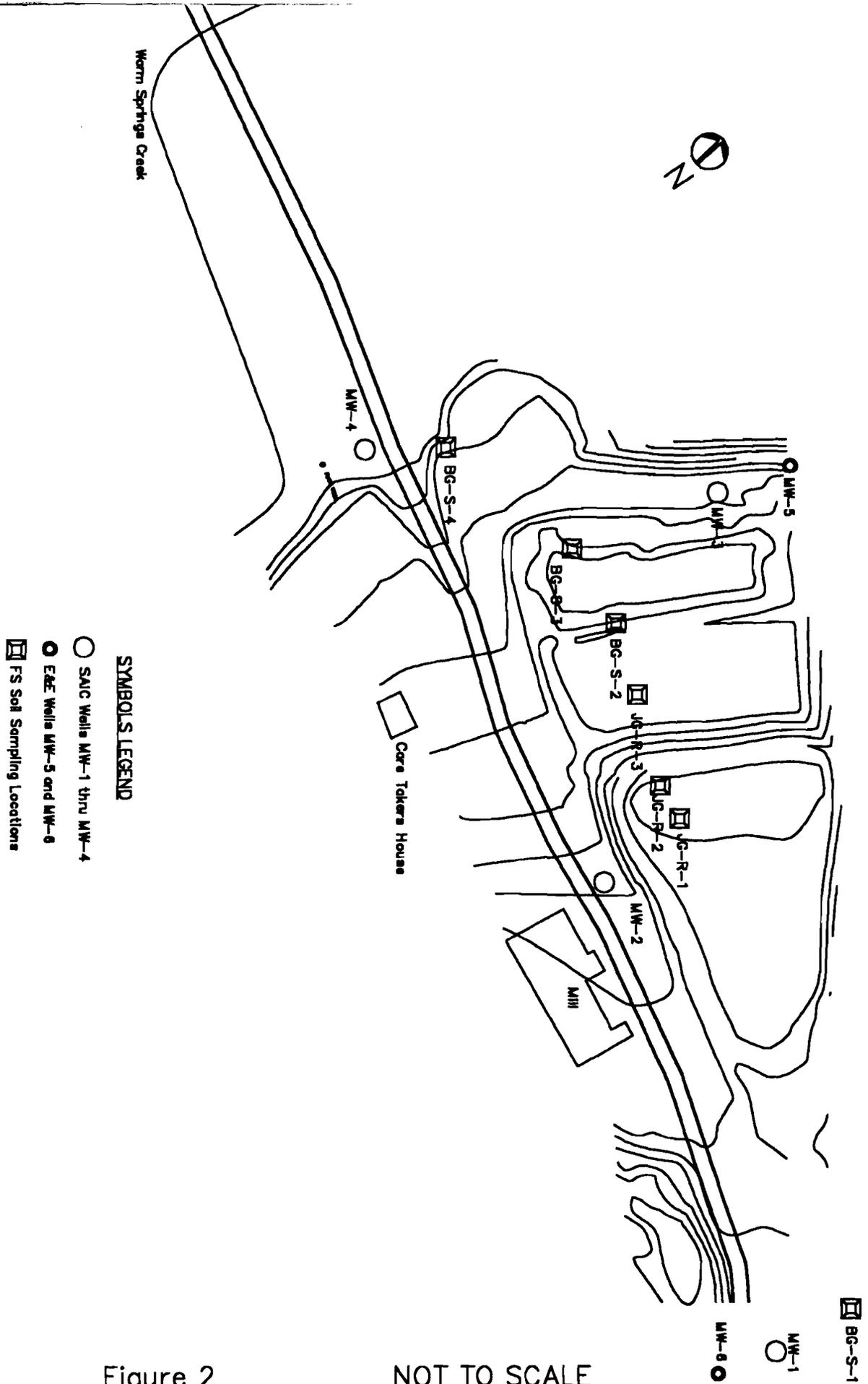


Figure 2

NOT TO SCALE

## **2.2 Site Operations and History**

The site has been operated as a custom mill site since 1950. Ore was brought in from various mine sites in the area and then processed. Sun Valley Lead and Silver Mines (SVLS) filed for a lease on the site in June of 1950. The lease was kept by SVLS until 1968. In 1968 the FS was notified that Tri-State Inc purchased all claims and patented lands including Bassett Gulch. In 1968, Cardinal Silver leased the site from Tri-State. Cardinal Silver retrofitted the mill in 1970. Soon Cardinal Silver went bankrupt and US Silver operated the mill for one year. US silver defaulted on their operating permit in 1972. Lewis Wells and Ralph Hafer purchased the mill sites from SVLS and acquired Tri-States interests. The lease was quitclaimed on August 11, 1972

The FS records show that Brigham Young University (BYU) Minerals Department purchased the lease from Hafer and Wells on July 1974 paying about \$30,000. BYU subleased the site to Grandview Metals and Cash Industries from Grandview in 1979.

BYU sold the lease and buildings to Rothschild Guaranty Ltd., was a Delaware Corporation, in March 1985. In 1986 Rothschild Mining Corporation (RMC) was founded and maintained as the leasee. In 1996 RMC sold their company and interest to Quail Land and Development (QLD). QLD is still holding all the interest at the site. In 1997, QLD ran the mill to determine if it was operational.

## **2.3 Waste Characteristics**

According to Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sections 101 (4) and 101 (33), a source is defined as an area where a Hazardous Substance may have been deposited, stored, disposed, or placed. Soil that may have been become contaminated as a result of hazardous substance migration is also a source. There are several sources present on the site as discussed below.

### **2.3.1 Tailings Impoundment**

The Impoundment (Figure 2) is divided into three ponds. All were dry at the time of this report. All retain recharged water from spring melt and runoff. The ponds are dry by mid June drying mostly by evaporation. This Impoundment contains tailings generated by the floatation mill generally tan in color. The tailings are very fine that can be characterized as minus (-) 150 sized particles. The entire impoundment is about 1000 feet long by 200 wide, about 200,000 ft<sup>2</sup>. The depth varies from 6 feet to less than one and estimated volume is about 30,000 c.y.

Some tailings were removed by machine from the Impoundment basin to increase the pond capacity. These tails were placed in the Warm Springs Creek wetlands area and the 100 year flood plain. These tailings cover an estimated 41,000 s.f. (E&E 1999).

### 2.3.2 Mill Building

During full operation, the mill building during contained a chemical lab, ball mill, transformers, and various chemicals. The mill was still in operation during the summer of 1997. However, operation was limited to a few test runs until the current operator received an operating permit.

The chemicals from the lab have been removed. A fume extractor hood still remains. There are sediments in the mill sump, the volume is about 1 c.y.

### 2.4 Previous Investigations

The Idaho Geological Survey ("IGS") did a site investigation on August 2, 1994 (IGS 1994). The investigation was part of a cooperative agreement with USDA-Forest Service Region 4 to investigate old and abandoned mine sites in the region. The field inspection looked at different sources. The site was rated by the IGS as a medium priority. They reported that the tailing piles contain sulfides, and the lower tailings pile was within the flood plain of Warm Springs Creek. The site was dry and no surface water discharges were observed. No sampling was performed at the site during this inspection.

Jeff Gabardi of the FS sampled the tailings at three locations at a depth of 2 feet. The samples were analyzed for 8 RCRA metals using TCLP extraction method EPA 6010A. The results showed that lead exceeded the TCLP limit of 5 mg/l in two of the three locations. The results for lead were 14.2, 19.3, and <0.04 mg/l. (See Table 1)

**TABLE 1**  
**TCLP Samples on January 12, 1996**

<b>Metals</b>	<b>Tailings JG-R-1(mg/l)</b>	<b>Tailings JG-R-2(mg/l)</b>	<b>Tailings JG-R-3(mg/l)</b>
<b>Arsenic</b>	0.05	<0.04	<0.04
<b>Barium</b>	0.033	0.026	0.044
<b>Mercury</b>	<0.0002	<0.0002	<0.0002
<b>Selenium</b>	<0.04	<0.04	<0.04
<b>Silver</b>	<0.003	<0.003	0.008
<b>Cadmium</b>	0.979	0.806	0.0196
<b>Chromium</b>	0.04	0.006	0.009
<b>Lead</b>	14.2	19.3	<0.04

Pat Trainor of the FS sampled the tailings and a background location on October 29, 1996. The samples showed that Arsenic, Mercury, Silver, Cadmium, Selenium, and Lead levels exceeded three times the levels of background. The results are shown in Table 2. The metals were analyzed as totals.

**Table 2  
Metals Results on October 29, 1996**

<b>Metals</b>	<b>Background BG-S-1(mg/kg)</b>	<b>Tailings BG-S-2(mg/kg)</b>	<b>Tailings BG-S-3(mg/kg)</b>	<b>Tailings BG-S-4(mg/kg)</b>
<b>Arsenic</b>	4.56	533 *	2260 *	96.6 *
<b>Barium</b>	300	<0.50	49.2	35.9
<b>Mercury</b>	<0.0005	0.719 *	0.438 *	0.332 *
<b>Selenium</b>	9.36	3.77	61.9 *	2.45
<b>Silver</b>	0.303	3.77 *	6.83 *	2.25 *
<b>Cadmium</b>	0.326	7.69 *	14.8 *	5.96 *
<b>Chromium</b>	5.78	8.46	20.4 *	7.15
<b>Lead</b>	24.2	649 *	1570 *	285 *

\* Denotes that results are greater than 3 times the background.

The USDA-Forest Service contracted a groundwater investigation in December 1997. The contractor Science Applications International Corporation (SAIC,) was selected as the contractor to drill wells to find and sample the groundwater (SAIC 1998). Four monitoring wells were installed on December 29 and 30, 1997. Large boulders were encountered in three locations. The depth to the boulders ranged from 7.3 to 9 feet below the surface. The drill method was an auger type; and drilling had to stop because of bit refusal. The auger was not able to drill past the boulder strata. All three were dry wells. The forth was drilled in the wetlands near Warm Springs, groundwater was found at 7.7 feet. The wells were checked in June 1998, and the dry wells remained dry. Figure 2 shows the wells location.

### **3.0 PATHWAYS**

#### **3.1 Groundwater Pathway**

The Bassett Gulch Mill Site is situated at the confluence of Bassett Gulch and Warm Springs Creek on Quaternary Age terrace gravels. The material is coarse to medium size angular gravel derived from the dark gray to black limestones exposed in the adjacent hill slopes and buff to brown colored volcanic lavas and flow breccias exposed at the head of the drainage. The entire mill site is underlain by calcareous sandstone, sandy and silty limestone, and argillite of the Permian Age Eagle Creek Member - Wood River Formation (Worl, 1991). The underlying rock is exposed in the hill slopes on both sides of Bassett Gulch and for several hundred feet up the drainage. The lavas and flow breccias at the head of the drainage are of Tertiary Age Challis Volcanic origin. The terrace gravels mask indications of faulting in the drainage bottom. There are springs at the toe of the terrace near Warm Springs Creek that indicate there may be a concealed fault at the base of the slope. It is

uncertain if the springs originate from a steeply dipping normal fault that parallels the east side of the gulch from a thrust fault that parallels Warm Springs Creek; if the springs may be a result of surface water migrating through the unconsolidated gravels.

### 3.1.1 Hydrogeology

It was reported by Ted Devoe (Gabardi 1998) a Cash industries employee that Cash drilled a 150-foot well in order to get enough water for processing. The water encountered was warm, and because of low yields, the well was abandoned. Mr. Devoe could not recall the actual flow or the geology encountered during the operation.

In 1997 SAIC a contractor for the USDA-FS, attempted to drill four monitoring wells on site. Figure 2 shows location of the wells. Three of the wells within the site encountered a layer of carbonintous rocks at 9 feet. No water was contacted, and because the drill type was unable to penetrate the rock, the project was abandoned. The wells were checked in June of 1998 during high water, and all wells were dry.

E & E drilled two wells (Figure 2), one at the base of the tailings near the Warm Springs Creek Flood plain (MW-5) and the other up gradient from the site (MW-6). MW-5 encountered water at about 34 feet and was sampled. MW-6 drilled into bedrock at about 40 feet, and the well was dry.

### 3.1.2 Targets

Table 3 shows the number of drinking water wells within the 4-mile radius and the population. The nearest well is within ¼ mile and across Warm Springs Creek from the site. All of the wells within the two mile radius is for single family residences. (The numbers of wells were found from researching the Idaho Department of Water Resources Well Logs.) The largest number of residences (172) was within a 3-4 mile radius (Ketchum P&Z 1998). We were unable find the actual number of persons only the number residences.

**Table 3**  
**Drinking Water Wells and Population within Four Miles of the Site.**

<b>Radius from Site (mile)</b>	<b>Wells</b>	<b>Population<sup>1</sup></b>
<b>0 - ¼</b>	<b>3</b>	<b>9</b>
<b>¼ - ½</b>	<b>5</b>	<b>15</b>
<b>½ - 1</b>	<b>5</b>	<b>15</b>
<b>1-2</b>	<b>5</b>	<b>15</b>
<b>2-3</b>	<b>31</b>	<b>144</b>
<b>3-4</b>	<b>54</b>	<b>172</b>
<b>Totals</b>	<b>103</b>	<b>310</b>

<sup>1</sup> The population reported in Table 3 is an extrapolation using the number of residences times an assumed 3 persons per household. E&E estimated that 368.8 people use groundwater from the alluvial drinking water within 4 miles of the site.

## 3.2 Surface Water Pathway

### 3.2.1 Hydrology

The surface water hydrology reported begins at the site and extends 15 miles downstream in the waters of the Wood River. The site itself is at the base of a down valley, which slopes towards Warm Spring Creek. The warm spring nominal channel is about 200-300 feet from the tailings. The mean annual precipitation is 17.4 inches (FS Ketchum RD). The average annual flow for Warm Spring's Creek is 87.4 cfs measured at Guyer Hot Springs, a USGS gauging station (USGS 1999) is about 3.5 miles downstream from the site. Warm Springs Creek flows into the Wood River system at Ketchum about 5 miles from the site. The average flow measured at the Hailey gauge station about 20 miles from the site is 560 cfs (USGS 1999). The lowest portion of tailings is within the wetlands and also within the 100-year flood plain.

### 3.2.2 Targets

#### 3.2.2.1 *Drinking Water*

There are no drinking water intakes along the 15 miles target limit. The population downstream includes the town of Ketchum (pop. 3711) about five miles from the site. There is one intake used for snowmaking purposes.

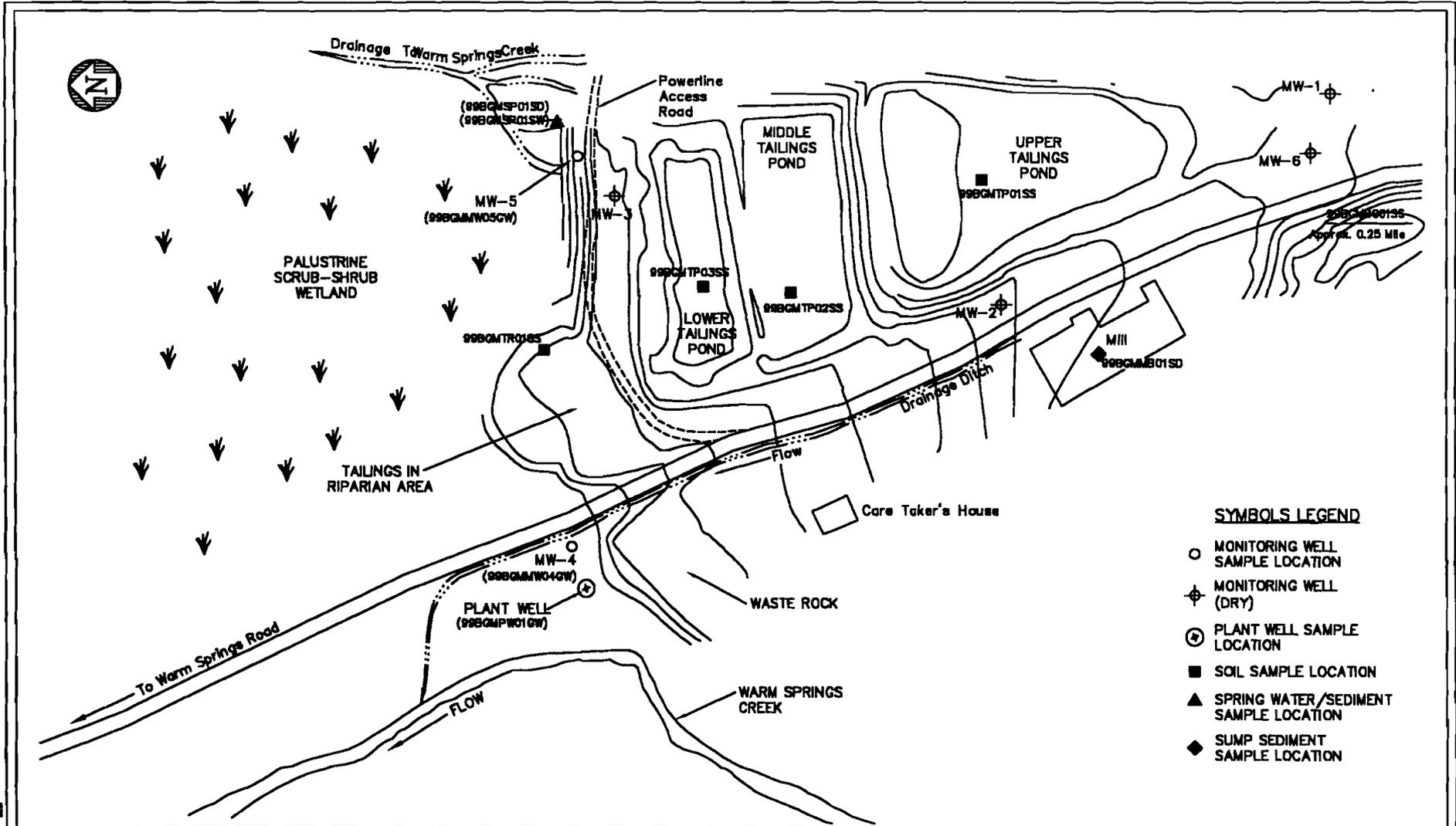
#### 3.2.2.2 *Human Food Chain*

Warm Springs and Wood River both support fisheries within the target area. Warm Springs Creek is stocked with about 4500 fish each year (IDFG 1994). There were 291 documented anglers fishing along the Warm Springs Creek in 1994. (IDFG 1994)

#### 3.2.2.3 *Environmental*

*Spiranthes Diluvalis* is the environmentally sensitive plant within the target area. (Garwood USDA-FS). Sensitive terrestrial animals include peregrine falcons, bald eagles, Rocky Mountain wolf, and boreal owl (Garwood USDA-FS). The sensitive fish species is the Wood River Sculpin. (Garwood USDA-FS)

About 24 miles of wetlands exists within 15 miles downstream from the site (E&E, 1999).



**SYMBOLS LEGEND**

- MONITORING WELL SAMPLE LOCATION
- ⊕ MONITORING WELL (DRY)
- ⊙ PLANT WELL SAMPLE LOCATION
- SOIL SAMPLE LOCATION
- ▲ SPRING WATER/SEDIMENT SAMPLE LOCATION
- ◆ SUMP SEDIMENT SAMPLE LOCATION

SEA PLANTED 12-10-98 001

U.S. DEPT. OF AGRICULTURE FOREST SERVICE  
**FIGURE 3**  
 ON-SITE SAMPLE LOCATION MAP  
 BASSETT GULCH MILL SITE INSPECTION  
 SAWTOOTH NATIONAL FOREST BETCHAM, IDAHO

SCALE IN FEET  
 0 100 200 300

DATE	BY	SCALE	FIGURE NO.
12-10-98	1007711_12.DWG	1"=100'	3-1

Technology and environmental, Inc.  
 Environmental Specialists in the Environmental  
 Health, and Safety

### **3.3 Air and Soil Exposure Pathways**

A fence does not enclose the site, however access to the site is controlled with a locked gate on the main access road. The nearest residence is located approximately ¼ mile north of the tailings ponds. No schools or daycare facilities are located within 1 mile of the site. Table 3 provides the resident population within a 4-mile radius of the site.

No commercial agriculture or livestock production areas are located in the vicinity of the Bassett Gulch Mill site (E & E 1999a).

*Spiranthes Diluvalis* is the environmentally sensitive plant within the target area. (Garwood USDA-FS). Sensitive terrestrial animals include peregrine falcons, bald eagles, Rocky Mountain wolf, and boreal owl (Garwood USDA-FS). The sensitive fish species is the Wood River Sculpin. (Garwood USDA-FS)

A full time caretaker resides at the site. An estimated 310 people reside within a 4-mile radius of the site. No habitat supporting federal- or state-listed threatened or endangered species exists within 4 miles of the site (ICDC 1999). No other sensitive environments are known to exist within 4 miles of the site. Approximately 303 acres of wetlands are known to exist within 4 miles of the site (EPA 1999). No commercial agriculture, silviculture, or major or designated recreational areas are known to exist within ½ mile of the site.

## **4.0 SAMPLING PROGRAM**

### **4.1 Field Sampling Plan**

The CERCLA site investigation in 1999 was performed by Ecology and Environment, Inc (E&E). E&E was contracted by the FS. This report is included as Appendix D, and data and findings are included throughout this report. Two additional monitoring wells were drilled as part of this project.

The site was sampled at a total of 20 locations for all matrixes. There were four soil samples, five sediment samples, five surface water samples, and six groundwater samples. Table 4 shows details of the sampling and Figure 3 shows locations of all on-site sampling.

## **5.0 SAMPLING RESULTS**

### **5.1 Results**

The field sampling was performed October 19-22, 1999 and results were published in February 2000. The attached report summarizes the results along with the Sampling Plan, QA.QC, and data validation information. Tables 5-9 displays results for the sampling.

Table 5

**SOURCE SAMPLES ANALYTICAL RESULTS SUMMARY  
BASSETT GULCH MILL  
KETCHUM, IDAHO**

E & E Sample I Depth (bgs) Description:	99BGMBG01SS 0-6" Background	99BGMTPO1SS 0-6" Upper Tailings Pond	99BGMTPO2SS 0-6" Middle Tailings Pond	99BGMTPO3SS 0-6" Lower Tailings Pond	99BGMTRO1SS 0-6" Tailings in Riparian Area	99BGMMBO1SD 0-6" Mill Building Sump
<b>TAL (not on the Target Analyte List)</b>						
Aluminum	15,000	9,200	15,000	15,000	6,300	23,000
Antimony	2.1 JB (2.9*)	2.3	2.2	3.5	3.5	3.3
Arsenic	5.5 JK (9.6*)	59 JK (34*)	220 JK (126*)	2,000 JK (1,150*)	140 JK (80.5*)	240 JK (138*)
Barium	450	600	11,000	2,300	13,000	4,200
Beryllium	0.47	0.75	1.2	0.89	0.5	0.98
Cadmium	2.1	1.4	5.6	51	8.1	9.1
Calcium	2,800 JH	6,700 JH	1,300 JH	10,000 JH	1,800 JH	24,000 JH
Chromium	20 JK (26*)	21 JK (16*)	79 JK (61*)	36 JK (28*)	45 JK (35*)	100 JK (78*)
Cobalt	4.2	2.1	2.5	8	2.3	18
Copper	8 JK (9.8*)	56 JK (46*)	84 JK (69*)	370 JK (303*)	61 JK (50*)	200 JK (164*)
Iron	12,000 JK	21,000 JK	28,000 JK	64,000 JK	15,000 JK	43,000 JK
Lead	37 JK (53*)	420 JK (292*)	410 JK (285*)	5,000 JK (3,470*)	290 JK (201*)	1,500 JK (1,040*)
Magnesium	5,200	430	1,400	5,900	860	14,000
Manganese	750	260	140	2,000	180	1,100
Mercury	0.037 U	0.29	3	0.97	1.3	1.2
Nickel	6.4 JB (39*)	41 U	18 JB	37 U	8.2 JB	50 U
Potassium	2,500	2,200	2,800	2,100	970	6,900
Selenium	2.9 U	1.6 JB	3.5	5.8	2.6 JB	3.8 U
Silver	0.16 JK (0.28*)	16 JB	6.4 JK (3.7*)	33 JK (19*)	4.1 JK (2.4*)	22 JK (13*)
Sodium	450 U	470 U	850 U	11,000	1,300	990 U
Thallium	0.97 U	1 U	1.1	0.73 JB	0.54 JB	1.3 U
Vanadium	20 JK (26.8*)	6.9 JK (5.1*)	74 JK (55*)	45 JK (34*)	43 JK (32*)	75 JK (56*)
Zinc	150 JK (215*)	230 JK (153*)	520 JK (347*)	4,700 JK (3,130*)	710 JK (473*)	910 JK (607*)
<b>Cyanide (mg/kg)</b>						
Cyanide	1.0	1.0 U	1.7	4.8	1.1 U	2.0
<b>BTEX (mg/kg)</b>						
Benzene	NA	NA	NA	NA	NA	0.047 U
Toluene	NA	NA	NA	NA	NA	0.047 U
Ethylbenzene	NA	NA	NA	NA	NA	0.047 U
m&p-Xylene	NA	NA	NA	NA	NA	0.095 U
o-Xylene	NA	NA	NA	NA	NA	0.047 U

Bold type indicates positively detected concentrations

Underline type indicates result is significant as defined in Section 5.

## Key:

- \* = Adjusted concentration per EPA document No. EPA 540-F-94-028.
- B = Analyte detected below the sample quantitation limit.
- bgs = Below ground surface.
- BTEX = Benzene, toluene, ethylbenzene, xylenes
- H = High bias
- ID = Identification.
- J = The analyte was positively identified. The associated numerical result is an estimate.
- K = Unknown bias.
- L = Low bias.
- mg/kg = Milligrams per kilogram.
- NA = Target Analyte List
- TAL = Analysis not performed.
- U = The analyte was not detected at or above the reported result.

Table 6

GROUNDWATER SAMPLES ANALYTICAL RESULTS SUMMARY  
BASSETT GULCH MILL  
KETCHUM, IDAHO

E & E Sample ID Description:	99BGMPW01GW Plant Well-Background	99BGMNV04GW MW-4	99BGMMW05GW MW-5	99BGMDW01GW 574 Warm Springs Road	99BGMDW02GW 592 Warm Springs Road	99BGMDW03GW 594 Warm Springs Road
<b>Metals (mg/L)</b>						
Aluminum	0.23	2.7	21	0.2 U	0.2 U	0.2 U
Antimony	0.003 UJK	0.0038 UJK	0.003 UJK	0.003 UJK	0.003 UJK	0.003 UJK
Arsenic	<b>0.0055</b>	<b>0.014</b>	<b>0.011</b>	<b>0.0027</b>	<b>0.002</b>	<b>0.0031</b>
Barium	<b>0.11</b>	<b>0.11</b>	<b>0.43</b>	<b>0.07</b>	<b>0.079</b>	<b>0.081</b>
Beryllium	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Cadmium	0.001 U	<b>0.00052 JB</b>	<b>0.0011</b>	0.001 U	0.001 U	0.001 U
Calcium	<b>35 JK</b>	<b>33 JK</b>	<b>280 JK</b>	<b>49 JK</b>	<b>49 JK</b>	<b>48 JK</b>
Chromium	0.01 U	<b>0.0078</b>	<b>0.027</b>	0.01 U	0.01 U	0.01 U
Cobalt	0.005 U	<b>0.0034</b>	<b>0.0057</b>	0.005 U	0.005 U	0.005 U
Copper	<b>0.022</b>	0.01 U	<b>0.016</b>	0.01 U	<b>0.06</b>	<b>0.026</b>
Iron	2.7	4.6	14	<b>0.06</b>	<b>0.056</b>	<b>0.057</b>
Lead	<b>0.012</b>	<b>0.023</b>	<b>0.064</b>	<b>0.00024 JB</b>	<b>0.0064</b>	<b>0.0015</b>
Magnesium	<b>5.2 JK</b>	<b>5.1 JK</b>	<b>22 JK</b>	<b>8.6</b>	<b>9.9 JK</b>	<b>9.3 JK</b>
Manganese	<b>0.0497 JB</b> ( <b>0.05*</b> )	0.12	<b>0.58</b>	<b>0.004 JK</b>	<b>0.0037 JB</b>	<b>0.0036 JB</b>
Mercury	0.0002 U	0.0002 U	<b>0.00066</b>	0.0002 U	0.0002 U	0.0002 U
Nickel	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Potassium	1.2 U	1.7	<b>5.8</b>	1.3 U	1.3 U	1.4 U
Selenium	<b>0.017</b>	<b>0.016</b>	<b>0.019</b>	<b>0.016</b>	<b>0.017</b>	<b>0.017</b>
Silver	0.0005 U	0.0005 U	<b>0.0012</b>	0.0005 U	0.0005 U	0.0005 U
Sodium	<b>5.9</b>	<b>5.1</b>	<b>10</b>	2.4 U	2 U	2.6 U
Thallium	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium	0.002 U	<b>0.011</b>	<b>0.026</b>	0.005 U	0.005 U	0.005 U
Zinc	<b>0.41</b>	<b>0.033</b>	<b>0.11</b>	<b>0.09</b>	<b>0.097</b>	<b>0.12</b>
<b>Organics (mg/L)</b>						
Cyanide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
<b>BTEX (mg/L)</b>						
Benzene	0.001 U	0.001 U	0.001 U	NA	NA	NA
Toluene	0.001 U	0.001 U	0.001 U	NA	NA	NA
Ethylbenzene	0.001 U	0.001 U	0.001 U	NA	NA	NA
m&p-Xylene	0.002 U	0.002 U	0.002 U	NA	NA	NA
o-Xylene	0.001 U	0.001 U	0.001 U	NA	NA	NA

Bold type indicates positively detected concentrations

Underline type indicates result is significant as defined in Section 5.

Italic type indicates result is above an EPA recommended action level for drinking water.

## Key:

- \* = Adjusted concentration per EPA document No. EPA 540-F-94-028.
- B = Analyte detected below the sample quantitation limit.
- bgs = Below ground surface.
- BTEX = Benzene, toluene, ethylbenzene, xylenes
- EPA = United States Environmental Protection Agency.
- ID = Identification.
- J = The analyte was positively identified. The associated numerical result is an estimate.
- K = Unknown bias.
- L = Low bias.
- mg/L = Milligrams per liter.
- NA = Analysis not performed
- TAL = Target Analyte List
- U = The analyte was not detected at or above the reported result.

**Table 7**

**SURFACE WATER SAMPLES ANALYTICAL RESULTS SUMMARY  
BASSETT GULCH MILL  
KETCHUM, IDAHO**

<b>E &amp; E Sample ID Description:</b>	<b>99BGMWC03SW Warm Springs Creek Background</b>	<b>99BGMWC02SW Warm Springs Creek Adjacent to Site</b>	<b>99BGMWC01SW Warm Springs Creek Downstream of Site</b>	<b>99BGMSP01SW Spring Below Tailings Ponds</b>
<b>TAL Inorganic Elements (mg/L)</b>				
Aluminum	0.2 U	<b>0.033 JB</b>	<b>0.21</b>	0.2 U
Antimony	0.003 UJK	0.003 UJK	0.003 UJK	0.003 UJK
Arsenic	<b>0.0037</b>	<b>0.011</b>	<b>0.003</b>	<b>0.0057</b>
Barium	<b>0.015</b>	<b>0.11</b>	<b>0.052</b>	<b>0.095</b>
Beryllium	0.002 U	0.002 U	0.002 U	0.002 U
Cadmium	0.001 U	0.001 U	0.001 U	0.001 U
Calcium	<b>29 JK</b>	<b>73 JK</b>	<b>30 JK</b>	<b>120 JK</b>
Chromium	0.01 U	0.01 U	0.01 U	0.01 U
Cobalt	0.005 U	0.005 U	0.005 U	0.005 U
Copper	0.01 U	<b>0.012</b>	<b>0.019</b>	0.01 U
Iron	<b>0.023 JB</b>	<b>0.12</b>	<b>0.085</b>	<b>0.073</b>
Lead	<b>0.00051 JB (0.001*)</b>	<b>0.0034</b>	<b>0.00042 JB</b>	<b>0.0029</b>
Magnesium	<b>5 JK</b>	<b>7.6 JK</b>	<b>5.2 JK</b>	<b>11 JK</b>
Manganese	0.05 U	<b>0.005 JB</b>	<b>0.0058 JB</b>	<b>0.0077 JB</b>
Mercury	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.04 U	0.04 U	0.04 U	0.04 U
Potassium	0.78 U	<b>2.2</b>	1.3 U	2.3
Selenium	<b>0.015</b>	<b>0.016</b>	<b>0.014</b>	<b>0.017</b>
Silver	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Sodium	<b>5.9</b>	<b>4.7</b>	<b>5.9</b>	<b>7.9</b>
Thallium	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	<b>0.02</b>	<b>0.033</b>	<b>0.043</b>	<b>0.026</b>
<b>Cyanide (mg/L)</b>				
Cyanide	0.050 U	0.050 U	0.050 U	3.5 U
<b>BTEX (mg/L)</b>				
Benzene	NA	NA	NA	0.001 U
Toluene	NA	NA	NA	0.001 U
Ethylbenzene	NA	NA	NA	0.001 U
m&p-Xylene	NA	NA	NA	0.002 U
o-Xylene	NA	NA	NA	0.001 U

Bold type indicates positively detected concentrations

Underline type indicates result is significant as defined in Section 5.

Italic type indicates result is above a federal freshwater ambient water quality criterion.

Key:

- \* = Adjusted concentration per EPA document No. EPA 540-F-94-028.
- B = Analyte was detected below the sample quantitation limit.
- bgs = Below ground surface.
- BTEX = Benzene, toluene, ethylbenzene, xylenes
- EPA = United States Environmental Protection Agency.
- ID = Identification.
- J = The analyte was positively identified. The associated numerical result is an estimate.
- K = Unknown bias.
- L = Low bias.
- mg/L = Milligrams per liter.
- NA = Analysis not performed
- TAL = Target Analyte List
- U = The analyte was not detected at or above the reported result.

**Table 8**

**SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY  
BASSETT GULCH MILL  
KETCHUM, IDAHO**

<b>E &amp; E Sample ID</b>	<b>99BGMWC03SD</b>	<b>99BGMWC02SD</b>	<b>99BGMWC01SD</b>	<b>99BGMSP01SD</b>
<b>Depth (bgs)</b>	<b>0-2"</b>	<b>0-2"</b>	<b>0-2"</b>	<b>0-2"</b>
<b>Description:</b>	<b>Warm Springs Creek Background</b>	<b>Warm Springs Creek Adjacent to Site</b>	<b>Warm Springs Creek Downstream of Site</b>	<b>Spring Below Tailings Ponds</b>
<b>TABLE Inorganic Elements (mg/kg)</b>				
Aluminum	<b>6,700</b>	<b>8,600</b>	<b>5,300</b>	<b>18,000</b>
Antimony	<b>1.6 (3.9*) JB</b>	<b>1.8 JB</b>	<b>1.5 JB</b>	<b>400</b>
Arsenic	<b>30 JK</b> <b>(52*)</b>	<b>7.7 JK</b> <b>(4.4*)</b>	<b>12 JK</b> <b>(6.9*)</b>	<b>3,700 JK</b> <b>(2,100*)</b>
Barium	<b>100</b>	<b>310</b>	<b>72</b>	<b>1,400</b>
Beryllium	<b>0.52 U</b>	<b>0.37 JB</b>	<b>0.34 JB</b>	<b>1.4 U</b>
Cadmium	<b>0.74 JB</b> <b>(1.3*)</b>	<b>0.88 JB</b>	<b>0.44</b>	<b>16</b>
Calcium	<b>3,400 JH</b>	<b>4,900 JH</b>	<b>2,800 JH</b>	<b>33,000 JH</b>
Chromium	<b>26 JK</b> <b>(34*)</b>	<b>29 JK</b> <b>(22*)</b>	<b>21 JK</b> <b>(16*)</b>	<b>31 JK</b> <b>(24*)</b>
Cobalt	<b>5.7</b>	<b>5.5</b>	<b>5.1</b>	<b>3 JB</b>
Copper	<b>6 UJK</b> <b>(7.32*)</b>	<b>7.2 JK</b> <b>(5.9*)</b>	<b>6.2 JK</b> <b>(5.1*)</b>	<b>56 JK</b> <b>(46*)</b>
Iron	<b>15,000 JK</b>	<b>13,000 JK</b>	<b>13,000 JK</b>	<b>52,000 JK</b>
Lead	<b>76 JK</b> <b>(109*)</b>	<b>61 JK</b> <b>(42*)</b>	<b>56 JK</b> <b>(39*)</b>	<b>29,000 JK</b> <b>(20,100*)</b>
Magnesium	<b>4,200</b>	<b>4,700</b>	<b>4,100</b>	<b>4,000</b>
Manganese	<b>170</b>	<b>130</b>	<b>240</b>	<b>130</b>
Mercury	<b>0.04 U</b>	<b>0.044 JB</b>	<b>0.034 U</b>	<b>4.3</b>
Nickel	<b>52 U</b>	<b>5.3 JB</b>	<b>44 U</b>	<b>140 U</b>
Potassium	<b>1,100</b>	<b>1,400</b>	<b>730</b>	<b>5,200</b>
Selenium	<b>0.87 JB</b> <b>(3.9*)</b>	<b>1.1</b>	<b>3.3 U</b>	<b>20</b>
Silver	<b>0.23 (0.40*) JK</b>	<b>0.37 JK</b> <b>(0.21*)</b>	<b>0.18 JK</b> <b>(0.10*)</b>	<b>170 JK</b> <b>(98*)</b>
Sodium	<b>590 U</b>	<b>570 U</b>	<b>510 U</b>	<b>4,800</b>
Thallium	<b>1.3 U</b>	<b>1.2 U</b>	<b>1.1 U</b>	<b>1.1 JB</b>
Vanadium	<b>33 JK</b> <b>(44*)</b>	<b>30 JK</b> <b>(22*)</b>	<b>25 JK</b> <b>(19*)</b>	<b>38 JK</b> <b>(28*)</b>
Zinc	<b>150 JK</b> <b>(225*)</b>	<b>120 JK</b> <b>(80*)</b>	<b>120 JK</b> <b>(80*)</b>	<b>2,600 JK</b> <b>(1,700*)</b>
<b>Cyanide (mg/kg)</b>				
Cyanide	<b>1.3 U</b>	<b>1.4 U</b>	<b>0.97 U</b>	<b>3.5 U</b>

Bold type indicates positively detected concentrations

Underline type indicates result is significant as defined in Section 5.

Key:

- \* = Adjusted concentration per EPA document No. EPA 540-F-94-028.
- B = Analyte detected below the sample quantitation limit.
- bgs = Below ground surface.
- EPA = United States Environmental Protection Agency.
- ID = Identification.
- J = The analyte was positively identified. The associated numerical result is an estimate.
- K = Unknown bias.
- L = Low bias.
- mg/kg = Milligrams per kilogram.
- U = The analyte was not detected at or above the reported result.

**Table 9**

**TCLP TAILINGS SAMPLES  
ANALYTICAL RESULTS SUMMARY  
BASSETT GULCH MILL  
KETCHUM, IDAHO**

<b>E &amp; E Sample ID</b>	<b>99BGMTP01SS</b>	<b>99BGMTP02SS</b>	<b>99BGMTP03SS</b>	<b>RCRA Hazardous Waste Threshold Concentration</b>
<b>Depth (bgs)</b>	<b>0-6"</b>	<b>0-6"</b>	<b>0-6"</b>	
<b>Description:</b>	<b>Upper Tailings Pond</b>	<b>Middle Tailings Pond</b>	<b>Lower Tailings Pond</b>	
<b>TCLP Metals (mg/L)</b>				
Arsenic	0.2 U	0.2 U	<b>0.16</b>	5.0
Barium	<b>0.16</b>	<b>0.62</b>	<b>1.3</b>	100.0
Cadmium	0.02 U	<b>0.046</b>	<b>0.45</b>	1.0
Chromium	0.01 UJL	0.01 UJL	0.01 UJL	5.0
Lead	<b>0.28</b>	0.05 U	<b>0.54</b>	5.0
Mercury	0.002 U	0.002 U	0.002 U	0.2
Selenium	0.4 U	0.4 U	0.4 U	1.0
Silver	0.01 UJK	0.6 UJK	0.6 UJK	5.0

Bold type indicates positively detected concentrations.

Key:

- bgs = Below ground surface.
- ID = Identification.
- J = The analyte was positively identified. The associated numerical result is an estimate.
- K = Unknown bias.
- L = Low bias.
- mg/L = Milligrams per liter.
- RCRA = Resource Conservation and Recovery Act
- TCLP = Toxicity Characteristic Leaching Procedure
- U = The analyte was not detected at or above the reported result.

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