Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Idaho Panhandle National Forest: Volume II: Gold Creek Drainage

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Report originally prepared for the U.S. Forest Service, Region 1, Under Participating Agreement No. FS-01-96-14-2800

Field Inspection conducted by Earl Bennett, John Kauffman, Falma Moye, and William Rember
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Video Index
High 8mm format, Master Tape, 2.5 hours long.

Hours, Minutes, Seconds* ........................................ Property Name

0:00:12 ...................................................... Start Tape- Introduction
0:01:30 ...................................................... Property Location (maps)
0:09:50 ...................................................... Conjecture Mine
0:26:35 ...................................................... Idaho Lakeview Mine
0:42:40 ...................................................... Weber Mine
0:50:38 ...................................................... Keep Cool Mine
1:06:00 ...................................................... New Rainbow Mine
1:15:35 ...................................................... Vulcan Mine
1:23:08 ...................................................... Hidden Treasure Mine
1:32:00 ...................................................... Squaw Bay Limestone Mine
1:47:56 ...................................................... Lakeview Limestone Quarries
1:52:20 ...................................................... Blanket Lead- No Video
No Video ...................................................... Max Creek Limestone
1:52:40 ...................................................... Max Dunn Mine
2:01:54 ...................................................... Wiberg Mine
2:06:25 ...................................................... Silver Leaf Mine
2:11:45 ...................................................... Perry Mine
2:15:24 ...................................................... Princess Panama Mine
No Video ...................................................... Bellville Prospect
2:18:30 ...................................................... Rennie Prospect
2:21:25 ...................................................... Shoshone Silver Mill
No Video ...................................................... Lone Hand Mine
No Video ...................................................... Unnamed Locality (SP-7)
2:27:50 ...................................................... End Credits

* Tape counter in hours, minutes, seconds. Properties are in the same order as in the text.
Mines in the text with no video are so noted in this index.
1.0 PROJECT OVERVIEW

1.1 INTRODUCTION

In order to fulfill its obligations under the Clean Water Act and related legislation, the Northern Region of the United States Forest Service (USFS) needs to identify and characterize the abandoned and inactive mines with environmental, health, and/or safety problems that are on or could impact National Forest Service-administered lands. The Northern Region of the USFS administers National Forest lands in the northern part of Idaho, Montana, and parts of North and South Dakota. The Idaho Geological Survey (IGS) is the lead state agency for the collection, interpretation, and distribution of information about the geology and mineral resources of Idaho. The USFS and the IGS, having determined that an inventory and preliminary characterization of abandoned and inactive mines in Idaho would be beneficial to both agencies, have entered into a series of participating agreements to accomplish this work. The first forest inventoried was the Panhandle National Forest. This report, Volume II, presents the results of the work done in the Lakeview mining district (Gold Creek drainage). For continuity, the general design of this report follows that used by the Montana Bureau of Mines and Geology for similar studies in Montana.

1.2 PROJECT OBJECTIVES

In 1992, the USFS and IGS entered into an agreement to inventory abandoned and inactive mines on or affecting Forest Service lands in Idaho. Work on the initial phase of the project included developing a computerized database of all such mines and prospects and plotting the locations of these properties on National Forest base maps. Phase 2 work conducted the following year provided the Forest Service with screening forms containing site information from the database and map overlays at 7.5-minute scale for areas of dense mining activity. Phase 3 started in the summer of 1996 and included field examination of properties in the Prichard Creek and Eagle Creek basins in Shoshone County and preparation of reports discussing the ownership and operational history of selected mines. An addition to the 1996 work on Phase 3 included looking at all of the mines in the Lakeview mining district (Gold Creek area) in Bonner County.

The overall objectives of this inventory and preliminary characterization process, as defined by the USFS, were to:

1. Systematically identify all mine sites with possible human health, environmental, and/or safety related problems that either are on or affecting National Forest Service lands.

2. Identify the human health and environmental risks at each location based on site characterization factors (see Section 1.5), including screening-level soil and water samples taken and analyzed in accordance with Environmental Protection Agency (EPA) protocols and quality control procedures.

3. Based on site characterization factors, identify those sites that are not affecting National Forest Service lands and that can therefore be eliminated from further consideration.
4. Cooperate with other state and federal agencies, and integrate the Northern Region program with their programs.

5. Develop and maintain a data file of site information that will allow the Region to pro-actively respond to governmental and public interest group concerns.

In addition to the USFS objectives outlined above, the IGS objectives included gathering new information associated with these abandoned and inactive mines. The Survey's enabling legislation (Sections 47-201–47-204 of the Idaho Code) designates IGS as the lead state agency for the collection, interpretation, and distribution of all geologic and minerals data for Idaho.

1.3 ABANDONED AND INACTIVE MINES DEFINED

For the purposes of this study, mines, mills, or other processing facilities related to mineral extraction and/or processing are defined as abandoned or inactive as follows:

A mine is considered abandoned if there are no identifiable owners or operators for the facilities, or if the facilities have reverted to federal ownership.

A mine is considered to be inactive if there is an identifiable owner or operator of the facility, but the facility is not currently operating and there are no approved authorizations or permits to operate.

1.4 HEALTH AND ENVIRONMENTAL PROBLEMS AT MINES

A variety of safety, health, and environmental problems may occur at abandoned and inactive mines. These include metals that contaminate ground water, surface water, and soils; airborne dust from abandoned tailings impoundments; eroding mine and mill waste materials that contribute excessive amounts of sediment to surface waters; unstable waste piles with the potential for catastrophic failure; and physical hazards associated with mine openings and dilapidated structures. The most important environmental hazard is the contamination of both surface and subsurface water by metals, acid mine drainage, or sediment loading.

Metals are often transported from a mine by water (ground water discharge or surface runoff) and may be dissolved, suspended, or carried as part of the bedload. When sulfides are present, acid water can form; this, in turn, increases the solubility of metals. This condition, known as acid mine drainage (AMD), is a significant source of metal releases at some mine sites in Idaho.

1.4.1 Acid Mine Drainage

Trexler and others (1975) identified six factors that govern the formation of metal-laden acid mine waters. They are:

1) availability of acid-producing minerals, particularly pyrite,
2) presence of oxygen,
3) moisture in the atmosphere,
4) availability of leachable heavy metals,
5) availability of water to transport the dissolved constituents, and
6) mine characteristics, which affect movement of air and water through the mine workings.

These factors occur not only within the mines themselves, but also within mine dumps and mill tailings piles, making these waste materials potential sources of contamination as well. Formation of acid mine drainage can be reduced if minerals such as calcite, which can neutralize acidity, are present (Trexler and others, 1975; Marvin and others, 1995).

Acid mine drainage is formed by the oxidation and dissolution of sulfides, particularly pyrite (FeS₂) and pyrrhotite (Fe₁₋₀S). Other sulfides play a minor role in acid generation. Oxidation of iron sulfides forms sulfuric acid (H₂SO₄), sulfate ions (SO₄²⁻), and reduced iron (Fe²⁺). When sulfide-bearing rock is mined, the sulfide minerals are exposed to atmospheric oxygen and oxygen-bearing water. Consequently, the sulfide minerals are oxidized, and acid mine waters are produced (Trexler and others, 1975; Marvin and others, 1995).

The oxidation of the reduced iron is the step that limits how much acid will form. The rate of this reaction can be greatly increased by iron-oxidizing bacteria (Thiobacillus ferrooxidans). The oxidized iron produced by biological activity promotes further oxidation and dissolution of pyrite, pyrrhotite, and marcasite (FeS₂, a dimorph of pyrite) (Trexler and others, 1975; Marvin and others, 1995).

Once formed, the acid can dissolve other sulfide minerals to produce high concentrations of copper, lead, zinc, and other metals. Minerals that can contribute heavy metals to acid mine drainage include arsenopyrite, FeAsS; chalcocite, CuFeS₂; galena, PbS; tetrachloride, (CuFe)₁₂Sb₄S₁₆; and sphalerite, (Zn, Fe)S. Aluminum can be leached by the dissolution of aluminosilicates common in soils and waste material found in Idaho. The dissolution of any given metal is controlled by the solubility of that metal (Trexler and others, 1975; Marvin and others, 1995).

1.4.2 Solubility of Selected Metals

The following information is paraphrased from Marvin and others (1995, p. 5-6). This report cites the following references as sources for this material: Lindsay (1979), Stumm and Morgan (1981), Hem (1985), and (Maest and Metesh, 1993).

At a pH above 2.2, ferric hydroxide [Fe(OH)₃] produces a brownish orange color in surface waters and forms a precipitate with a similar color on rocks in affected streams. If other metals, such as copper, lead, cadmium, zinc, and aluminum, are present in the source rock, they may also precipitate with or adsorb onto the ferric hydroxide (Stumm and Morgan, 1981). Alunite [KAl₃(SO₄)₂(0H)₆] and jarosite [KFe₃(SO₄)₂(OH)₆] will precipitate at pH of less than 4, depending on SO₄²⁻ and K⁺ activities (Lindsay, 1979).
Under acidic conditions, the solubility of the metal controls how much will be released into the environment:

**Manganese** solubility is strongly controlled by the redox state and is limited by the presence of minerals such as pyrolusite and manganite; under reducing conditions, pyrolusite [MnO₂] dissolves and manganite [MnO(OH)] precipitates. Manganese is found in mineralized environments as rhodochrosite [MnCO₃] and its weathering products.

**Aluminum** solubility is most often controlled by alunite [KAl₃(SO₄)₂(OH)₆] or by gibbsite [Al(OH)₃], depending on pH. Aluminum is one of the most common elements in rock-forming minerals such as feldspars, micas, and clays.

**Arsenic** tends to precipitate and adsorb with iron at low pH and de-sorb or dissolve at higher pH. Once oxidized, arsenic will be found in solution in higher pH waters. When the pH is between 3 and 7, the dominant arsenic compound is a monovalent arsenate, H₂AsO₄. Arsenic is abundant in metallic mineral deposits as arsenopyrite [FeAsS], enargite [Cu₃AsS₄], tennantite [Cu₁₂As₄S₁₃], and other minerals.

**Cadmium** solubility data are limited. When the pH of soils is above 7.5, the solubility of cadmium is controlled by the carbonate species octavite [CdCO₃]; when the pH of the soil is below 6, cadmium solubility is controlled by strengite [Cd₃(PO₄)₂]. Octavite is the dominant control on the solubility of cadmium in soils. In water, at low partial pressures of H₂S, CdCO₃ is easily reduced to CdS.

**Copper** solubility in natural waters is controlled primarily by the amount of carbonate present; malachite [Cu₂(OH)₂CO₃] and azurite [Cu₃(OH)₂(CO₃)₂] form when CO₃⁻ ions are available in sufficient concentrations. In soil, copper combines readily with iron to form cupric ferrite. Other compounds, such as sulfate and phosphates, may also control copper solubility in soils. Copper is present in many ore minerals, including chalcopyrite [CuFeS₂], bornite [Cu₃FeS₄], chalcocite [Cu₂S], and tetrahedrite [Cu₁₂Sb₄S₁₃].

**Mercury** readily vaporizes under atmospheric conditions and thus is most often found in concentrations well below the 25 μg/L equilibrium concentration. The most stable form of mercury in soil is its elemental form. Mercury is found in low temperature hydrothermal ores as cinnabar [HgS], in epithermal (hot springs) deposits as native mercury, and as native mercury in man-made deposits where mercury was used to process gold ores.
Lead concentrations in natural waters are controlled by the formation of lead carbonate, which has an equilibrium concentration of 50 µg/L when the pH is between 7.5 and 8.5. As with other metals, concentrations in solution increase with decreasing pH. In sulfate soils with a pH of less than 6, the formation of anglesite determines how much lead will remain in solution. The formation of cerussite, a lead carbonate, controls solubility in buffered soils. Lead occurs in the common ore mineral galena [PbS].

Zinc solubility is controlled by the formation of zinc hydroxide and zinc carbonate in natural waters. When the pH is above 8, the equilibrium concentration of zinc in water with a high bicarbonate content is less than 100 µg/L. Franklinite may control solubility at pH less than 5 in water and soils, and its formation is strongly affected by sulfate concentrations. Thus, production of sulfate from AMD may ultimately control solubility of zinc in water affected by mining. Sphalerite [ZnS] is common in mineralized systems.

1.4.3 The Use of pH and Specific Conductivity to Identify Water Quality Problems

Specific conductance (SC) and pH provide a rapid way to distinguish many "problem" mine sites from those that have no adverse water-related impacts. As a rough screening tool, low pH (<6.0) and high SC (variable) usually occur at sites with problems; neutral or higher pH and low SC indicate sites that are less likely to have serious problems.

Limiting data collection only to pH and SC largely ignores the various controls on solubility and can lead to overlooking some types of problems. Arsenic, for example, is most mobile in waters with higher pH values (>7), and its concentration is strongly dependent on the presence of dissolved iron. Cadmium and lead may also exceed standards in waters with pH values within acceptable limits.

Reliance on SC as an indicator of site conditions can also be misleading in certain situations. The SC value of a sample represents 55 to 75 percent of the total dissolved solids (TDS), depending on the concentration of sulfate. Also, it is necessary to have a statistically significant amount of SC data for a study area in order to define what constitutes a high or low SC value.

In some cases, a water sample with a near-neutral pH and a moderate SC could have one or more dissolved metal species that may exceed standards. The complete evaluation of a mine site for adverse impacts on water and soil should include the collection of samples for analysis of metals, cations, and anions.
1.5 METHODOLOGY

1.5.1 Data Sources

The IGS began compiling a database of mining properties in Idaho in 1979. This work has continued to date, and the database (now digital) contains information on some 8,700 mines and prospects. All or parts of the following databases and information sources have been integrated into this digital information system:

1. the Mineral Industry Location Subsystem (MILS) database (U.S. Bureau of Mines)
2. the Mineral Resources Data System (MRDS) database (U.S. Geological Survey)
3. published compilations of mines and prospects data
4. state publications on Idaho mineral deposits
6. IGS mineral property files
7. all mines and prospects noted on the appropriate USGS 7.5-minute quadrangle maps
8. data held in private collections or company information.

Most of the data for this project were collated with existing data in the IGS Mines and Prospects digital database. As noted, this is the most complete compilation available for information on Idaho's mining properties. The IGS continues to update the database, which now contains an estimated 85-90 percent of the mining properties in the state. During the field visits, the IGS located some (but not many) mines and prospects for which no previous information existed. Also, a very few mines listed in the database were not found.

1.5.2 Pre-field Screening

Field crews visited almost all the mine sites in the study areas, emphasizing the properties with the potential to release hazardous substances and those for which there was not enough information available to make that determination without a field visit. The Survey and the USFS developed screening criteria (Table 1.5-1) which they used to determine if a site had the potential to release hazardous substances or posed other environmental or safety hazards. The first page of the Field Form (Appendix A) contains the screening criteria. If any of the answers were "yes" or unknown, the site was visited. Personal knowledge of a site and published information were used initially to answer the questions. Forest Service mineral specialists used these criteria to "screen out" several sites using their knowledge of an area.

Mine sites which were not visited were retained in the database along with the data source(s) that were consulted. However, if these sites were close to a visited site, the geologist usually looked at them to verify that the screening information was correct.

Placer mines were not studied as part of this project. Although mercury was used in amalgamating free gold in placer mines, the complex nature of placer deposits makes detection of mercury difficult and is beyond the scope of this inventory. Due to their oxidized
nature, placer deposits are not likely to contain other anomalous concentrations of heavy metals.

Table 1.5-1. Screening Criteria (answer Yes or No to each item).

<table>
<thead>
<tr>
<th>Yes/No</th>
<th>Screening Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mill site or tailings present.</td>
</tr>
<tr>
<td>2.</td>
<td>Adits with discharge or evidence of discharge.</td>
</tr>
<tr>
<td>3.</td>
<td>Evidence of or strong likelihood for metal leaching or AMD (water stains, stressed or lack of vegetation, waste below water table, etc.)</td>
</tr>
<tr>
<td>4.</td>
<td>Mine waste in floodplain or shows signs of water erosion.</td>
</tr>
<tr>
<td>5.</td>
<td>Residences, high public use area, or environmentally sensitive area (as listed in HRS) within 200 feet of disturbance.</td>
</tr>
<tr>
<td>6.</td>
<td>Hazardous wastes/materials (chemical containers, explosives, etc.)</td>
</tr>
<tr>
<td>7.</td>
<td>Open adits/shafts, highwalls, or hazardous structures/debris.</td>
</tr>
</tbody>
</table>

If the answers to criteria 1 through 6 were *all* "NO" (based on literature, personal knowledge, or a site visit), the site was not investigated further.

### 1.5.3 Field Inspection Procedures

The sites which could not be screened out by using the criteria in Table 1.5-1 were visited by an IGS geologist. At sites for which little geologic or mining data existed, geologists characterized the geology, collected samples for geochemical analysis, evaluated the deposit, and described workings and processing facilities present. All information required to fill in the Field Questionnaire (Appendix A) was gathered.

When it was determined that a site had a possible environmental problem, more sampling and description were required. Information was collected concerning environmental degradation, hazardous mine openings, the presence of structures, and land ownership. After the potential problems were described, appropriate soil and water samples were collected. All site locations were refined using conventional field methods, and each site was located by latitude and longitude and by Township, Range, and Section. If previously determined, these values were checked and corrected, as needed.

On public lands, sites with ground-water discharge, flowing surface water, or contaminated soils (as indicated by impacts on vegetation) were mapped. The sketch maps show locations
of the workings, exposed geology, dumps, tailings, and surface water and geologic sample locations. Oblique aerial photographs were sometimes substituted or used to supplement the field sketches. The entire site was photographically recorded using both still images and videotape. The videotape record proved especially useful for site description and review, and is recommended for future studies.

1.5.3.1 Soil, Rock, and Mine Waste Sampling Procedures

At sites identified as having a potential problem, the geologist collected soil, rock, and waste samples, as appropriate. Sample locations were selected in areas where waste material was obviously impacting natural material. In most cases a composite sample was gathered to get as representative a sample as possible or multiple samples were collected. All sample sites were located so as to assess conditions on National Forest lands. Three types of samples were collected:

1) select rock, soil, or waste samples—specimens representing a particular material taken for analysis;

2) composite samples—rock and soil taken systematically from a waste dump or tailings pile for analysis, representing the overall composition of material in the source;

3) leach samples—duplicates of selected composite samples (usually waste rock or mill tailings) for testing leachable metals.

The three types of samples were used to examine the value and metal content of dumps and tailings, and to check the availability of metals during leaching when sample sites were exposed to water. Outcrops and waste materials were not sampled extensively enough to provide reliable estimates of tonnages, grades, or economic feasibility.

1.5.3.2 Water Sampling Procedure

As noted, this project focused on the impacts of mining on surface water, ground water, and soils. The reasoning behind this approach was that a mine disturbance may have high total metal concentrations yet may be releasing few metals into the surface water, ground water, or soil. Conversely, another disturbance could have lower total metal content but be releasing metals in concentrations that adversely impact the environment.

The geologist selected and marked water sample sites based on field parameters (SC, pH, temperature) and observations (such as erosion and staining of soils or streambeds). Sample locations were chosen that would provide the best information on the relative impact of the site to surface water and soils. All sites were accurately located on topographic base maps. Surface water samples were collected at all discharge points at the site, as well as samples from upstream and downstream of the site.
At each water sampling site, the temperature, specific conductivity, and pH were measured. A unique sample number was affixed to the sample bottle. A 500-ml sample was collected (split in the lab into a raw sample and a filtered sample). The field sample was acidified with 0.1N nitric acid and stored in a secured ice box. The samples remained under constant refrigeration and security until analyzed approximately 3-5 days later.

Since monitoring wells were not installed as part of this investigation, the evaluation of metal contamination of ground water was limited to strategic sampling of surface water and soils. In most cases, background water-quality data at a particular mine site was restricted to upstream surface water samples. However, in many drainages background samples were collected at sites with no visible contamination. Background soil samples were not collected. Laboratory leach tests were used to determine if metals might be released from mine waste material, which could provide additional insight to possible ground-water contamination.

1.5.4 Analytical Methods

The Analytical Sciences Laboratory at the University of Idaho performed all of the laboratory analyses using the following EPA-approved protocols and quality assurance standards:

Water Samples (acidified and unfiltered)—Total Recoverable Metal Screen (EPA Test 200.7).
Water Samples (acidified and unfiltered)—Arsenic (EPA Test 206.2), Lead (EPA Test 239.2), and Mercury (ICP, Cold Vapor).
Water Samples (raw and filtered 0.45 micron filter)—Dissolved Metal Screen (EPA Test 200.7).
Soil and Waste Material—Element Screen (EPA Test 3050).
Leachable Metals, TCLP—Metal Screen (EPA Test 1311/6010).

1.5.5 Standards

EPA and various state agencies have developed human health and environmental standards for various metals. To try to put the metal concentrations that were measured into some perspective, they were compared to these developed standards. However, it is understood that the background metal concentrations in mineralized areas may exceed these standards.

1.5.5.1 Water-Quality Standards

The Safe Drinking Water Act (SDWA) directs EPA to develop standards for potable water. Some of these standards are mandatory (primary) and some are desired (secondary). The standards established under the SDWA are often referred to as primary and secondary maximum contaminant levels (MCLs). Similarly, the Clean Water Act (CWA) directs EPA to develop water-quality standards (acute and chronic) that will protect aquatic organisms. These standards may vary with water hardness and are often referred to as the Aquatic Life Standards. The primary and secondary MCLs along with the acute and chronic Aquatic Life Standards for selected metals are listed in Table 1.5-2. As these standards can vary with water hardness, a range of values is given for some elements. Hardness was not measured for this study.
Table 1.5-2. Standards for contaminants in water.

<table>
<thead>
<tr>
<th>Element</th>
<th>Primary MCL (mg/L)</th>
<th>Secondary MCL (mg/L)</th>
<th>Aquatic Life, Acute (mg/L)</th>
<th>Aquatic Life, Chronic (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>---</td>
<td>0.05-0.2</td>
<td>0.75</td>
<td>0.087</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.05</td>
<td>---</td>
<td>0.36</td>
<td>0.19</td>
</tr>
<tr>
<td>Barium</td>
<td>2</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.005</td>
<td>---</td>
<td>0.004/0.009</td>
<td>0.001/0.002</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.1</td>
<td>---</td>
<td>1.7/3.1</td>
<td>0.21/0.37</td>
</tr>
<tr>
<td>Copper</td>
<td>1.3</td>
<td>1</td>
<td>0.018/0.034</td>
<td>0.012/0.012</td>
</tr>
<tr>
<td>Iron</td>
<td>---</td>
<td>0.3</td>
<td>---</td>
<td>1</td>
</tr>
<tr>
<td>Lead</td>
<td>0.015</td>
<td>---</td>
<td>0.082/0.2</td>
<td>0.003/0.008</td>
</tr>
<tr>
<td>Manganese</td>
<td>---</td>
<td>0.05</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.002</td>
<td>---</td>
<td>0.0024</td>
<td>0.000012</td>
</tr>
<tr>
<td>Nickel</td>
<td>0.1</td>
<td>---</td>
<td>1.4/2.5</td>
<td>0.16/0.28</td>
</tr>
<tr>
<td>Zinc</td>
<td>---</td>
<td>5</td>
<td>0.12/0.21</td>
<td>0.11/0.19</td>
</tr>
</tbody>
</table>

1.5.5.2 Soil and Rock Background Standards

It is useful to have some idea about the natural background values of rocks and soils when interpreting geochemical data. Although no whole rock or soil samples were run for this study, an estimate can be made from the analyses presented by Gott and Cathrall (1980). They analyzed 998 rock samples from the Wallace Formation and 2,298 soil samples from above Wallace parent material. The median results from these analyses are presented in Tables 1.5-3 and 1.5-4, along with data for the Prichard, Burke, Revett, and St. Regis Formations. These samples were analyzed by emission spectrophotometry, a much less accurate technique than we use today. However, due to the large number of analyses, the data is still useful, especially for estimating background values. For example, an average sample of the Wallace Formation might contain 45 ppm (mg/Kg) lead, 115 ppm (mg/Kg) zinc, 29 ppm (mg/Kg) copper, 0.13 ppm (mg/Kg) mercury, and has arsenic below detection. These data were used by the Environmental Protection Agency as background data for their studies of the Bunker Hill Superfund Site (Nick Ceto, 1997, personal communication).
Table 1.5-3. Median values of metals in rock samples from various units of the Belt Supergroup (data from Gott and Cathrall, 1980, ppm = mg/Kg).

<table>
<thead>
<tr>
<th>Element</th>
<th>Prichard Formation</th>
<th>Burke Formation</th>
<th>Revett Formation</th>
<th>St. Regis Formation</th>
<th>Wallace Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron (percent)</td>
<td>3</td>
<td>1.8</td>
<td>1.4</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Magnesium (percent)</td>
<td>0.4</td>
<td>0.1</td>
<td>0.05</td>
<td>0.19</td>
<td>0.48</td>
</tr>
<tr>
<td>Calcium (percent)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.05</td>
</tr>
<tr>
<td>Titanium (percent)</td>
<td>0.3</td>
<td>0.19</td>
<td>0.13</td>
<td>0.19</td>
<td>0.21</td>
</tr>
<tr>
<td>Manganese (ppm)</td>
<td>224</td>
<td>386</td>
<td>381</td>
<td>600</td>
<td>360</td>
</tr>
<tr>
<td>Barium (ppm)</td>
<td>343</td>
<td>360</td>
<td>235</td>
<td>543</td>
<td>378</td>
</tr>
<tr>
<td>Beryllium (ppm)</td>
<td>1.3</td>
<td>---</td>
<td>---</td>
<td>0.9</td>
<td>0.89</td>
</tr>
<tr>
<td>Cobalt (ppm)</td>
<td>5</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>3.9</td>
</tr>
<tr>
<td>Chromium (ppm)</td>
<td>40</td>
<td>13</td>
<td>8.3</td>
<td>20</td>
<td>23.8</td>
</tr>
<tr>
<td>Molybdenum (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Nickel (ppm)</td>
<td>10</td>
<td>5.5</td>
<td>4.2</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Strontium (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Vanadium (ppm)</td>
<td>54</td>
<td>26</td>
<td>20</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Sulfur (percent)</td>
<td>0.01</td>
<td>0.007</td>
<td>0.006</td>
<td>0.007</td>
<td>0.009</td>
</tr>
<tr>
<td>Mercury (ppm)</td>
<td>0.03</td>
<td>---</td>
<td>0.03</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>Copper (ppm)</td>
<td>22</td>
<td>6.2</td>
<td>8</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Lead (ppm)</td>
<td>34</td>
<td>14</td>
<td>10</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td>60</td>
<td>31</td>
<td>15</td>
<td>20</td>
<td>41</td>
</tr>
<tr>
<td>Silver (ppm)</td>
<td>0.4</td>
<td>0.36</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Cadmium (ppm)</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Arsenic (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Antimony (ppm)</td>
<td>109</td>
<td>1.1</td>
<td>1.6</td>
<td>2.2</td>
<td>1.1</td>
</tr>
<tr>
<td>No. of Samples</td>
<td>727</td>
<td>402</td>
<td>455</td>
<td>839</td>
<td>998</td>
</tr>
</tbody>
</table>
Table 1.5-4. Median values of metals in soil samples from various units of the Belt Supergroup (data from Gott and Cathrall, 1980; ppm = mg/Kg).

<table>
<thead>
<tr>
<th>Element</th>
<th>Rock Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pritchard Formation</td>
</tr>
<tr>
<td>Iron (percent)</td>
<td>3.1</td>
</tr>
<tr>
<td>Magnesium (percent)</td>
<td>0.61</td>
</tr>
<tr>
<td>Calcium (percent)</td>
<td>0.57</td>
</tr>
<tr>
<td>Titanium (percent)</td>
<td>0.56</td>
</tr>
<tr>
<td>Manganese (ppm)</td>
<td>1,285</td>
</tr>
<tr>
<td>Barium (ppm)</td>
<td>647</td>
</tr>
<tr>
<td>Beryllium (ppm)</td>
<td>1.4</td>
</tr>
<tr>
<td>Cobalt (ppm)</td>
<td>14</td>
</tr>
<tr>
<td>Chromium (ppm)</td>
<td>43</td>
</tr>
<tr>
<td>Molybdenum (ppm)</td>
<td>---</td>
</tr>
<tr>
<td>Niobium (ppm)</td>
<td>9</td>
</tr>
<tr>
<td>Nickel (ppm)</td>
<td>29</td>
</tr>
<tr>
<td>Strontium (ppm)</td>
<td>159</td>
</tr>
<tr>
<td>Vanadium (ppm)</td>
<td>98</td>
</tr>
<tr>
<td>Mercury (ppm)</td>
<td>0.13</td>
</tr>
<tr>
<td>Copper (ppm)</td>
<td>21</td>
</tr>
<tr>
<td>Lead (ppm)</td>
<td>54</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td>140</td>
</tr>
<tr>
<td>Silver (ppm)</td>
<td>0.5</td>
</tr>
<tr>
<td>Cadmium (ppm)</td>
<td>1.3</td>
</tr>
<tr>
<td>Arsenic (ppm)</td>
<td>10</td>
</tr>
<tr>
<td>Antimony (ppm)</td>
<td>1</td>
</tr>
<tr>
<td>Sulfur (percent)</td>
<td>0.029</td>
</tr>
<tr>
<td>No. of Samples</td>
<td>1,705</td>
</tr>
</tbody>
</table>
There are no federal standards for concentrations of metals and other constituents in soils; acceptable limits for such are often based on human and/or environmental risk assessments for an area. Since no assessments of this kind have been done, concentrations of metals in soils were compared to the limits postulated by the U.S. EPA for the Clark Fork Superfund site (Table 1.5-5). The proposed upper limit for lead in soils is 1,000 mg/Kg to 2,000 mg/Kg, and 80 to 100 mg/Kg for arsenic in residential areas.

Table 1.5-5. Clark Fork Superfund background levels for selected elements.

<table>
<thead>
<tr>
<th>Material</th>
<th>As (mg/Kg)</th>
<th>Cd (mg/Kg)</th>
<th>Pb (mg/Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Mean Soil</td>
<td>6.7</td>
<td>0.7</td>
<td>20.0</td>
</tr>
<tr>
<td>Helena Valley Mean Soil</td>
<td>16.5</td>
<td>0.2</td>
<td>11.5</td>
</tr>
<tr>
<td>Missoula Lake Bed Sediments</td>
<td>n.a.</td>
<td>0.2</td>
<td>34.0</td>
</tr>
<tr>
<td>Blackfoot River</td>
<td>4.0</td>
<td>&lt;0.1</td>
<td>n.a.</td>
</tr>
<tr>
<td>Phytotoxic Concentration</td>
<td>100.0</td>
<td>100.0</td>
<td>1,000.0</td>
</tr>
</tbody>
</table>

1.5.6 Analytical Results

The results of the sample analyses were used to estimate the nature and extent of potential impacts to the environment and human health. Selected results for each site are presented in the discussion; a complete listing of water quality, soil chemistry, and leach test results are presented in Appendix C.

The data fields in the current database are presented in Appendix B, and the format (dBase IV) is compatible with the widely used ARC/INFO Geographical Information System (GIS). In addition, all of the field observations and analytical data were entered into a Paradox database, which is compatible with other studies under way by the U.S. Forest Service.
2.0 LAKEVIEW DISTRICT (GOLD CREEK DRAINAGE)

2.1 INTRODUCTION

The Lakeview mining district (named for the small town of Lakeview) in Bonner County is located on the southeastern tip of Lake Pend Oreille (Figure 2.1-1). Access to Lakeview is by a dirt and oiled road known as the Bunco Road (USFS Road No. 332). The junction of Bunco Road and U.S. Highway 95 is about 3.2 miles south of Athol. Boat access to Lakeview is across Lake Pend Oreille from Bayview. The entire study area is shown on the Lakeview 7.5-minute quadrangle published by the U.S. Geological Survey (Figure 2.1-2).

As noted by Kun (1974, p. 3):

The area has short, hot and dry summers, moderately wet springs and autumns, and relatively mild winters with heavy localized snowfall. The temperature varies from about 80° in the summer to -20° in the winter, in the vicinity of the Conjecture Mine. The temperature limits are more extreme at higher elevations, but in Lakeview the temperature rarely falls below freezing. Snow was found in places at higher elevations until mid-June, 1967, and a heavy snowfall was observed in mid-October of the same year.

Most of the area is within the Kaniksu and Coeur d’Alene National Forests. Dense forests of conifers and thick brush cover most of the northern slopes and valley floors. Secondary growth of conifers, replacing forests destroyed by fire and areas that have been logged, are abundant in the northern part of the mapped area.

Altitudes of the mapped area range from 2063 feet at lake level, to 5146 feet on Green Mountain (northern part of the quadrangle, Pl. 1 [Figure 2.2-1]). Most slopes are steep with an estimated average gradient of 30 degrees, but varying from 10 degrees and less on the tops of ridges to over 60 degrees on the lakeshore cliffs. The drainage consists of deeply entrenched streams, some of which show marked control by joints and faults.

2.1.1 Summary of the Lakeview District Study

There were twenty-two mining properties (Table 2.1.1-1) examined in the Lakeview (Gold Creek) district. One mine, the Lone Hand, was not located with certainty. Sites with either significant environmental problems (usually acid water, high metal loadings in water, or old mill tailings) or physical hazards (open adits, tunnels, shafts, or pits) are discussed below.

Of the 22 mines, eight have an environmental impact on or near USFS lands. The magnitude of the problem almost always correlates with the amount of production at the property (the greater the production, the larger the problem). Of the eight mines, the Conjecture, Keep Cool, Idaho Lakeview, and Weber could have significant environmental impacts from either metal
Figure 2.1-1. Location of the Lakeview mining district (Gold Creek drainage), Bonner County, Idaho (U.S. Forest Service Idaho Panhandle National Forests/Coeur d’Alene National Forest map, scale 1:126,720).
Table 2.1.1-1. Summary of sites within the Lakeview mining district (Gold Creek drainage). Site name in bold indicates a potential environmental hazard. Under “Environmental Hazards”: W = a water problem, T = a mill tailings problem. Under “Physical Hazards”: A = adit, P = pit, S = shaft, O = open, C = caved or otherwise closed.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Mine Name</th>
<th>Surface Owner</th>
<th>H2O Sample</th>
<th>Solid sample</th>
<th>Environmental Hazards</th>
<th>Physical Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP 1</td>
<td>Twin Creek Limestone Quarry</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP 4</td>
<td>Squaw Bay Limestone</td>
<td>FS</td>
<td></td>
<td></td>
<td>1AC</td>
<td>1AO (?)</td>
</tr>
<tr>
<td>SP 6</td>
<td>Vulcan Mine (Glasscock Property)</td>
<td>FS</td>
<td>2 (acid)</td>
<td>W</td>
<td>2AC</td>
<td>1AO</td>
</tr>
<tr>
<td>SP 7</td>
<td>Unnamed location (R9029602)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO 1S</td>
</tr>
<tr>
<td>SP 9</td>
<td>Blanket Lead (Argus)</td>
<td>FS?</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SP 10</td>
<td>Lakeview Limestone</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td>3P 1S</td>
</tr>
<tr>
<td>SP 13</td>
<td>Hidden Treasure Mine (Grafter)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC 3AO</td>
</tr>
<tr>
<td>SP 14</td>
<td>Max Dunn Prospect (Bloody Shirt)</td>
<td>FS</td>
<td>3</td>
<td>W</td>
<td>1AC</td>
<td></td>
</tr>
<tr>
<td>SP 15</td>
<td>Wiberg</td>
<td>FS?</td>
<td>1</td>
<td>W</td>
<td>2AC</td>
<td>1AO</td>
</tr>
<tr>
<td>SP 16</td>
<td>Silver Leaf Group Prospect</td>
<td>FS</td>
<td>3</td>
<td>W?</td>
<td>2AC</td>
<td></td>
</tr>
<tr>
<td>SP 17</td>
<td>Perry Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SP 18</td>
<td>Conjecture Mine</td>
<td>P</td>
<td>6</td>
<td>W</td>
<td>2AC</td>
<td>2S</td>
</tr>
<tr>
<td>SP 19</td>
<td>Idaho Lakeview Mine (Venezuela; Hewer)</td>
<td>P</td>
<td>3</td>
<td>1</td>
<td>W, T</td>
<td>1AO</td>
</tr>
<tr>
<td>SP 20</td>
<td>Lone Hand Mine</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP 21</td>
<td>Keep Cool Mine</td>
<td>P</td>
<td>1</td>
<td>1</td>
<td>T</td>
<td>2AO 2AC</td>
</tr>
<tr>
<td>SP 22</td>
<td>Princess Panama (Swastika)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SP 23</td>
<td>Belleville Prospect (Belleville Prospect)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SP 24</td>
<td>New Rainbow (Rainbow; Silver Bull; Silver Bell)</td>
<td>FS</td>
<td>3</td>
<td>W?</td>
<td>1AO</td>
<td>2AC</td>
</tr>
<tr>
<td>SP 25</td>
<td>Weber Mine</td>
<td>P</td>
<td></td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP 27</td>
<td>Rennie Prospect (Comet)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>K8309607</td>
<td>Shoshone Mill</td>
<td>P</td>
<td>1</td>
<td>T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K9039602</td>
<td>Unnamed (possible Weber extension)</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Ownership is based on Figures 2.1-1 and 2.1-2. FS = U.S. Forest Service; P = private.
contamination, erosion of dumps or mill tailings, or both; and all four could benefit from varying degrees of remediation and reclamation.

The main waste dumps at the Conjecture and Idaho Lakeview are significant and directly impact Gold Creek and Chloride Gulch, respectively. Signs are evident of major erosion of these dumps during the spring flood in 1996. These dumps need to be stabilized and moved back from the active drainages. Also, the mill tailings dump at the Idaho Lakeview impinges on Chloride Gulch and, though stabilized, is actively eroding into the gulch. Logging at the Keep Cool mine has exposed not only old waste dumps, but also the bedrock and bare soil, to active erosion. Sediment loading from the Keep Cool area into Chloride Gulch is probably significant, especially during the spring runoff. The large expanse of bare rock at the Weber Pit could also constitute a significant source of sediment during floods.

Many more of the 22 examined properties have physical hazards than environmental problems. As noted in Table 2.1.1-1, there are 10 mines with accessible mine openings. All of these are of concern, but several stand out. The pit described at the Lakeview limestone mine (SP-10) was judged to be a particularly dangerous opening. The concern about the other mine openings is proportional to the ease of access. For example, the tragic deaths of two young men in the Squaw Bay limestone mine in 1993 were in part related to the easy boat access to the mine from Lake Pend Oreille. Likewise, the larger mines generally have better roads than those long overgrown or with limited access. Based on this hypothesis, the open adits at the Idaho Lakeview and Keep Cool mines are a potential problem. A general goal of any remediation plan for this area (and indeed for the entire state) should be to close mine openings to any possible public access. This could be done either by caving (most effective) or gating (least effective).

Aside from closing all mine openings, other recommendations from major (and most costly) to minor include:

* Removing the culvert from the lower waste dump at the Conjecture mine and rechanneling Gold Creek through this dump and the upper waste dump. This will be the largest and most expensive reclamation project in the district.
* Pulling back the west side of the waste dump from Chloride Gulch at the Idaho Lakeview mine and armorng the new west side of the dump to prevent erosion.
* Pulling back the bank of the mill tailings pile from Chloride Gulch below the Idaho Lakeview mill and armorng the new bank to prevent erosion into the gulch.
* Revegetating and reclaiming the damage from logging at the Keep Cool mine.

2.2 GEOLOGY

Major studies of the geology of the area encompassed by the Lakeview District include Sampson (1928), Harrison and Jobin (1965), and Kun (1974). A very brief description of the geologic framework of this area follows (Figure 2.2-1).
FIGURE 2.2-1. Geology of the Lakeview mining district (Gold Creek drainage) (Plate 1 from Kun, 1974).
The metal mines in the district are hosted by metasedimentary rocks of the Belt Supergroup of Precambrian age. The characteristics of the various units comprising the supergroup is shown in Table 2.2-1. Most important for the Lakeview mines is the Wallace Formation. Kun breaks the Wallace into three members—lower, middle, and upper. Many of the district’s metal mines are in the middle member.

Overlying the Belt rocks in places, especially along the shoreline of Lake Pend Oreille, are younger, Cambrian-age metasedimentary rocks including from oldest to youngest, the Gold Creek Quartzite, the Rennie Shale, and the Lakeview Limestone. Several quarries and mines were developed in the limestone. These provided lime for early cement production in the Spokane, Washington, area.

Two types of igneous rocks intrude the sediments. Granodiorite plutons belonging to the Idaho batholith of Cretaceous age are the most abundant. A number of lamprophyric dikes were mapped underground or in road cuts, but these seldom crop out. Kun (1974) notes a number of these dikes, which appear to be intruded into the Spider fault.

A number of major faults have been mapped by Kun (1974) and Harrison and Jobin (1965) in the Lakeview 7.5-minute quadrangle. These include the main structure in the area, the Packsaddle Mountain strike-slip fault, and subsidiary structures such as the Spider fault, the Cedar Creek fault, and the Dan fault. Kun also describes the Conjecture and Hewer shear zones, along which several of the more significant mines in the district are located.

Alpine glaciers have carved the steep mountain topography. In places, sheets of Pleistocene glacial outwash, till, and glacial lake deposits cover the bedrock units. Talus slopes, stream alluvium, and several landslides make up the youngest geologic units in the area.

2.3 ECONOMIC GEOLOGY

The following summary of the district’s mining history is taken from Kun (1974, p. 3-5). Details of individual mine histories, when available, are included in the property descriptions.

William A.D. Bell, Peter Steinmetz, and Albert Chamberlain were about to return empty-handed to Eagle City, Idaho, after a long summer of prospecting in northern Idaho, when they decided to check a prominent outcrop visible to the north from what, today, is called the Pend Oreille divide (at the junction of Bunco and Weber roads, SE3, sec. 35, T. 53 N., R. 1 W.). The samples from this outcrop showed massive sulfides (and later produced assays as high as 200 oz/ton in silver). The prospectors, between September 27, and October 8, 1888, located eleven claims in the names of A. Weber and S.P. Donnelly, the men who had financed their prospecting. The prominent gossan outcrop was located near the headwaters of Gold Creek (then called East Chloride Gulch), on what is now the Weber Pit (anonymous, unpublished private report, 1925).
Table 2.2-1. Generalized section of the Belt Supergroup (Hobbs and others, 1965, p. 14).

<table>
<thead>
<tr>
<th>Group</th>
<th>Formation</th>
<th>Lithology</th>
<th>Thickness (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missoula</td>
<td>Striped Peak Formation</td>
<td>Interbedded quartzite and argillite with somearenaceous dolomite beds. Purplish gray and pink to greenish gray. Ripple marks, mud cracks common. Top eroded.</td>
<td>1,500+</td>
</tr>
<tr>
<td></td>
<td>Upper part</td>
<td>Mostly medium- to greenish-gray finely laminated argillite. Somearenaceous dolomite and impure quartzite, and minor gray dolomite and limestone in the middle part.</td>
<td>4,500-6,500</td>
</tr>
<tr>
<td></td>
<td>Lower part</td>
<td>Light-gray more or less dolomitic quartzite interbedded with greenish-gray argillite. Ripple marks, mud cracks abundant.</td>
<td></td>
</tr>
<tr>
<td>Ravalli</td>
<td>St. Regis Formation</td>
<td>Upper part Light greenish-yellow to light green-gray argillite; thinly laminated. Some carbonate-bearing beds.</td>
<td>1,400-2,000</td>
</tr>
<tr>
<td>Group</td>
<td></td>
<td>Lower part Gradational from thick-bedded pure quartzite at base to interbedded argillite and impure quartzite at top. Red-purple color characteristic; some green-gray argillite. Some carbonate-bearing beds. Ripple marks, mud cracks, and mud-chip breccia common.</td>
<td></td>
</tr>
<tr>
<td>Revett Quartzite</td>
<td></td>
<td>Thick-bedded vitreous light yellowish-gray to nearly white pure quartzite. Grades into nearly pure and impure quartzite at bottom and top. Cross-stratification common.</td>
<td>1,200-3,400</td>
</tr>
<tr>
<td>Burke Formation</td>
<td></td>
<td>Light greenish-gray impure quartzite. Some pale red and light yellowish-gray pure to nearly pure quartzite. Ripple marks, swash marks, and pseudo-conglomerate.</td>
<td>2,200-3,000</td>
</tr>
<tr>
<td>Prichard Formation</td>
<td>Upper part</td>
<td>Interbedded medium-gray argillite and quartzose argillite and light-gray impure to pure quartzite. Some mud cracks and ripple marks.</td>
<td>12,000+</td>
</tr>
<tr>
<td></td>
<td>Lower part</td>
<td>Thin- to thick-bedded, medium gray argillite and quartzose argillite; laminated in part. Pyrite abundant. Some discontinuous quartzite zones. Base buried.</td>
<td></td>
</tr>
</tbody>
</table>
The news of the discovery of the new district in 1888 produced an exodus from Wallace, Burke, Murray, and Eagle cities in the Coeur d'Alene mining district, the three last-mentioned towns being nearly emptied. By the winter of 1888-89, the new town of Chloride (SE3, sec. 15, T. 53 N., R. 1 W) had a population of 2,000 people, "but after several months of riotous living, most of them left the district,..." (Sampson, 1928). The Smith ranch now marks the former site of Chloride. [Elsewhere, Kun notes that the town of Lakeview had a population of 5,000 in 1888, and a steamer service connected Sandpoint, Bayview, and Lakeview.]

The first carload of 40 tons of ore was shipped to Great Falls, Montana, in January, 1889, and averaged 47 oz/ton in silver and $1.80 in gold. Later ore shipments were made to the Molton Mill, Butte, Montana, until 1895 when a 30-ton capacity stamp mill was built in Lakeview. The mill proved to be a failure because the silver and gold were floated off with the antimony and lead, yielding only 33 percent of the total precious metal content (private report, 1925). In 1896, a forest fire destroyed all the building and timbering, and thereafter ore from the Weber Mine was shipped to Tacoma, Washington, for processing.

During the period from 1889 to 1917, the Keep Cool, Idaho Lakeview, and several adits and small shafts in the Conjecture Mine area, were located. A smelter was built in the late 1880's at Sandpoint, Idaho, and ore from the entire Pend Oreille mining district was shipped there by lake steamers. It proved to be an economic failure and closed shortly afterwards.

In 1906, Frank Weber sold a three-quarter interest in the Weber Mine to the Standard Development Co. of Chicago, but the contract was never completed, and litigation followed until 1920. The mine reopened in 1921, and the main level (no. 4 on Pl. 6 [Figure 2.8-2]) was developed and enlarged prior to 1925 (anonymous, unpublished private report, 1925).

By 1923, in the present-day Conjecture Mine area, the Spider and Graham adits had been driven. A systematic exploration program in this area by T.C. Cunningham of the Lakeview Silver Mines Company led to the discovery of a large orebody (Sampson, 1928). Workings included the Spider adit, 1150 ft. long, the Graham adit, 600 ft. long, and a 200 ft. inclined shaft (Campbell, 1923 [1924]).

In the same year, 1923, the Venezuela Mine (now the Idaho Lakeview Mine) had only a 900 ft. long adit and employed two people. In 1924, the mine and adjacent claims were taken over by the Hewer Mining Company which started an intensive underground exploration program and built a mill which operated for some time (Campbell, 1924 [1925]). This activity continued for several years and included the sinking of an inclined shaft (Pl. 3 [omitted]), which exposed two new ore bodies (Campbell, 1926 [1927]).
During the mid-1920's, the International Portland Cement Co. mined large quantities of Lakeview Limestone from mines in the vicinity of Bayview and Lakeview (Fig. 1 [omitted]), and was the largest producer of cement in Idaho during that time (Campbell, 1924 [1925] and 1926 [1927]). All limestone was shipped to the company's plant near Spokane, Washington.

In later years, development continued mainly in the Keep Cool and Conjecture mines. In 1938, the Keep Cool Mine was milling its own ore and shipping the concentrates by truck to the Bunker Hill Smelter, at Bradley, Idaho. Drifts were driven along the vein at five levels with the lowest, no. 5, being the main haulage way. This adit was 530 ft. long and timbered at intervals (private report, 1938).

An editorial in the Mining and Machinery Journal (1938) states that:

“W.M. Cady, manager of the Silver Leaf mines near Lakeview in Bonner County, Idaho, says his company is planning enlargements of the mill to a capacity of 100 tons daily. ‘There is lots of ore in the property’ he said. A cross vein is being opened by drift.”

In January, 1951, D.E. Majer and L.H. Funnel purchased the Conjecture Mine and adjacent properties, and formed Conjecture Mines Inc. In 1956, the existing inclined shaft was reopened and deepened from the 400 ft. level, where it had been extended earlier, to the 700 ft. level. About 3,000 ft. of workings uncovered two large ore shoots.

In late 1956, Federal Resources Corporation leased the Conjecture, Silver Leaf, Keep Cool, and Idaho Lakeview mines, and adjacent claims and initiated a detailed surface and underground exploration and assessment program of the properties. Trenches were dug between the Silver Leaf, Conjecture and Keep Cool mines (Pl. 1 [Figure 2.2-1]), and a new 2,000 foot deep, three-compartment shaft was sunk at a point about 600 ft. north of the Conjecture inclined shaft. About 12,000 ft. of drifts on four levels were driven and carefully mapped (Pl. 4 and 5 [omitted]). In 1964, Federal Resources ended their exploration work and returned the property to Conjecture Mines, Inc. The property was leased in 1967 by Duval Corporation, and surface exploration work was done during the same year and in the summers of 1968 and 1969, with partial dewatering of the vertical shaft. Some diamond drilling was also done with one hole being drilled in excess of 4,000 feet. The property was returned to Conjecture Mines, Inc. in 1970.

The Keep Cool Mine, which had produced ore until World War II, was partially reopened in the summer of 1967 for exploration work. The Keep Cool and Idaho Lakeview mines were leased in 1967 by Sunshine Mining Co. of Kellogg, Idaho. The Idaho Lakeview Mine reportedly operated as late as 1956 (Savage, 1967), but showed signs of having been idle for a long time when visited in 1967.
The Austin-Meyer Corporation leased the Weber Pit in 1949, and until recently has regularly shipped ore to the American Smelting and Refining Company smelter in Tacoma, Washington (private report, 1960).

The Vulcan Mine and surrounding adits, north of Lakeview (S2, sec. 35, T. 54 N., R. 1 W) have been intermittently worked by R. Glasscock during the 1950's and 1960's. The Vulcan Mine, which was caved at the portal in 1967, was reportedly reopened in 1968.

The Lakeview mining district has produced an estimated $2,000,000 in silver, lead, zinc, and gold from its discovery in 1888 until the early 1960s (Kun, 1968).

In 1977, Shoshone Silver Mining Company began developmental work in several of the underground mines in the Lakeview district and had an operating agreement with Lakeview Consolidated Silver Mines, Inc. Reportedly, the company milled ore throughout the summer. In 1980, the company milled 600 tons of ore from the Keep Cool mine and the open pit at the Weber mine. Shoshone reopened the Idaho Lakeview mine and planned on completing 700 feet of new tunnel. The company mill was centrally located to several properties in the district. However, in 1981, the company shut down all operations because of declining metal prices. The mill had processed $54,000 worth of ore before closing.

The next year Shoshone Silver opened up and rehabilitated about 200 feet of old tunnel at the Idaho Lakeview mine. A new carbon-in-pulp leach circuit was installed at the 70- to 100-ton-per-day Weber mill. Plans called for operating the Weber, Keep Cool, and Idaho Lakeview mines. By 1983, oxidized ore mined from the open pit at the Weber and the Keep Cool mine (leased from Sunshine Mining Company and Lakeview Consolidated Silver Mines, Inc.) was processed at the company mill. By October, the company had sold 10,757 ounces of silver to Sunshine for refining. The mill site was under patent application. Ore was crushed and stockpiled in 1984, but the mill was closed. An old tunnel was opened at the Kapco mine as part of an exploration program. The company planned to do surface work on the Weil group of claims that lie on an extension of the Hewer vein in the Idaho Lakeview vein system. The following year, work continued at the Weber mine. A 200 ton-per-day ball mill purchased from the Galena mill was installed and some new buildings were constructed. However, there was no active mining as the company was again waiting for an improvement in metal prices. There was a 10,000 ton stockpile of ore near the mill. In 1987, a 500-foot-long exploration tunnel was driven at the Idaho Lakeview claims. By now, the company had a 98 percent interest in the Keep Cool group and a 100 percent interest in the Weber and Weil (Drumheller) group. There was a little trenching at the Idaho Lakeview mine in 1988, after which the mine and mill remained closed to date.

2.3.1 General Characteristics of the ore

Kun (1974) summarizes the general characteristics of the ore deposits in the Lakeview district as follows (p. 27):

The metallic mineral deposits of Lakeview are similar in their structural setting and mineralogy to the descriptions by Fryklund (1964) of the ores of the Coeur
d’Alene mining district. The ores differ in their metal content and size of the orebodies. The silver content per ton of the Lakeview ores is much higher than those from the Coeur d’Alene district (Sampson, 1928) while the size of proven orebodies is much larger in the latter district. Characteristically, the ores in the Lakeview mining district are galena-carbonate-quartz fillings and replacements along shear zones. In addition to argentiferous galena, the deposits contain varying amounts of pyrite, sphalerite, tetrahedrite, and arsenopyrite, and minor and localized stibnite, hubnerite and various silver sulfosalts. Secondary enrichment of silver is of definite importance in most mines, where oxidized ores of high grade were the first and often only ones to be mined.

Most of the ore from the Lakeview mining district was mined from three fracture systems (Plate 1 [Figure 2.2-1] and Figure 2 [omitted]):
1) the northeast-trending Conjecture Vein,
2) the southeast-trending Weber Vein,
3) the northeast-trending Hewer Shear.

The ore shoots were enclosed in quartz and breccia in the shear zones, and were partly fracture-fillings and partly replacements similar to the orebodies in the Coeur d’Alene mining district. Most of the ores from the Lakeview mines were massive but there are disseminated sulfide minerals visible in the Weber Pit and on the main level of the Idaho Lakeview Mine. The host rock for most of the orebodies was the Middle and Lower Members of the Wallace Formation, as opposed to the Coeur d’Alene district where most orebodies are found in the lower part of the Ravalli Group and Prichard Formation (Ridge, 1968, p. 1423-1431).

2.3.2 Summary of Mill Development

The location and history of ore processing mills in the Lakeview district is important because one of the problem areas in many mining districts is old mill tailings disposal sites. Mills were located at one time or another at the Conjecture, Keep Cool, Idaho Lakeview, and Weber mines. Today, only the mill built by Shoshone Silver in 1975 (about 1 mile below, or north of, the Conjecture mine) is still standing and operable. Milling in the area began as noted by Kun (1974, p. 4) in “...1895 when a 30-ton capacity stamp mill [a 10-stamp mill built by the Union Iron Works of San Francisco (Parker, 1907)] was built in Lakeview. The mill proved to be a failure because the silver and gold floated off with the antimony and lead, yielding only 33 percent of the total precious metal content (private report, 1925). In 1896, a forest fire destroyed all the building and timbering, and thereafter ore from the Weber mine was shipped to Tacoma, Washington, for processing.” There is no evidence of this mill or associated tailings today.

One car of rich silver concentrate was shipped in 1934 from the Weber mine, where the ore was treated in a 15-ton-per-day (tpd) flotation mill. No evidence of this mill was found during the field inspection in 1996.
In 1924, the Idaho Lakeview mine was worked by the Hewer Mining Co. Several hundred tons of ore containing lead, but valuable primarily for silver, were treated in a 100-tpd flotation mill. As much time was spent in development work as in erecting the mill, which was moved from the Loon Lake mine in Washington. The plant operated only 30 days. In 1955, ore shipments from the Weber were made to the Idaho Lakeview mill or direct to smelters, as the Weber mine was not equipped with a concentration plant. As noted, in 1996 the Idaho Lakeview mill is falling down, partially burned, and all equipment has been removed. There is a substantial amount of mill tailings (estimated 3,900 cubic yards) near the mill site, which were sampled.

In 1937, Silver Leaf Mines Corporation treated several thousand tons of ore in a 50-ton flotation plant at the Keep Cool mine; construction of the plant was completed in March. A small amount of tails from this mill were noted and sampled during the field inspection in 1996.

In 1953, Lyle Funnell and Donald E. Majer erected a 60-ton flotation mill at the Conjecture mine and processed about 2,500 tons of silver ore. In 1962, Federal Resources Corporation planned to reactivate a 100-tpd mill at the Conjecture. This mill was located on the east side of the creek about halfway between the old shaft and the new headframe (William Rember, written communication, 1996).

In 1975, Kauffman (p. 1) reports that “A 100 ton per day mill is presently being built on Gold Creek, about 1 mile below the Conjecture mine and about 2 miles below the Weber Pit. The mill is being constructed to handle the ore from the Weber, which is mainly Au-Ag ore with some lead and zinc values.” This is the mill built by Shoshone Silver and is the only operable mill in the district today.

### 2.4 HYDROLOGY AND HYDROGEOLOGY

As shown in Figures 2.1-1 and 2.1-2, all of the streams in the Lakeview 7.5-minute quadrangle drain into Lake Pend Oreille. Almost the entire drainage in the quadrangle consists of the main stem and tributaries of Gold Creek, including from east to west the North Fork of Gold Creek, Kick Bush Creek, the main stem of Gold Creek, Chloride Gulch, and West Gold Creek. Most of the mine workings and all of the mines with any significant production are located near or in the main stem of Gold Creek and Chloride Gulch. As most of the rocks in the quadrangle, especially in the main mining area, belong to the Wallace Formation (known informally as the Belt carbonate), the problem of acid mine drainage is minimal, even though one of the mines (the Vulcan) is leaking acid water. The high carbonate content of the rocks should quickly neutralize any acid water flowing from the mines. The smaller outcrops of the Lakeview Limestone (Cambrian age) near the shore of the lake also mitigate any acid mine water problems.

The neutralizing effect of the rock is supported by the water chemistry. The field party collected seven background samples from the major tributaries to Gold Creek (locations shown on Figures 2.1-1 and 2.1-2). The chemical analyses for these samples are shown in Table 2.4-1, along with water quality standards suggested by the Environmental Protection Agency (EPA). All background samples were below the EPA primary and secondary MCL and acute and chronic Aquatic Life standards. With the exception of iron and barium, only sample R9049605 (tributary
to Chloride Gulch, 0.0041 mg/L arsenic) and sample R9039603 (Gold Creek above the Weber mine, 0.014 mg/L zinc) had metal values above the analytical detection limit. Based on the background water sample data in Table 2.5-1, all drainages are stable and are probably not receiving any metals from natural values in rock of the Wallace Formation.

2.5 SUMMARY OF THE GOLD CREEK DRAINAGE

2.5.1 Summary of Environmental Observations

Most of the exceedences to the EPA water standards are from the mines located in the upper reaches of Chloride Gulch and the upper eastern tributaries of the gulch (Tables 2.5-1 and 2.5-2). These include the Idaho Lakeview, Wiberg, and Bloody Shirt mines.

A stream sample should be collected and analyzed from just below the confluence of Chloride Gulch and the tributary to Chloride Gulch where the Wiberg mine (SP-15) is located. This would test if the higher arsenic values found in water samples collected for this study (Wiberg, Bloody Shirt, Idaho Lakeview adits, and background stream water sample R9049605) are reflected in the main stem of Chloride Gulch. The only other values of arsenic detected in mine water samples were from the New Rainbow Adit No. 1 and the seep from Adit No. 1 at the Conjecture Mine. Most of the samples that were high in arsenic also exceed other metal values based on suggested EPA water standards.

2.5.2 Mill Waste Samples

Arsenic is considered to be one of the elements of most concern in any environmental study of base or precious metal mines. Commonly, waste material from old mills (called mill tailings) contains high values of arsenic as well as other metals. In the Coeur d'Alene district, tailings from a mill using relatively modern flotation technology generally contain several orders of magnitude more arsenic than tailings from mills using older gravity separation (commonly jigs, hence called jig tails). The higher arsenic values can be attributed to the different separation methods. Jig separation is a gravity-based method where the heavier minerals remain together. For example, tetrahedrite and arsenopyrite (major sources of arsenic) stay with the heavier galena and sphalerite and end up being shipped to the smelter. Selective flotation separates sphalerite and galena from the arsenic-bearing minerals. These minerals end up in the tailings, causing higher arsenic values in the waste pile.

Samples of mill tailings were collected from all known mill sites in the Lakeview district, including the Keep Cool (small dump), Idaho Lakeview (significant dump), and Shoshone Silver mines (significant dump) (Table 2.5-3). As expected, all samples contained metal loadings, including arsenic, copper, lead, and zinc which exceed the Clark Fork Superfund Background Levels. In addition, the leach test (TCLP) indicates that cadmium and lead are leachable from these tails and that arsenic is available from the Idaho Lakeview tails. As noted, the stream sample collected from below the Idaho Lakeview mine (R9049603) contains traces of arsenic and lead and exceeds EPA standards for zinc. However, it is not possible to say if the higher values are coming from the mill tails or from the water flowing from the Lakeview adit.
Table 2.5-1. Results of analyses of adit and stream water samples in the Lakeview mining district (Gold Creek drainage), Bonner County, Idaho, except for samples collected from the Conjecture Mine (units in mg/L).

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<th>FIELD NO.</th>
<th>REMARKS (Water Samples)</th>
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<th>As</th>
<th>Ba</th>
<th>Cl</th>
<th>Cr</th>
<th>Cu</th>
<th>Fe</th>
<th>Hg</th>
<th>Mn</th>
<th>Ni</th>
<th>Zn</th>
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<td>0.011</td>
<td>0.007</td>
<td>---</td>
<td>0.078</td>
<td>6.7</td>
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<td>0.00055</td>
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<td>0.011</td>
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<td>0.057</td>
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<td>---</td>
<td>---</td>
<td>0.017</td>
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<td>0.048</td>
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<td>0.027</td>
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<td>Gold Creek, above Weber pit (BG)</td>
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<td>---</td>
<td>0.029</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.049</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>R9049608</td>
<td>Kick Bush Cr. on FS Road 278 (BG)</td>
<td>---</td>
<td>0.027</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.013</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>R9059609</td>
<td>W. Gold Cr. on old road to Lakeview (BG)</td>
<td>---</td>
<td>0.029</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.048</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

**EXPLANATION**

- Blank space = no analysis
- Below Detection Limit is ---

**WATER QUALITY STANDARDS**

| Primary MCL (mg/L) | 0.05 | 2 | 0.005 | 0.1 | 0.05 | 0.002 | 0.1 |
| Secondary MCL (mg/L) | 0.05-0.2 | 1.7-3.1 | 0.018-0.034 | 1.08-0.02 | 0.0024 | 1.4-2.5 | 0.12-0.21 |
| Aquatic Life, Acute (mg/L) | 0.75 | 0.36 | 0.004-0.009 | 0.018-0.034 | 1.08-0.02 | 0.0024 | 1.4-2.5 | 0.12-0.21 |
| Aquatic Life, Chronic (mg/L) | 0.087 | 0.19 | 0.001-0.002 | 0.21-0.37 | 0.012-0.012 | 0.003-0.008 | 0.900012 | 0.16-0.28 | 0.11-0.19 |
Table 2.5-2. Results of analyses of adit and stream water samples collected from the Conjecture Mine (units in mg/L).

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>Al</th>
<th>As</th>
<th>Ba</th>
<th>Cd</th>
<th>Cr</th>
<th>Cu</th>
<th>Fe</th>
<th>Pb</th>
<th>Mn</th>
<th>Hg</th>
<th>Ni</th>
<th>Zn</th>
</tr>
</thead>
<tbody>
<tr>
<td>K8309601</td>
<td>No. 1 Adit seepage. Raw</td>
<td>0.17</td>
<td>0.021</td>
<td>0.006</td>
<td>BDL</td>
<td>BDL</td>
<td>0.64</td>
<td>0.0074</td>
<td>0.1</td>
<td>BDL</td>
<td>0.02</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>K8309601</td>
<td>No. 1 Adit seepage. Filtered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309602</td>
<td>No. 2 Adit seepage. Raw</td>
<td>0.011</td>
<td>0.028</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>0.049</td>
<td>BDL</td>
<td>0.055</td>
<td>BDL</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>K8309602</td>
<td>No. 2 Adit seepage. Filtered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309603</td>
<td>Upstream from Adits 1 &amp; 2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309604</td>
<td>150 feet above south dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309605</td>
<td>Seep- lower waste dump.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309606</td>
<td>Downstream/ waste dump. Raw</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309606</td>
<td>Downstream/ waste dump. Filtered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BDL = Below Detection  
BLANK = no analysis  
mg/L = ppm

<table>
<thead>
<tr>
<th>WATER QUALITY STANDARDS</th>
<th>0.05</th>
<th>2</th>
<th>0.005</th>
<th>0.1</th>
<th>0.05</th>
<th>0.002</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL (mg/l)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary MCL (mg/l)</td>
<td>0.05-0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Acute (mg/l)</td>
<td>0.75</td>
<td>0.36</td>
<td>.004/.009</td>
<td>1.7/3.1</td>
<td>.018/0.34</td>
<td>1</td>
<td>.082/0.2</td>
</tr>
<tr>
<td>Aquatic Life, Chronic (mg/l)</td>
<td>0.087</td>
<td>0.19</td>
<td>.001/.002</td>
<td>0.21/0.37</td>
<td>.012/0.012</td>
<td>.003/.008</td>
<td>0.000012</td>
</tr>
</tbody>
</table>
Table 2-5.3: Results of analyses of mill tailings samples collected in the Lakeview mining district (Cold Creek drainage), Bonner County, Idaho (units in mg/Kg).
3.1 CONJECTURE MINE (Site No. SP-18)

3.1.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Conjecture Mine is located 6 miles south of the small town of Lakeview on Gold Creek in the north ½ of sec. 26, T. 53 N., R. 1 W. The road to the mine (No. 1017) connects to USFS Road 278 (the main access road to Lakeview) about three miles south of Lakeview. Road 1017 continues south past the Conjecture to the New Rainbow and Weber mines and connects to the Bunco Road (USFS No. 332) on top of the ridge. The mine is on patented ground surrounded by Forest Service land.

When Federal Resources Corporation operated the mine in the 1960s, the property included 80 claims. These included the following: Rainbow (Survey 2689), Conjecture and Spider (Survey 2683), Comet (Survey 3071), and the Silver Cord and Lucky Strike (Survey 2744) patented claims.

3.1.2 Geologic Features (Figure 2.2-1)

According to Kun (1974, p. 34), at the Conjecture Mine:

Gold Creek cuts through the middle part of the Lower Member of the Wallace Formation. Good exposures can be seen in roadcuts north and south of the mine. Most workings in the Conjecture Mine area, which are shown in Plate 4 [omitted], are confined to the calcareous part of the Lower Member. The contact between the St. Regis and Wallace Formations is present between the 1,000 and 2,000 ft. levels in the new [No. 2] shaft. Part of the workings on the 2,000 ft. level are in the St. Regis Formation and specimens representative of this formation are present on the dump.

The Conjecture orebody consists of several ore shoots (Pl. 5 [omitted]) which apparently merge at depth to form two mineralized zones, which follow the trend of the Conjecture shear zone. The Conjecture shear zone (Pl. 1 [Figure 2.2.-1]) trends approximately N. 30° E. and dips 65 degrees to the north. The north-south trending, normal, Spider fault offsets the shear zone, with the eastern block uplifted (Pl. 1 [Figure 2.2-1] and 5 [omitted]). Unpublished assay plans indicate that the ore shoots are not homogeneous in sulfide content. In the upper levels of the inclined shaft, very high-grade ore, possibly supergene-enriched, was mined. In the deeper levels, the ore zones are restricted to vein-type fracture fillings, with erratic width and metal content. The veins often have a gradation into barren shear zones, or are partially displaced by lamprophyre dikes.

3.1.3 Site History

Kun (1974) summarized the history of the Conjecture Mine as follows (p. 33-34):

Located in 1894, the Spider and Graham adits produced high grade ore until the
early 1920's, when the inclined shaft [No. 1] was started. The incline replaced a vertical shaft that had been damaged by fire (Sampson, 1928). Lakeview Silver Mines Co. operated the mine intermittently from the 1920's until early 1951 when the mine and adjacent patented claims were purchased by D.E. Majer and L.H. Funnel, who formed Conjecture Mines, Inc. This company mined ore from four levels using the inclined shaft until 1956 when Federal Resources Corporation leased the property in order to undertake an exploration program. By 1963, Federal Resources had finished a 2,000 ft. shaft [No. 2], about 500 ft. northeast from the incline (Pl. 4 [omitted]), and had driven over 13,000 ft. of drifts from four levels. The results of this exploration work were not satisfactory to Federal Resources and the property was returned to Conjecture Mines, Inc. in 1965. In 1967, Duval Corporation leased all the property and conducted surface exploration including soil sampling and detailed mapping. Duval Corporation also initiated underground exploration by partially de-watering the vertical shaft and by core-drilling from the surface to a depth in excess of 4,000 feet. The property was once again returned to Conjecture Mines in 1970.

There was little activity at the property from 1970 until 1978, when Sunshine Mining Company renewed an exploration agreement with Conjecture Mines. In 1980, Conjecture Mines, under an operating agreement with Minerals Management, Inc., evaluated the silver-lead potential of the mine. Conjecture thought about sinking an inclined shaft at the property in 1981, but this was not done. There was no further activity until 1995, when Royal Silver Mines, Inc., obtained a lease on the Conjecture and announced plans for an aggressive exploration program, if funds were available.

According to data from the U.S. Bureau of Mines, the total production from the Conjecture Mine was 111 ounces of gold, 81,333 ounces of silver, 13,825 pounds of copper, 90,983 pounds of lead, and 53,778 pounds of zinc from 12,663 tons of ore. Most of this production came in the period 1952 to 1956.

3.1.4 Environmental Condition

3.1.4.1 Site Features

The site was visited by John Kauffman and William Rember on August 30, 1996. A video segment describing the Conjecture Mine is on the Lakeview videotape (index 0:09:50-0:26:35).

The Conjecture was a large mine. Workings include two shafts, two collapsed adits, several surface buildings, and two large waste dumps. Another adit, shown on the topographic map near Shaft No. 1 on the west side of Gold Creek, was not found. The site is littered with considerable timber, cribbing, metal scrap, pipe, old machinery, and car bodies. The following description begins near the south end of the property and goes northward (Figure 3.1-1).

The southernmost workings of the Conjecture include two caved adits and the caved No. 1 Shaft (Figure 3.1-2). The two dumps from the adits and the dump from the shaft collectively form what
is called the upper, or south, dump in this report. These dumps are approximately 200 feet long, 100 feet wide, and are about 50 feet thick on the north end of the dump. Gold Creek flows along the west side of the upper waste dump.

The inclined No. 1 shaft on the west side of Gold Creek is near the south end of the property (Figure 3.1-3). According to a local resident, the shaft is filled with water to about 25 feet below the shaft collar. There is an old collapsed wooden structure around the shaft and the area is surrounded by a crude barbed wire fence (Figure 3.1-4). A “Keep Out” sign is posted. The waste dump from this shaft was cribbed along Gold Creek, but the cribbing has rotted and the toe of the waste dump has been cut and eroded by the creek. Also, it looks like some of this waste rock has been removed from the dump, possibly for road metal (Figure 3.1-5). Shaft No. 1 is easily accessible and should be better secured.

The two original adits at the mine (Figure 3.1-6) are located on the east side of Gold Creek across from Shaft No. 1. The adits are very close together. Both are caved and have a minor amount of seepage (both were sampled). The water in the seeps contains aquatic insects, particularly dragonfly and damselfly larva, and there is a good stand of grasses and other vegetation along the seeps. The seeps quickly disappear into the adit dumps, which impinge on Gold Creek (Figure 3.1-7). This dump has had some rock added to it, and the newer material is piled higher than the elevation of the adits (Figure 3.1-8). A small tributary flows into Gold Creek just south of the second adit. The north end of the adit dump impinges on the south end of the north, or lower, dump (Figure 3.1-9).

The second shaft (Shaft No. 2) is located several hundred yards downstream from Shaft No. 1 and is on the east side of Gold Creek. It is surrounded by an approximately 15-foot-high concrete headframe foundation. A 20- by 20-foot concrete block building (hoist house) is adjacent to and south of Shaft No. 2. An old house trailer and two small cabins are just north of the shaft. Material mined from this shaft makes up a large waste dump referred to here as the north, or lower, dump. This dump measures approximately 325 feet long, 270 feet wide, and 60 feet thick on north end of the dump (Figure 3.1-10).

Gold Creek flows both over and under the north dump. An approximately 30-inch-in-diameter culvert was placed under what is now the dump as a flume for Gold Creek (Figure 3.1-11). Parts of the culvert are exposed in the big erosional slot cut on the north end of the dump. There is still considerable water flowing through the culvert, which is now crushed where exposed by erosion (Figure 3.1-12). Continued failure of this culvert will result in even more erosion. The extent of the problem is obvious in Figure 3.1-13. In addition to the culvert, part of Gold Creek flows over and is actively eroding the dump, which is now part of the creek’s channel (Figure 3.1-14). Gold Creek also flows onto the dump by Shaft No. 2, and the south end of the dump is very green where it is irrigated by the creek (Figure 3.1-10).

Most of the north, or lower, dump is eroded into two halves where the culvert has failed and Gold Creek flows through the dump material. A seep (trickle) in the erosion slot of the waste dump was sampled. In places along the west side of the dump, erosion has cut down through the waste rock into the slope wash that makes up the base of the dump. The access road to these lower
workings is washed out by erosion (Figure 3.1-13). Although the flood in the spring of 1996 took its toll on this dump, vegetation is growing out of the eroded sidewalls of the erosion slot, which means that revegetation has been active for some time (Figure 3.1-13). Sediment from this dump that is washed down Gold Creek during flood is probably the most significant environmental problem at the mine site.

3.1.4.2 Sample Locations
Sample localities are shown in Figures 2.1-2 and 3.1-1.

3.1.4.2.1 Soil Samples
No soil samples were collected at this site.

3.1.4.2.2 Water Samples

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K8309601</td>
<td>Adit 1</td>
<td>546</td>
<td>60° F.</td>
<td>7.83</td>
<td>seep</td>
</tr>
<tr>
<td>K8309602</td>
<td>Adit 2</td>
<td>325</td>
<td>54° F.</td>
<td>7.5</td>
<td>seep</td>
</tr>
<tr>
<td>K8309603</td>
<td>tributary of Gold Creek, about 50 feet</td>
<td>80</td>
<td>54° F.</td>
<td>7.61</td>
<td>2 ft. wide; 0.5 ft. deep</td>
</tr>
<tr>
<td></td>
<td>above the adits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309604</td>
<td>150 feet above the southernmost dump</td>
<td>52</td>
<td>50° F.</td>
<td>7.8</td>
<td>5 ft. wide; 0.5 ft. deep</td>
</tr>
<tr>
<td>K8309605</td>
<td>a seep in the erosion slot in the lower</td>
<td>113</td>
<td>56° F.</td>
<td>7.24</td>
<td>seep</td>
</tr>
<tr>
<td></td>
<td>dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8309606</td>
<td>Gold Creek below (north of) the dumps</td>
<td>101</td>
<td>58° F.</td>
<td>7.71</td>
<td>5 ft. wide; 0.5 ft. deep</td>
</tr>
</tbody>
</table>

3.1.4.2.3 Analytical Results

The chemical analyses for the water samples collected at the Conjecture Mine are shown in Table 2.5-2, along with suggested EPA water quality standards. Perhaps the most important water sample collected at the Conjecture site is the downstream sample K8309606 (Table 2.5-2). Neither the filtered or raw sample exceed any of the four water quality standards. However, the raw sample does contain a trace of arsenic (0.008 mg/L (or ppm)) and zinc (0.11 mg/L (or ppm) raw and 0.13 mg/L (or ppm) filtered). So, in spite of the fact that water flowing from Adit No. 1 (sample K8309601) contains 0.17 mg/L (ppm) arsenic (fifth highest water value in the district) and exceeds standards for cadmium, lead, and zinc and that Gold Creek also flows over and through the upper and lower waste dumps at the Conjecture, the water quality in the main creek
below the mine is satisfactory. The tributary to Gold Creek just south of the adits also has no metal loadings (K8309603) and is a good background sample. As with most of the mines in the Lakeview district, the major environmental concern is sediment loading during flood, not water chemistry. The water flowing from Adit No. 2 (K8309602) also contains trace arsenic (0.011 mg/L (or ppm)) and exceeds both Aquatic Life standards for zinc. The upstream sample K8309604 contains trace amounts of arsenic and lead.

3.1.5 Structures

A collapsed wooden structure surrounds the No. 1 Shaft. An approximately 15-foot-high concrete headframe foundation surrounds Shaft No. 2. A 20- by 20-foot concrete block building (hoist house) is adjacent to this shaft, and an old house trailer and two small cabins are just north of it.

3.1.6 Safety

Shaft No. 1 is easily accessible and should be better secured.
Figure 3.1-1. Sketch map of the Conjecture Mine, showing the surface features and sample locations.
Figure 3.1-2. Aerial oblique view of the upper, or south, dump and Shaft No. 1 location. The view is looking south up Gold Creek along the No. 1017 road. The road that crosses the creek in the middle of the picture goes to the two caved adits which are in the left corner. The arrow points to Shaft No. 1 (Roll 216382, frame #25).

Figure 3.1-3. Shaft No. 1 and the collapsed wooden structure around the shaft. A poor barbed wire fence surrounds the shaft and a “Keep Out” sign is posted (Roll K4, frame #23).
Figure 3.1-4a. Panorama looking north down Gold Creek from the south end of the upper dump at the Conjecture Mine (Roll K4, frame #25).

Figure 3.1-4b. Some material appears to have been removed from the south dump, perhaps for road metal (Roll K4, frame #26). This photograph is to the right (east) of Figure 3.1-4a.
Figure 3.1-4c. Panorama looking north down Gold Creek from the south end of the upper dump. The road to the right goes to the caved adits on the east side of Gold Creek (Roll K4, frame #27). This photograph is located to the right (east) of Figure 3.1-b.

Figure 3.1-5. The north end of the south dump. The slash pile is the same pile as in the middle of Figure 3.1-4b (Roll K4, frame #24).
Figure 3.1-6. The two collapsed adits on the east side of Gold Creek (Roll 214169, frame #3).

Figure 3.1-7. The dump(s) from the collapsed adits impinge on Gold Creek (Roll 214169, frame #4).
Figure 3.1-8. The north end of the adit dump. Note the material on the left that appears to have been added to this dump. This dump rests on the south end of the north dump (Roll 214169, frame #6).

Figure 3.1-9a. Panorama from east to west, looking south along the north or lower dump. (Roll K4, frame #20).
Figure 3.1-9b. Panorama from east to west, looking south along the north or lower dump. This photograph is to the west of Figure 3.1-9a (Roll K4, frame #19).

Figure 3.1-9c. Panorama from east to west, looking south along the north or lower dump. This photograph is to the west of Figure 3.1-9b. Headframe and hoist house are in the middle of the picture (Roll K4, frame #18).
Figure 3.1-9d. Panorama from east to west, looking south along the north or lower dump. Upper or south dump from the adits is just visible on the right. Green area just right of the hoist house is where Gold Creek is flowing into the dump. Photo is to the west of Figure 3.1-9c (Roll K4, frame #17).

Figure 3.1-10. Aerial view looking northeast over the lower, or north, dump. Note the foundation for the headframe for Shaft No. 2 and the hoist house. Below the hoist house, Gold Creek is running over the dump. The flume under the dump is visible to the left in the bottom of the erosional slot cut in the lower dump (Roll 217757, frame #8).
Figure 3.1-11. The flume in the erosional slot in the lower dump. The foundation for the headframe and the hoist house are in the right center of the photograph (Roll 217077, frame #13).

Figure 3.1-12. The crushed flume section exposed in the erosional slot in the lower waste dump (Roll 217077, frame #12).
Figure 3.1-13a. Panorama looking north down Gold Creek through the erosional slot cut in the lower dump by the creek. The access road to the lower dump and Shaft No. 2 in the left of the picture was washed out by the Spring 1996 flood. The power line goes down the main (No. 1017) road (Roll K4, frame #21).

Figure 3.1-13b. Panorama looking north down Gold Creek through the erosional slot cut in the lower dump by the creek. This photograph is to the east of Figure 3.1-13a (Roll K4, frame #22).
Figure 3.1-14. Aerial view looking south up the erosion slot in the lower dump. The flume is visible in the bottom of the slot. Also, Gold Creek (in the upper right of the picture) is actively eroding the dump (Roll 216382, frame #24).
3.2 IDAHO LAKEVIEW MINE (Site No. SP-19)
Alternate names—Venezuela, Vensuela, Hewer, Western Adventure.

3.2.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Idaho Lakeview Mine (NW ¼, sec. 28, T. 53 N., R. 1 W.) is in Chloride Gulch (the west tributary of Gold Creek), about 5 miles south of Lakeview. Access from Lakeview is south on USFS Road No. 278 for about three miles and then due south on Road 1180 to Road 1380, which goes to the lower workings of the mine. Access can also be gained going north from the Bunco Road (USFS Road 332) via Road 1180, which goes to the upper workings of the mine. The mine is on patented claims surrounded by U.S. Forest Service land.

3.2.2 Geologic Features (Figure 2.2-1)

According to Kun (1974, p. 36-38):

The Idaho Lakeview Mine is located entirely in the siltites and argillites of the Middle Member of the Wallace Formation. The geology of the lower levels, which are driven from an inclined internal shaft, is not known, except for the information presented on Plate 3 [omitted]. The orebody is contained within the Hewer shear and appears to be similar to the Conjecture Mine, with massive ore shoots, separated by very low grade sulfide zones. Stopes more than 100 ft. in height indicate that the shoots were continuous for a considerable distance in the dip direction.

Ore specimens found on the Idaho Lakeview dumps have massive sulfides including blebs of pyrite, galena, and tetrahedrite (Fig. 19 [omitted]). Exsolution of pyrite from tetrahedrite along cleavage planes can be observed in one specimen. Replacement textures between galena and tetrahedrite are characteristic of these specimens more than elsewhere in the district. Another characteristic is that large zones of late quartz occupy as much as half of the width of the Hewer shear.

Examination of smelter returns obtained on shipments made in 1935-36 show that the ore contained about 12 to 15 oz/ton silver, and 2 percent lead and 2 percent zinc. This ore originated from the main and 100 ft. levels, and was mostly oxidized.

3.2.3 Site History

The first mention of the Venezuela Mine (also called the Hewer or Idaho Lakeview Mine) by the U.S. Geological Survey/U.S. Bureau of Mines was in 1905 when it was part of the mineral holdings of the Ponderay Smelting Company. Several shipments of silver ore were made in 1916. Test lots of ore were shipped from the mine by the Hewer Mining Company in 1923. The following year, several hundred tons of silver-lead ore (the silver was the most valuable constituent) were treated in a 100-ton flotation mill, which was moved from the Loon Lake Mine in Washington. In 1928, the Idaho Lakeview Mines Company purchased the Hewer Mine,
installed a new hoist, and enlarged the shaft with the intent of sinking it to a depth of 1,200 feet. Development work continued until 1929, but the mill was idle.

Closed by the depression, the Hewer property was reopened in 1935 by the Revis Company, and several thousand tons of silver ore were treated by flotation-concentration. The mine closed the following year. Mining resumed and was more or less continuous from 1940 to 1950, reaching a peak of 2,000 tons in 1946.

There was little more activity until 1955, when some ore from the Weber Mine was milled on the property. In 1957, Federal Uranium Corporation acquired operating control of the Keep Cool and Hewer mines and made preliminary plans to work them from a shaft on the Conjecture property. However, most of Federal’s work was concentrated on the Conjecture Mine, and the company dropped its program in 1964.

In 1980, Shoshone Silver Mining Company reopened the Idaho Lakeview Mine and planned on completing 700 feet of new tunnel. The company had built a 100 ton-per-day mill about one mile south of the Conjecture Mine to process ore from the Lakeview and other properties in the district. About 200 feet of old tunnel were rehabilitated in 1982.

In 1984, the company planned to do surface work on the Weil group of claims that lie on an extension of the Hewer vein. A 500-foot-long tunnel was driven at the Idaho Lakeview in 1987 to look for a mineralized target found by drilling. Some trenching was done in 1988 before all operations ceased at the property due to low silver prices.

According to U.S. Bureau of Mines production records, the Idaho Lakeview Mine produced 146 ounces of gold, 235,890 ounces of silver, 13,251 pounds of copper, 383,934 pounds of lead, and 73,298 pounds of zinc from 31,042 tons of ore. First production was in 1916, with most production from 1923-1927 and 1941-1949.

3.2.4 Environmental Condition

The Idaho Lakeview Mine was visited by John Kauffman and William Rember on September 4, 1996. The mine site is shown on the Lakeview videotape (index 0:26:35-0:42:40).

3.2.4.1 Site Features

The Idaho Lakeview Mine consists of one open adit, a waste dump, a mill, and a mill tailings disposal site covering 8-10 acres (Figure 3.2-1). The adit is open and has iron-stained water flowing from it (Figure 3.2-2). A metal grate or gate in the adit is open. The water from the adit flows across the waste dump into Chloride Gulch. There are good rails going from the adit onto the dump (Figure 3.2-3). Near the end of the rail line is a road that goes to the mill. There is a collapsed building outside of the adit on the dump. Clean water is flowing out of a pipe in this collapsed structure. The waste dump measures about 300 feet long and 75 feet wide and is 60 feet thick on the deepest part of the pile near the creek (Figure 3.2-4).
Chloride Gulch flows along the west side of the waste dump (Figure 3.2-5). The bank on the west side of the creek, as well as the waste dump on the east side of the creek, is being eroded (Figure 3.2-6). However, there was little water in Chloride Gulch at the time of the visit. There are old cars, sheet metal, timbers, and other junk in the stream channel. The face of the waste dump is very steep adjacent to the stream. A few small trees are growing on the dump.

The mill is down the road from the adit. There are two old collapsed cabins just north of the mill, and the road in this area was washed out by this spring's flood. The mill has concrete foundations, and the lower part of the mill has burned (Figure 3.2-7). The upper part of the building is still standing (Figure 3.2-8). There is a small pile of mill tails by the east side of the structure, but the main tailings disposal site is farther down the road.

Just beyond the mill are two more collapsed buildings. The tailings disposal site is past these buildings on Chloride Gulch (Figure 3.2-9). The road here has been washed out. The tailings site is about 300 feet long and 70 feet wide and probably averages about 5 feet thick, for a total of 3,900 cubic feet of material. The old flotation tailings have been armored with shale rock and are naturally reseeding. However, the water in Chloride Gulch has cut into the tails along the end and side of the tailings pile (Figure 3.2-10).

The water flowing from the adit and the erosion of the mill tailings are the most serious problems at this site.

3.2.4.2 Sample Locations

3.2.4.2.1 Soil Samples

A sample was collected from the flotation tailings dump (Sample No. R9049604; Table 2.5-3). The sample contains very high values of arsenic (4,700 µg/g (ppm)), copper (520 µg/g (ppm)), lead (2,800 µg/g (ppm)), and zinc (7,100 µg/g (ppm)).

3.2.4.2.2 Water Samples

<table>
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<th>Sample No</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R9049601</td>
<td>Upstream in Chloride Gulch from the adit</td>
<td>24</td>
<td>46°F</td>
<td>6.93</td>
<td>1 ft. wide; 0.25 ft. deep</td>
</tr>
<tr>
<td>R9049602</td>
<td>Idaho Lakeview Mine adit</td>
<td>365</td>
<td>46°F</td>
<td>6.83</td>
<td>3</td>
</tr>
<tr>
<td>R9049603</td>
<td>Downstream in Chloride Gulch, below the flotation tailings pile</td>
<td>103</td>
<td>48°F</td>
<td>7.1</td>
<td>---</td>
</tr>
</tbody>
</table>

49
Water sample R9049602 (filtered and unfiltered) from Adit No. 1 exceeded at least one of the four EPA water quality standards for aluminum, arsenic, cadmium, copper, iron, lead, manganese, mercury, and zinc (Table 2.5-1). The filtered sample exceeds the secondary MCL and Aquatic Life Chronic values for aluminum, the Aquatic Life Chronic standard for arsenic, all standards for cadmium, both Aquatic Life standards for copper, the secondary MCL and Aquatic Life Acute standard for iron, the Aquatic Life Chronic standard for lead, the Secondary MCL for manganese, all standards for mercury, and both Aquatic Life standards for zinc. The raw sample from the adit contains the most lead, mercury, zinc, iron, manganese, and copper, and the second highest value of arsenic (Wiberg Adit #1 was first) found in any water sample from the Lakeview District. However, the downstream sample, R9049603, exceeded both Aquatic Life standards for zinc only. The upstream sample R9049601 did not exceed any of the standards. It appears that dilution is taking care of the metal problem in the adit water.

3.2.5 Structures

There is a collapsed building on the dump outside of the adit. There are two old collapsed cabins just north and west of the mill. The mill has concrete foundations; the lower part of the mill is burned, but the wooden upper part is still standing. Just beyond the mill are two more collapsed buildings.

3.2.6 Safety

The open adit could be dangerous and should be gated or closed. The ruins of the mill are accessible and could be hazardous to the unwary explorer.
Figure 3.2.1. Sketch map of the Idaho Lakeview Mine, showing the surface features and sample locations.
Figure 3.2-2. Open adit at the Idaho Lakeview Mine. Note the iron-stained water flowing from the adit (Roll 214170, frame #21).
Figure 3.2-3. Looking south across the waste dump of the Idaho Lakeview Mine. The adit is left of center. Chloride Gulch is to the right of the collapsed building (Roll 217077, frame #17).

Figure 3.2-4. Looking north across the waste dump from near the adit and collapsed building shown in Figure 3.2-3. The rails on the right of the photo are above a road that leads to the mill (Roll 214070, frame #22).
Figure 3.2-5. Active erosion of the waste dump. The collapsed building on the dump is visible in the left upper center of the picture. Most of the water in Chloride Gulch at the time of the site visit was coming from the adit and is iron stained (Roll 214170, frame #23).

Figure 3.2-6. West side of the waste dump near the nose of the dump. Note the junk in the creek and the erosion of the bank on the right side (west) of the photo (Roll 214170, frame #24).
Figure 3.2-7. Idaho Lakeview mill. The front of the mill has burned. Some mill tailings may be present just to the left of the mill building. The road in the lower part of the picture leads to the mine (to the right) and to the tailings pond (to the left) (Roll 217077, frame #25).

Figure 3.2-8 Side view of the Idaho Lakeview mill (Roll 217077, frame #18).
Figure 3.2-9. Tailings disposal site. The surface of the site has been armored with country rock (shale) and is naturally reseeding. Chloride Gulch is just to the right of the tailings (Roll 214170, frame #26).

Figure 3.2-10. Erosion of mill tailings into Chloride Gulch along the north side of the disposal site (Roll 217077, frame #20).
3.3 WEBER MINE (Site No. SP-25)
Alternate names- New Rainbow, Webber, Rainbow.

3.3.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Weber open pit and adjacent properties are on Gold Creek, one mile south of the Conjecture Mine (NW ¼, sec. 35, T. 53 N., R. 1 W.) The pit is on the No. 1017 Road, which can be accessed from either USFS Road 278 or USFS Road 332 (Bunco Road). The easiest access is from the Bunco Road (about 0.3 mile). The mine is on patented claims surrounded by U.S. Forest Service land.

3.3.2 Geologic Features (Figure 2.2-1)

According to Kun (1974, p. 36):

The open pit and mine (Pl. 6 [Figure 3.3-2]) are in the calcareous beds of the Lower Member of the Wallace Formation. The orebody is located to the west and adjacent to the intersection of the Weber vein and the Spider fault (Fig. 2 [omitted]), where the shear zone widens and is mineralized throughout the four levels of the mine (Pl. 6 [Figure 3.3-2]). Lamprophyre dikes cut through the orebody and late quartz veins were abundant enough in the mined portion of the pit to be shipped for their silica content to Tacoma, Washington (C. Weber, oral communication, 1967) . . .

The ore is brecciated in the open pit and consists mainly of galena, and minor tetrahedrite and sphalerite, with quartz as gangue (Fig. 18 [omitted]). The sulfides fill fractures and engulf early-stage quartz. Some ore is in massive crustifications having cores of late, drussy quartz. The Weber pit is on the Weber shear close to its intersection with the Spider fault. Quartz and sulfide veins within the shear zone can be seen in the upper benches, while lamprophyre dikes are visible in the bottom of the pit. An interesting characteristic of the open pit is the mineralization of the lamprophyre dikes. The mafic dikes, believed to be associated with the Spider fault, contain abundant disseminated pyrite and other unidentified sulfides.

Assays from smelter returns (Table 2 [omitted]), during the first few years of production show that since 1890, several shipments of ore were made with an average silver content of about 40 oz/ton, 8-10 percent lead and an equal percentage of zinc. Savage (1967) reports that ore shipped in 1962 to the Tacoma, Washington, smelter contained about 0.04 oz/ton of gold, 7 to 8 oz/ton of silver, and 0.5 percent of combined lead and zinc. The production and average grade (Table 2 [omitted]) for the years 1890 to 1934 are from the underground workings, while the 1963 figures are from the open pit where quartz was the main mineral mined and the ore was 60-80 percent silica.
3.3.3 Site History

The first shipment of ore from the Weber Mine recorded by the U.S. Geological Survey/U.S. Bureau of Mines was in 1916. The next mention was in 1922, when the Lakeview Mining and Milling Company shipped several cars of rich silver ore from the underground mine. One car of silver concentrates was shipped in 1934. It was processed in a 15-tpd flotation mill at the site.

Serious operations began in the second half of 1949 when the Lakeview Lease operated the Weber Mine (under the lease, the mine was known as the New Rainbow) as an underground operation. The New Rainbow Mining Company continued shipping ore from the underground workings until 1956. The ore was either shipped directly to smelters or processed at the Idaho Lakeview mill.

In 1954, the Austin Meyer Corporation began shipping ore from the Weber open pit, which was developed above the No. 3 level of the underground workings. Mining from the open pit continued until 1965. This surface ore was shipped to the Tacoma smelter, where the charge for treating the ore was low because the high-silica content of the material made it desirable as a flux for copper smelting.

In 1980, Shoshone Silver Mining Company milled 600 tons of ore from the open pit at the Weber. The company had signed operating agreements with Lakeview Consolidated Silver Mines, Inc., on several properties in the Lakeview district. Their new mill was centrally located to the district’s mines. By 1983, full operations were under way processing oxidized ore from open pits at the Weber Mine (leased from Sunshine Mining Company and Lakeview Consolidated Silver Mines, Inc.) By October, the company had sold 10,757 ounces of silver to Sunshine for refining. Development and mill improvement continued until 1985, by which time a 10,000 ton ore stockpile had been accumulated. By 1987, the company had a 100% interest in the Weber. Shoshone Silver ceased all operations in the district in 1992, waiting for better metal prices. Since then, there has been no activity at the mine or mill.

According to the U.S. Bureau of Mines, production from the Weber Mine was 3,455 ounces of gold, 875,356 ounces of silver, 6,596 pounds of copper, 756,603 pounds of lead, and 41,409 pounds of zinc from 127,011 tons of ore. Most of the production occurred from 1949 to 1965, with some production occurring between 1901 to 1934 and 1976 to 1981.

3.3.4 Environmental Condition

3.3.4.1 Site Features

The Weber open pit was visited by John Kauffinan and William Rember on September 3, 1996. A video segment of the site is on the Lakeview videotape (index 0:42:40-0:50:38).

The main working at the Weber is an open pit located above the New Rainbow underground workings (Figure 3.3-1 and Figure 3.3-2). The pit is a "U" shaped excavation with the open part to the southeast (Figure 3.3-3). There is an abandoned excavator at the top of the pit wall. The
pit walls are roughly 200 feet high on the northwest wall, tapering to about 40 feet at the open end on the south and north. There is vegetation in the bottom of the pit indicating a seep, but there was not enough water to sample.

There are essentially two dump levels. The upper dump extends from the north pit wall about due east, with the toe of the dump along the Gold Creek road (Figure 3.3-4). The lower dump extends from pit level eastward along the south edge of the pit. Gold Creek Road crosses this dump near its eastern edge and extends for about 350 feet across the dump (Figures 3.3-4 and 3.3-5). The face of the lower dump has been eroded into Gold Creek (Figure 3.3-6), but there were no seeps observed in the dump. The lower dump measures about 350 feet long, averages about 40 feet wide, and is 70 feet thick. The upper dump is about 30 feet long, 20 feet wide (variable), and 70 feet thick. The total area covered by the dumps and the pit is about 10 acres.

3.3.4.2 Sample Locations

3.3.4.2.1 Soil
   No soil samples were taken at this site.

3.3.4.2.2 Water
   No water samples were taken at this site.

3.3.5 Structures
   No structures remain at this site.

3.3.6 Safety

No safety hazards were noted at the mine, with the exception of the steep pit walls that could slough.
Figure 3.3-1. Sketch map of the Weber pit area showing the surface features and sample locations.
Geologic, composite mine, and cross-section maps of the open pit, Nos. 2, 2 1/2, 3 and 4 adits, Weber mine, Lakeview mining district.

Figure 3.1-2: Map showing the spatial relationship of the underground workings of the New Rainbow mine and the Weber open pit
(Plate 6 from Kin, 1974)
Figure 3.3-3. Weber open pit, looking west (Roll 217077, frame #14).

Figure 3.3-4a. Weber open pit, looking west (Roll 214170, frame #1).
Figure 3.3-4b. Weber open pit, looking northwest (Roll 214170, frame #2). This photograph overlaps the right edge of Figure 3.3-4a.

Figure 3.3-4c. Weber open pit, looking north across the top of the dump (Roll 214170, frame #3). This photograph is adjacent to the right edge of Figure 3.3-4b.
Figure 3.3-5. Bottom of the Weber open pit, looking east from the air (Roll 216382, frame #22).

Figure 3.3-6. Dump at the Weber open pit, looking northeast (Roll 214170, frame #4).
3.4 KEEP COOL MINE (Site No. SP-21)

3.4.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Keep Cool Mine is located about 5½ miles south of Lakeview on the East Branch of Chloride Gulch in the SE ¼, sec. 27, T. 53 N., R. 1 W. Three miles south of Lakeview, USFS Road 278 joins Road 1017. The Keep Cool is about 4½ miles up Road 1017, past the New Rainbow and Weber mines. Road No. 1017 also connects to the Bunco road (USFS Road 332) about ½ mile uphill from the mine, and this is the best access. The mine site contains four patented claims named the Keep Cool 1-4. The patented ground is surrounded by U.S. Forest Service land.

3.4.2 Geologic Features (Figure 2.2-1)

According to Kun (1974, p. 38):

The Keep Cool Mine is entirely within the Lower Member of the Wallace Formation. The workings follow a vein on the western end of the Weber shear zone, and to the east of a barren, normal fault, which is similar in characteristics to the Spider fault (Fig. 2 [omitted]). Thus, the Keep Cool orebody appears similar to the Weber, in structure as well as texture and ore grade.

The ore specimens examined in this study were taken from the dumps. The samples show massive sulfides forming blebs in fractures (Fig. 13 [omitted]). The sulfides identified are galena, sphalerite and tetrahedrite, with minor chalcocyprite and boulangerite (?). Gangue minerals are pyrite, quartz and siderite. Kotschevar (1938) reports the ore as being:

“... galena, mainly as specular with gneissic grain and highly veneered surface. Sphalerite is intimately associated with galena. Chalcocyprite and pyrite are disseminated throughout the galena, sphalerite and quartz."

The paragenesis of the ore minerals is shown on Figure 21 [omitted]. Assays from the two levels and stopes, shown on Figure 20 [omitted], average 20 oz/ton in silver 3-4 percent lead and 6-7 percent zinc. No production data is available.

3.4.3 Site History

In 1928, the underground workings at the Keep Cool Mine included five adits (Savage, 1967). In 1937, the lower (No. 5) level was used as the main haulage level, and ore from the mine was processed in the adjacent mill and shipped by truck to the Bunker Hill smelter (Kotschevar, 1938). That year, the mine, operated by the Silver Leaf Mines Corporation, accounted for the entire output of the Lakeview district. The company also built a 50-tpd flotation plant in 1937, which only operated until 1938.

Plans were announced to reopen the mine in 1942, using funds from a Reconstruction Finance Corporation loan. The ore was to be processed in the Idaho Lakeview mill 4½ miles away. The
Idaho Lakeview mill was being rehabilitated as recommended by the Knapp Refractory Ore Process Company.

About 200 tons of ore were mined in 1943. There is no further mention of the property until 1950, when there was some production until 1954.

In 1957, the Federal Uranium Corporation acquired control of the adjoining Keep Cool and Hewer mines and made preliminary plans to work them from a shaft on the Conjecture property. As noted, most of Federal's efforts were concentrated at the Conjecture Mine, and there was little work done at the Keep Cool. Kun (1974) notes that the No. 5 level at the Keep Cool was reopened in 1967 by the Sunshine Mining Co., who had leased the property.

In 1980, Shoshone Silver Mining Company milled 600 tons of ore from the Keep Cool and the Weber open pit. The company had operating agreements with Lakeview Consolidated Silver Mines, Inc., on several properties in the area. However, in 1981, the company closed its operations in the Lakeview district because of declining metal prices.

In 1983, full operations were again under way at Shoshone Silver's mill and mines. Oxidized ore from the open pit at the Weber and from the Keep Cool (leased from Sunshine Mining Company and Lakeview Consolidated Silver Mines, Inc.) was processed at a carbon-in-pulp leaching plant. By 1987, Shoshone Silver had a 98 percent interest in the Keep Cool group and a 100 percent interest in the Weber and Weil (Drumheller) group. In 1990 the company drove about 350 feet of new drift at the Keep Cool and was stockpiling lead/silver ore, waiting for more favorable prices. In 1991, a 2- to 3-man crew drove 200 feet of exploration drift at the mine, after which all operations ceased.

According to the U.S. Bureau of Mines, production from the Keep Cool Mine was 474 ounces of gold, 35,180 ounces of silver, 29,250 pounds of copper, 479,739 pounds of lead, and 616,127 pounds of zinc from 10,415 tons of ore and 230 tons of reprocessed tailings. Most of the production occurred from 1937 to 1954.

3.4.4 Environmental Condition

3.4.4.1 Site Features

The site was visited by John Kauffman and William Rember on September 3, 1996. A video segment showing the Keep Cool is on the Lakeview videotape (index 0:50:38-1:06:00).

The Keep Cool Mine (Figure 3.4-1) is on an eastern intermittent tributary of Chloride Gulch and about 400 feet below the Bunco Road. There are 5 adits, according to Kun (1974). These were numbered from top to bottom. We numbered them in reverse as we went up the hill, so Adit No. 1 is the lowermost.
Adit No. 1 (Figure 3.4-2) is open and was refurbished in the mid-1960s by Sunshine Mining Company (Figure 3.4-3). There is water that flows about 50 feet from the adit into a pool behind the waste dump, where it disappears. This dump extends to and slightly across the drainage.

The possible remains of an old mill and a small tailings impoundment were noted (Figure 3.4-4). Some balls from a ball mill were found, and a sample of the tailings was collected. The tailings disposal area measures 20 feet long, 10 feet wide, and 20 feet thick. Large slash piles from recent logging have been stacked on the waste dump, and the entire mine site has been extensively modified by logging. We estimate that about 2 of the 6 disturbed acres in this area are covered with waste rock. This waste rock appears to average about 15-20 feet thick, but this is a very "ball park" estimate.

Adit No. 2 is approximately 100 feet above Adit 1. It is dry, partly caved, and covered with wooden slats. Someone could crawl between the slats to enter the adit (Figure 3.4-5). There may also be some mill tails here.

Adit No. 3 (Figure 3.4-6) is about 50 feet above and slightly northeast of Adit No. 2. It is caved, and dry. There is a small, collapsed shack at this site. The hillside here is caved, and the site has been substantially disrupted by logging. A logging road appears to have cut the toe of the dump at this adit.

About 100 feet above Adit No. 3, there may be another caved adit. However, there is little evidence left. There is no visible sign of adits above this possible adit, but the area has been substantially modified by logging. It looks as if the area above this location, extending uphill to the road, is a series of cuts. No adits are present (Figure 3.4-7).

3.4.4.2 Sample Locations

3.4.4.2.1 Soil

The mill tailings were sampled (Sample No. R9039605). As with other tailings samples, this one contains high values of arsenic, copper, lead, and zinc (Table 2.5-3).

3.4.4.2.2 Water

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<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (gpm)</th>
</tr>
</thead>
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<tr>
<td>R9039604</td>
<td>Adit No. 1</td>
<td>358</td>
<td>48° F.</td>
<td>7.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Sample R9039604 from Adit No. 1 exceeds the Aquatic Life Chronic standard for cadmium, both Aquatic Life standards for copper and zinc, and the secondary MCL for iron and manganese (Table 2.5-1).
3.4.5 Structures

There is a small collapsed shack at Adit No. 3 and the possible remains of an old mill at Adit No. 1.

3.4.6 Safety

The open adits should be securely gated or closed.
Figure 3.4-1. Aerial photograph of the Keep Cool Adit No. 1 level. Note the open adit and the slash piles from logging (Roll 216382, frame #21).

Figure 3.4-2. Keep Cool Adit No. 1, looking west (Roll 214170, frame #7).
Figure 3.4-3. Keep Cool Adit No. 1, close-up (Roll 214170, frame #8).
Figure 3.4-4. Possible remains of the Keep Cool mill, with jig tails above it (Roll 214170, frame #15).
Figure 3.4-5. Keep Cool Adit No. 2, looking southeast (Roll 214170, frame #13).
Figure 3.4-6. Keep Cool Adit No. 3, looking southeast (Roll 214170, frame #9).
Figure 3.4-7. Aerial view of the upper workings of the Keep Cool Mine, with USFS Road 1017 at the top of the picture (Roll 216382, frame #20).
3.5 NEW RAINBOW (Site No. SP-24)
Alternate names--Rainbow, Silver Bull, Silver Bell

3.5.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The New Rainbow Mine is on Gold Creek, about 3.4 miles south of the Conjecture Mine (south ½, sec. 26, T. 53 N., R. 1 W.) The mine is the underground workings below the Weber open pit. The Weber pit (SP-25) is described separately. The Rainbow Mine is on the No. 1017 Road, which can be reached from either USFS Road 278 or USFS Road 332 (Bunco Road). The easiest access is from the Bunco Road (about ¼ mile). The property is on Forest Service land.

3.5.2 Geologic Features (Figure 2.2-1)

According to Kun (1974), the New Rainbow is in calcareous rocks of the Lower Member of the Wallace Formation, near the intersection of the Weber shear zone and the Spider fault.

3.5.3 Site History

Kun (1974) notes that the Weber Mine (which was the first discovery in the Lakeview district) was originally developed by four underground levels before the Weber open pit was started in the 1940s. After World War II, the underground workings were leased by the New Rainbow Mining Company and became known as the New Rainbow Mine. Figure 3.3-2 (from Kun, 1974) shows the spatial relationship of the Rainbow underground workings and the Weber open pit.

The first recorded shipment of ore from the Weber Mine by the U.S. Geological Survey/U.S. Bureau of Mines was in 1916. The next mention was in 1922 when the Lakeview Mining and Milling Company shipped several cars of rich silver ore from the underground mine. One car of silver concentrates was shipped in 1934. It was processed in a 15-tpd flotation mill at the site.

Serious operations began in the second half of 1949 when the Lakeview Lease operated the Weber Mine (under the lease, it was known as the New Rainbow Mine) as an underground operation. The New Rainbow Mining Company continued shipping ore from the underground workings until 1956. The ore was either shipped directly to smelters or processed at the Idaho Lakeview mill as there was no mill at the New Rainbow. Like the ore from the Weber pit, the underground ore was very siliceous and was used as a flux for smelting copper at the Tacoma smelter.

Most of the production from the New Rainbow Mine has been combined with that from the Weber open pit by the U.S. Bureau of Mines. Production from the New Rainbow Mine reported separately was 8,227 ounces of silver and 10,171 pounds of lead from 115 tons of ore. This production occurred from 1902 to 1916.
3.5.4 Environmental Condition

3.5.4.1 Site Features

The New Rainbow Mine was visited by John Kauffman and William Rember on September 3, 1996. A video segment of the mine is on the Lakeview videotape (index 1:06:00-1:15:35).

The New Rainbow Mine is the underground portion of the original Weber Mine (Figure 3.5-1, panorama). The dump is long and narrow (435 feet long by 50 feet wide by 40 feet thick) and parallels Gold Creek. The dump does not impinge on the creek. Adit No. 1 is just above the Gold Creek Road at an elevation of about 3,450 feet (Figure 3.5-2). The portal has rotted timbers. The adit may be caved inside, but there is a partial opening at the portal. Seepage from this adit (estimated at 1 gpm) flows across the waste dump and disappears into the ground near the road. Although it does not actually reach the creek, upstream and downstream samples were collected because of the adit’s close proximity to Gold Creek. The waste dump has been dozed and reworked for an undetermined reason (possibly it was terraced for erosion control).

A second adit is shown beside Adit No. 1 on the topographic map. We found a collapsed adit or other feature at this location, which is about 70 feet south of Adit No. 1. It is barely visible in a growth of hemlock and has a rotted wooden grating over the opening.

Adit No. 3 is located on the east side of Gold Creek and was driven east or northeast (Figure 3.5-3). It is completely caved and dry. The dump at Adit No. 3 measures about 20 feet by 15 feet by 15 feet and is overgrown with thick brush and firs. Some scrap metal, pipes, iron bars, and a minor amount of garbage (tin and aluminum cans, etc.) are scattered around the property (Figure 3.5-4).

We checked the hillside above Adits No. 1 and No. 2 for other workings and found a number of small pits and old trenches at intervals for about 150-200 feet up the slope. Near the central portion of the waste dump for Adits No. 1 and No. 2 is a decayed, collapsed building with flattened stovepipe, cable, and other scrap. There is also a collar for a probable drill hole.

Two old, collapsed shacks were located near the south end of the property. One, along the east side of Gold Creek Road, has several walls still standing. The second, on the west side and just off the road, only has part of the roof structure showing. Most of this property is overgrown with brush and small trees; a few larger trees are about 1.5 feet in diameter.

3.5.4.2 Sample Locations

3.5.4.2.1 Soil

No soil samples were taken at this site.
3.5.4.2.2 Water

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (gpm)</th>
</tr>
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<tr>
<td>K9039601</td>
<td>Adit No. 1</td>
<td>341</td>
<td>48°F</td>
<td>7.3</td>
<td>1.0</td>
</tr>
<tr>
<td>R9039601</td>
<td>Downstream from K9039601</td>
<td>88</td>
<td>48°F</td>
<td>7.7</td>
<td>3 ft. wide; 0.5 ft. deep</td>
</tr>
<tr>
<td>R9039602</td>
<td>Upstream from K9039601</td>
<td>85</td>
<td>48°F</td>
<td>7.4</td>
<td>3 ft. wide; 0.5 ft. deep</td>
</tr>
</tbody>
</table>

Sample K9039601 exceeded the primary MCL for arsenic, both Aquatic Life Standards for zinc, and the Aquatic Life Chronic Standard for copper. Values for all other metals did not exceed any standards.

3.5.5 Structures

Near the central portion of the waste dump for Adits No. 1 and No. 2 is a decayed, collapsed building with flattened stovepipe, cable, and other scrap. There are two old shacks near the south end of the property that are nearly collapsed. One along the east side of Gold Creek Road has several walls still standing. The second, on the west side and just off the road, only has part of the roof structure showing.

3.5.6 Safety

With the exception of Adit No. 1, which may be partly open, no other significant hazards were noted on the property.
Figure 3.5-1a. Part 1 of a panorama of the portal and dump of Adit No. 1 at the New Rainbow Mine, looking west. Note the overgrown area of the portal and the small seepage cutting through the grass from center to bottom of picture (Roll K5, frame #2).

Figure 3.5-1b. Part 2 of a panorama of the portal and dump of Adit No. 1 at the New Rainbow Mine, looking northwest (Roll K5, frame #3). This photograph joins the right side of Figure 3.5-1a.
Figure 3.5-1c. Part 3 of a panorama of the portal and dump of Adit No. 1 at the New Rainbow Mine, looking northeast (Roll K5, frames #4). This photograph overlaps the right edge of Figure 3.5-1b.

Figure 3.5-1d. Part 4 of a panorama of the portal and dump of Adit No. 1 at the New Rainbow Mine, looking east. Note the small pool formed by a seep on the bench cut on the waste dump (Roll K5, frame #5). This photograph joins the right edge of Figure 3.5-1c.
Figure 3.5-2. New Rainbow Mine. Looking west at the collapsed portal to Adit No. 1, showing the rotten timbers (Roll K5, frame #6).
Figure 3.5-3. Portal of Adit No. 3, with a geologist collecting a water sample in the foreground (Roll 214169, frame #26).
Figure 3.5-4. Adit No. 3 dump with the creek in the foreground (Roll 214169, frame #25).
3.6 VULCAN MINE (Site No. SP-6)
Alternate names- Glasscock

3.6.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Vulcan Mine is shown on the Lakeview 7.5-minute quadrangle (south 1/2, sec. 35, T. 54 N., R. 1 W.) The mine lies just off USFS Road No. 278, about 31/2 miles north of the town of Lakeview and below the electric power transmission line. It is on U.S. Forest Service land.

3.6.2 Geologic Features (Figure 2.2-1)

According to Kun (1974, p. 38-40):

The development consists of about five adits driven along the vein, which cuts the Lakeview Limestone (Pl. 1 [Figure 2.2-1]), granodiorite, and siltites and argillites of the Wallace Formation. The limestone is highly contact-metamorphosed in certain zones and is altered to a green hornfels or a white marble. The east-trending vein is filled with quartz, and galena, pyrite and tetrahedrite stringers, some of which form pockets rich enough to mine. Brecciation, fracture-filling and replacement textures can be noted in the ore specimens from the Vulcan Mine (Fig. 11 [omitted]). The main ore mineral is galena (Fig. 22 [omitted]), which forms massive blebs and replaces early quartz and pyrite. It is surrounded and partially replaced by tetrahedrite penetrating fractures. Late pyrite and quartz fill fractures, but are seldom seen replacing the older minerals.

3.6.3 Site History

About three miles northeast of Lakeview on the main road, R. Glasscock of Lakeview developed several small, high-grade ore shoots along a vein on what was locally called Vulcan Hill. According to Kun (1974), the Vulcan Mine portal had caved by 1967. Some ore from the Vulcan and the other Glasscock properties was shipped to the Conjecture mill (Glasscock, oral communication to P. Kun, 1967). The U.S. Bureau of Mines reported production from the Vulcan in 1951. The mine produced 14 ounces of silver, 201 pounds of lead, and 109 pounds of zinc from 1,065 pounds of ore.

3.6.4 Environmental Condition

3.6.4.1 Site Features

The Vulcan Mine was visited by John Kauffman and William Rember on September 2, 1996. A video segment showing the mine is on the Lakeview videotape (index 1:15:35-1:23:08).

The Vulcan Mine has three adits. The upper two are caved, and the lower one is partially caved (Figure 3.6-1). All three are beneath and parallel to the power line. The lower adit (No. 1) is just off the old forest service road shown on the Lakeview 7.5-minute topographic map. The upper
adit (No. 3) is on the new USFS road (No. 278). Adit No. 3 is about 200 feet upslope from Adit No. 1. The toe of the dump from Adit No. 3 reaches the dump at Adit No. 2.

A small amount of water (estimated at 0.5 gpm) is seeping from Adit No. 1 (Figure 3.6-2; Sample R9039601). This water disappears into the dump about 75 feet from the portal (Figure 3.6-3). We could not find any seeps from the dump (Figure 3.6-3), and the water does not reach North Gold Creek.

The dump at Adit No. 2 measures 50 feet by 30 feet by 30 feet (along the faces). The dump at Adit No. 3 measures 45 feet by 25 feet by 30 feet (along the faces). USFS Road No. 278 crosses the top of this dump, which has been partially removed.

3.6.4.2 Sample Locations

3.6.4.2.1 Soil

No soil samples were taken at this site.

3.6.4.2.2 Water

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R9039601</td>
<td>Seep from Adit No. 1</td>
<td>984</td>
<td>50°F</td>
<td>3.8</td>
<td>seep</td>
</tr>
</tbody>
</table>

The water sample from the Vulcan Mine (R9029601) exceeds all standards for aluminum, cadmium, iron, manganese, and the Aquatic Life standard for copper and zinc (Table 2.5-1). In addition, the adit water has a pH of 3.8, the only acid water found in the study.

3.6.5 Structures

There were no structures present at this site.

3.6.6 Safety

With the exception of the partially caved adit, there were no hazardous features at this site.
Figure 3.6-1. Vulcan portal (Adit No. 1) taken from the dump, looking northeast (Roll 214169, frame #20).
Figure 3.6-2. Water seeping from the Vulcan No. 1 adit (Roll 214169, frame #22).
Figure 3.6-3. Vulcan dump at Adit No. 1, looking from the northeast to the southeast (Roll 214169, frame #21).
3.7 HIDDEN TREASURE MINE (Site No. SP-13)
Alternate names- Grafter

3.7.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Hidden Treasure Mine is located just southeast of the confluence of Kick Bush Creek and Gold Creek in the west ½ of sec. 11, T. 53 N., R. 1 W. Access is from USFS Road No. 278 about ½ mile south of Lakeview. The mine is on U.S. Forest Service land.

3.7.2 Geologic Features (Figure 2.2-1)

According to Kun’s 1974 geologic map, the mine is in the Middle Member of the Wallace Formation and is not far from the Cedar Creek and Packsaddle faults.

3.7.3 Site History

According to the U.S. Geological Survey/U.S. Bureau of Mines records, in 1907 the Hidden Treasure and Grafter claims were “productive of lead ore, carrying silver.” Small shipments of ore, valued at $862, were noted in 1911 from the Idaho Queen, Hidden Treasure, Fall Creek, and Rainbow properties. There is no further mention of the property.

3.7.4 Environmental Condition

3.7.4.1 Site Features

The site was visited by John Kauffman and William Rember on September 2, 1996. A video segment describing the mine is on the Lakeview videotape (index 1:23:08-1:32:00).

There are four adits with numerous prospect pits at the Hidden Treasure Mine (Figure 3.7-1). All of the adits are dry and three are caved an estimated 50 to 75 feet from the portals. The workings appear to be very old and cover about 1 acre. Adit No. 1 (Figure 3.7-2) is completely closed. Adits No. 2, No. 3, and No. 4 (Figures 3.7-3, 3.7-4, 3.7-5) are open and have been recently (and inadequately) blocked with loading pallets. All the adits strike about 30 degrees northeast. Adit No. 4 has the most material on the dump (Figure 3.7-6). A new road was built to the property by a Mr. Scheller in the last 5-10 years. It was supposed to cut the old workings but was not finished.

3.7.4.2 Sample Locations

3.7.4.2.1 Soil

No soil samples were taken at this site.

3.7.4.2.2 Water

No water samples were taken at this site.
3.7.5 Structures
   There are no structures at this site.

3.7.6 Safety
   Several of the adits may be partially open.
Figure 2.12-1. Sketch map of the Hidden Treasure mine, showing surface features.
Figure 3.7-2. Adit No. 1 at the Hidden Treasure Mine (Roll 214169, frame #7).
Figure 3.7-3. Close-up of open adit No. 2 at the Hidden Treasure Mine (Roll 214169, frame #12).
Figure 3.7-4. Close-up of open adit No. 3 at the Hidden Treasure Mine (Roll 214169, frame #13).
Figure 3.7-5. Open adit No. 4 at the Hidden Treasure Mine (Roll 214169, frame #15).

Figure 3.7-6. Dump for adit No. 3 at the Hidden Treasure (Roll 214169, frame #14).
3.8 SQUAW BAY LIMESTONE MINE (Site No. SP-4)
Alternate names- Old Limestone quarry, Portrock, R & N, Cement Mine, Blue Slide Lime.

3.8.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

This mine is located in sec. 34, T. 54 N., R. 1 W. It can be reached by boat from Pend Oreille Lake and is on the beach of the lake. The mine is on U.S. Forest Service land.

3.8.2 Geologic Features (Figure 2.2-1)

According to Kun’s (1974) geologic map, this mine is in a small sliver of the Lakeview Limestone of Cambrian age, as are most of the limestone properties in the area.

3.8.3 Site History

This is one of several mines in the Lakeview area that supplied limestone for the International Portland Cement Company’s operations in the mid-1920s (Kun, 1974). In 1944, 16 tons of zinc-lead-silver ore was shipped direct to a smelter from the mine (USBM).

As Idaho's population increases, the danger from inactive and abandoned mine lands increases. This was unfortunately demonstrated when two young men died in a pocket of bad air (carbon monoxide) in this old limestone mine, which is near Lakeview and located across Lake Pend Oreille from Bayview in Squaw Bay (cover picture). In June 1995, Stephen Novak and Chris Homstad were exploring the mine when the tragedy occurred. Further deaths were narrowly averted when four boys, who entered the mine to look for the lost explorers, returned to the entrance after one of them became ill and collapsed. Later, the mine rescue team from the Sunshine Mine entered the old workings to remove the bodies. This was the first accidental death in an old mine in the state in many years. The U.S. Forest Service sealed the entrance to the mine in September.

3.8.4 Environmental Condition

3.8.4.1 Site Features

The mine was visited by John Kauffman and William Rember on September 26, 1996. A video segment showing the mine is on the Lakeview videotape (index 1:32:00-1:47:56).

The Squaw Bay Limestone Mine operated as an underground and surface-cut mine covering about 5-10 acres (Figure 3.8-1). The main adit (No. 1), just above lake shore, is dry and has recently been secured with a rebar grate and rock bolts by Faucett International (Figure 3.8-2). Timbers are visible inside. Warning signs are posted on the grate.

The limestone was probably crushed on site. Concrete foundations of an assumed mill remain along the shoreline (Figure 3.8-3). Timbers, which protrude horizontally out into the water, could have been used to secure barges. North of Adit No. 1, and about 80 feet above lake level, is a
horizontal cut (Figure 3.8-4). It appears that limestone was excavated along the cut for 300-400 feet or more. A second dry adit (Adit No. 2) is located just above this horizontal cut (arrow in Figure 3.8-4). It is open and goes back at least 25-30 feet, as far as we could see (Figure 3.8-5). If it connects to the lower adit, there may be a shaft or winze which would be dangerous and provide access to the gated lower workings.

3.8.4.2 Sample Locations

3.8.4.2.1 Soil
   No soil samples were taken at this location.

3.8.4.2.2 Water
   No water samples were taken at this location.

3.8.5 Structures
   There are no structures left at this site.

3.8.6 Safety

The upper adit is open and goes back at least 25-30 feet. If it connects to the lower adit, there may be a shaft or winze, which would be dangerous and provide access to the gated lower workings.
Figure 2.13-1. Sketch map of the Squaw Bay Limestone mine, showing surface features.
Figure 3.8-2. Grated main adit to the Squaw Bay Limestone Mine (Roll 216380, frame #20).

Figure 3.8-3. More distant view of the grated adit at the Squaw Bay Limestone (Roll 216380, frame #21).
Figure 3.8-4. Concrete foundations of the limestone mill (Roll 216380, frame #22).

Figure 3.8-5. Area north of the limestone mill. Arrow points to the upper adit, or "air shaft" (Roll 216380, frame #24).
3.9 LAKEVIEW LIMESTONE QUARRIES (Site No. SP-10)

3.9.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Lakeview mines (pits) are clearly shown on the Lakeview 7.5-minute quadrangle. The pits are about ¼ mile west of the town of Lakeview and can be reached by an unnumbered road that splits off from USFS Road No. 278. According to Figure 2.1-2, the quarries appear to be on private property.

3.9.2 Geologic Features (Figure 2.2-1)

According to Kun’s (1974) geologic map, the pits are in the Lakeview Limestone of Cambrian age, as are most of the limestone mines in the area.

3.9.3 Site History

The first report (currently in the IGS files) to the Idaho Mine Inspector by the International Portland Cement Co., Ltd., of Spokane, Washington, was in 1924. It notes that both surface and underground limestone mining operations were underway on claims in the Lakeview area. In 1925, the company noted that the underground work would soon be replaced by a glory hole operation. The 1930 report says that all equipment was removed from the property and the surface plant abandoned.

A report filed with the Idaho Mine Inspector in 1964 by Great Western Aggregates, Inc., of Denver, Colorado, gives the following history:

The four patented mining claims listed on page one of this report [Blue Peter Lime Placer, Big Ledge Lime Placer, Big Buck Lime Placer, Wooden Lime Placer] were originally acquired by the Spokane Portland Cement Co. This company was purchased by Ideal Cement Co. on Oct. 1, 1954, and these claims have been transferred to Great Western Aggregates, Inc., which is a wholly owned subsidiary of Ideal Cement Co. Material for the manufacturing of cement was removed from this land by the Spokane Portland Cement Co. some years before it was dissolved. At the present time, this land is considered to be largely depleted. Distance and transportation facilities also make it difficult to use this land for a source of raw material in manufacturing cement, and for these reasons, there is little likelihood of any mining operation on this land in the foreseeable future.

3.9.4 Environmental Condition

3.9.4.1 Site Features

This site was visited by John Kauffman and William Rember on September 25, 1996. A videotape segment of the lower pits is on the Lakeview videotape (index 1:47:56-1:52:20), but the upper pit was not filmed due to poor lighting.
The Lakeview mines are limestone quarries located on the slope above Lake Pend Oreille. The property consists of two lower pits and an upper pit. The lower pits measure about 80+ feet deep and roughly 100 feet in diameter (Figures 3.9-1 and 3.9-2). Some vegetation and trees up to 6 inches in diameter are growing in the pits. A little water is seeping from the quarry slopes, but does not pool in the bottom of the pit and apparently drains out.

The upper pit is about 500-700 feet southwest of the lower pits. This pit also measures about 100 feet across and 80 feet deep. There is a funnel shaped hole or shaft in the bottom of this pit that apparently goes down a considerable distance (Figure 3.9-3). Rocks thrown into this opening could be heard bouncing for about ten seconds. There is also a little waste rock piled around the north edge of this pit. The funnel-shaped opening is very dangerous!

3.9.4.2 Sample Locations

3.9.4.2.1 Soil
   No soil samples were taken at this site.

3.9.4.2.2 Water
   No water samples were taken at this site.

3.9.5 Structures
   There are no structures left at this site.

3.9.6 Safety
   The open shaft in the upper pit is very dangerous!
Figure 3.9-1. Limestone quarry, East lower pit (Roll 216380, frame #13).
Figure 3.9-2. Limestone quarry, West lower pit. The pit is 80 to 100 ft. deep (Roll 216380, frame #16).
Figure 3.9-3. Upper limestone quarry (to the southwest of the two lower pits). This quarry contains an extremely dangerous hidden shaft (Roll 216380, frame #17).
3.10 BLANKET LEAD MINE (Site No. SP-9)
   Alternate names- Argus

3.10.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The mine is located in the NE ¼ of sec. 3, T. 53 N., R. 1 W. It is about ½ mile east of the town of Lakeview, just off USFS Road No. 278 near the North Fork of Gold Creek and the transmission line. The mine appears to be located on U.S. Forest Service land.

3.10.2 Geologic Features (Figure 2.2-1)

According to Kun’s (1974) geologic map, this prospect is in the Upper Member of the Wallace Formation.

3.10.3 Site History

This property produced a small amount of ore in the 1920s.

3.10.4 Environmental Condition

3.10.4.1 Site Features

This site was visited by John Kauffman and William Rember on September 25, 1996. No videotape was made of the site.

This is a prospect adit (Figure 3.10-1) that appears to have caved its entire length of about 100 feet. The present trench is on the south side of the North Fork of Gold Creek. The caved area of the adit is striking 335 degrees. Other than some old timbers in the very back of the adit, there is little evidence of man-made disturbance. The site covers less than 0.2 acre.

3.10.4.2 Sample Locations

3.10.4.2.1 Soil
   No soil samples were taken from this site.

3.10.4.2.2 Water
   No water samples were collected from this site.

3.10.5 Structures
   There were no structures left at the site.

3.10.6 Safety
   There were no significant hazards at the site.
Figure 3.10-1. Caved adit at the Blanket Lead prospect (Roll 216380, frame #18)
3.11 TWIN CREEK LIMESTONE QUARRY (Site No. SP-1)

3.11.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

This property is on a limestone promontory overlooking Lake Pend Oreille in the SE ¼ of sec. 26, T. 54 N., R. 1 W. An access road to the quarry takes off from USFS Road No. 278, just before this road passes under the power line.

3.11.2 Geologic Features (Figure 2.2-1)

According to Kun's (1974) geologic map, this quarry is in the Lakeview Limestone of Cambrian age.

3.11.3 Site History

This quarry is shown on a 1912 map of lime and cement operations in the Lakeview area (Renk, 1995). It probably supplied limestone to the International Portland Cement Company's plant at Squaw Bay (SP-4).

3.11.4 Environmental Condition

3.11.4.1 Site Features

This site was visited by John Kauffman and William Rember on September 26, 1996. No videotape was made of the site.

This is a small pit in the Lakeview Limestone (Figure 3.11-1). Only a small amount of limestone has been quarried and less than 0.10 acre has been disturbed. The limestone section is exposed for 500-1,000 vertical feet, dips 21 degrees to the southeast, and strikes 320 degrees SW-NE. There are no problems at this site.

3.11.4.2 Sample Locations

3.11.4.2.1 Soil

No soil samples were taken from this site.

3.11.4.2.2 Water

No water samples were collected from this site.

3.11.5 Structures

There are no structures at this site.

3.11.6 Safety

There are no hazards present at this site.
Figure 3.11-1. Twin Creek Limestone Quarry, showing the limestone dipping 21 degrees SE and striking 320 degrees NW (Roll 216380, frame #19).
3.12 MAX DUNN MINE (Site No. SP-14)
   Alternate names- Bloody Shirt

3.12.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

This mine is located in sec. 27, T. 53 N., R. 1 W. in Chloride Gulch. There is a jeep trail to the property that takes off just north of the junction of USFS Roads 1180 and 1380. The jeep trail is about ¾ mile south of the junction of Roads 278 and 1180. The mine is on U.S. Forest Service property.

3.12.2 Geologic Features (Figure 2.2-1)

3.12.3 Site History
   Savage (1967) noted that there were two claims at this site.

3.12.4 Environmental Condition

3.12.4.1 Site Features

The site was visited by John Kauffman and William Rember on September 27, 1996. A video segment showing this property is on the Lakeview videotape (index 1:52:20-2:01:54).

There are two adits on this property. The upper adit (No. 1) is caved at the portal, but there is minor seepage from the adit (Figure 3.12-1). The waste dump outside of this adit (50 feet long, 40 feet wide, and 50 feet thick on the face) is pretty well overgrown (Figure 3.12-2). The lower adit (No. 2) is near creek level and is open (Figure 3.12-3). It has a small dump, maybe 20 feet across by 20 feet wide by 5 feet thick. The toe of this dump has been washed away by the creek. Adit No. 2 is a decline, tipping 15-20 degrees for at least 15 feet, which is as far in as we could see (Figure 3.12-4).

3.12.4.2 Sample Locations

3.12.4.2.1 Soil
   No soil samples were taken from this site.

3.12.4.2.2 Water

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K9279601</td>
<td>Seep from Adit No. 1</td>
<td>260</td>
<td>42° F.</td>
<td>7.7</td>
<td>1/4</td>
</tr>
<tr>
<td>K9279603</td>
<td>Downstream Sample</td>
<td>37</td>
<td>42° F.</td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td>K9279602</td>
<td>Upstream Sample</td>
<td>34</td>
<td>42° F.</td>
<td>7.9</td>
<td>2 ft. wide; 0.5 ft. deep</td>
</tr>
</tbody>
</table>
The unfiltered split of Sample K9279601 from the seep from Adit No. 1 exceeds all EPA standards for arsenic and is just slightly higher than the upper limit of the Aquatic Life Chronic standard for zinc (Table 2.5-1). Only arsenic is a problem in the filtered sample. The upstream sample (K9279602) exceeds the Aquatic Life Standard for cadmium and both Aquatic Life standards for zinc. The downstream sample (K9279603) exceeds the Aquatic Life Chronic standard for zinc only. The arsenic is obviously not available in the active waterway, and the cadmium and zinc values only slightly exceed the standards.

3.12.5 Structures
There are no structures at the site.

3.12.6 Safety
There are no significant hazards at the site, although the lower adit should be closed.
Figure 2.17-1. Sketch map of the Max Dunn (Bloody Shirt) mine, showing the surface features and sample locations.
Figure 3.12-2a. Looking south at collapsed Adit No. 1, or upper adit, at the Max Dunn Mine. The adit is in the center of the picture (Roll K5, frame #19).

Figure 3.12-2b. Taken to the left of frame #19, looking southeast at a small waste rock pile on the main dump of the Max Dunn Mine (Roll K5, frame #20).
Figure 3.12-3. Looking east or southeast across the face of the upper waste dump from the toe of the dump at the Max Dunn Mine (Roll K5, frame #23).

Figure 3.12-4. Looking south at the open lower adit (No. 2) at the Max Dunn Mine (Roll K5, frame #22).
3.13 WIBERG MINE (Site No. SP-15)

3.13.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Wiberg Mine is located in the SE ¼ of sec. 21, T. 53 N., R. 1 W., in Chloride Gulch near a tributary to the gulch. The property is located on the west flank of the nose of the ridge shown on the Lakeview 7.5-minute quadrangle. Access is via USFS Road No. 1180, and the mine is about 1 mile south of the junction with USFS Road No. 278. Based on Figure 2.1-2, the mine is on U.S. Forest Service land.

3.13.2 Geologic Features (Figure 2.2-1)

According to Kun's (1974) map, the Wiberg Mine is in the Middle Member of the Wallace Formation. The mine is located near the northern end of the Hewer shear.

3.13.3 Site History

No history is available for this site.

3.13.4 Environmental Condition

3.13.4.1 Site Features

This site was visited by John Kauffman and William Rember on September 4, 1996. A video segment showing the mine is on the Lakeview I videotape (index 2:01:54-2:06:25).

The Wiberg property (Figure 3.13-1) has two caved adits. The lower adit (No. 1) has water seeping from it (Figure 3.13-2) at an estimated rate of <0.5 gpm. The elevation of the lower adit is about 2,830 feet. The dump at this adit measures 30 feet long, 30 feet wide, and 8 feet thick. The upper adit (No. 2) is about 30 feet higher and on the same strike (Figure 3.13-3) as Adit No. 1. The dump at Adit No. 2 measures 30 feet long, 18 feet wide, and 12 feet thick. Both dumps are overgrown with cedars of variable size. The upper dump has a caved area that may be the result of collapsing of the lower adit. Some old cars and other scrap metal are present at the site, which covers <0.5 acres.

3.13.4.2 Sample Locations

3.13.4.2.1 Soil

No soil samples were taken at this site.
3.13.4.2.2 Water

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (gpm)</th>
</tr>
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<tbody>
<tr>
<td>R9049606</td>
<td>Adit No. 1</td>
<td>234</td>
<td>48° F.</td>
<td>6.9</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Sample R9049606 from Adit No. 1 contains the most arsenic (1.3 mg/L (ppm)) of any water sample in the study area and exceeds all EPA water quality standards (Table 2.5-1). The sample also exceeds the Aquatic Life Chronic standard for cadmium and copper, the Secondary MCL and aquatic life standard for iron and manganese, and both Aquatic Life standards for zinc.

3.13.5 Structures
    There are no structures at this site.

3.13.6 Safety
    No significant hazards were noted at this site.
Figure 2.18-1. Sketch map of the Wiberg mine, showing surface features and sample locations.
Figure 3.13-2. Wiberg adit No. 1, close-up looking south (Roll 216380, frame #12).
Figure 3.13-3. Wiberg adit No. 2 from the dump, looking south (Roll 216380, frame #11).
3.14 SILVER LEAF MINE (Site No. SP-16)

3.14.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Silver Leaf Mine is located on the east branch of Gold Creek in the SE ¼, sec. 24, T. 53 N., R. 1 W., and is about eight miles southeast of Lakeview. From Lakeview, access is from USFS Road No. 278. About three miles south of Lakeview, Road No. 1078 branches off to the southeast to the Silver Leaf Mine. The upper end of Road No. 1078 connects to USFS Road No. 332 (Pend Oreille Divide or Bunco Creek Road) on the top of the ridge. The mine is on U.S. Forest Service land.

3.14.2 Geologic Features (Figure 2.2-1)

According to Kun (1974, p. 40), the Silver Leaf Mine “is on the easterly extension of the Conjecture vein (Pl. 1 [Figure 2.3] and 2 [omitted]). No record of production and assays are available, and the rocks on the dump contain few visible sulfides. The mine is located within chloritized siltites and argillites of the Middle Member of the Wallace Formation.”

3.14.3 Site History

The first mention of the Silver Leaf Mine by the USGS/USBM was in 1925 when it was reported that some ore had been shipped from mine. There is no other mention of the property.

3.14.4 Environmental Condition

3.14.4.1 Site Features

The Silver Leaf mine site was visited by John Kauffman and William Rember on September 3, 1996. A video segment of the mine is on the Lakeview videotape (index 2:06:25-2:11:45).

This description of the Silver Leaf begins at the at the upper workings (Adit No. 1, elevation about 4,050 feet) at the head of a tributary on the east side of Gold Creek. Adit No. 1 is caved and eroded back or excavated about 100 feet, where the collapse has formed a Y-shaped trough (Figure 3.14-1). An abundance of rock debris has been flushed from uphill into this trough. The dump at Adit No. 1 measures 50 feet long, 40 feet wide, and 20 thick.

There may also be a second collapsed adit just southeast of the dump at Adit No. 1. This dump (?) is very overgrown with thick brush. It could also be a small upper dump related to collapsed Adit No. 1. This pile of dirt is about 10 feet by 20 feet by 15 feet. Near this second pile is the floor of a decayed building or shed measuring about 9 feet by 9 feet, again overgrown and barely visible.

Adit No. 2 is about ¼ mile downstream from Adit No. 1 and was driven on the south side of the creek (Figure 3.14-2). The dump at Adit No. 2 measures about 100 feet by 90 feet by 20 feet. The site is very brushy, with some large trees growing on the dump face.
Adit No. 3 is about 15 feet north of the creek (Figure 3.14-3), just downstream from the Adit No. 2 dump. The dump at Adit No. 3 is about 30 feet long, but only about 6 feet wide and 5 feet thick. It has been washed away by the creek. There is water flowing from this adit at an estimated rate of 0.5 gpm, and it does reach the creek (Figure 3.14-4, Sample R9039606). The stream is intermittent and disappears into gravels.

3.14.5.2 Sample Locations

3.14.5.2.1 Soil

No soil samples were taken at this site.

3.14.5.2.2 Water

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity</th>
<th>Temperature</th>
<th>pH</th>
<th>Flow (gpm)</th>
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</thead>
<tbody>
<tr>
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<td>Water flowing from Adit No. 3</td>
<td>148</td>
<td>46° F.</td>
<td>7.4</td>
<td>0.5</td>
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<tr>
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<td>48° F.</td>
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<tr>
<td>R9039607</td>
<td>Upstream Sample</td>
<td>157</td>
<td>48° F.</td>
<td>7.3</td>
<td>3 ft. wide; &lt;0.5 ft. deep</td>
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</tbody>
</table>

Sample R9039606 from Adit No. 3 slightly exceeds the Aquatic Life Chronic standard for copper and the secondary MCL for iron (Table 2.5-1).

3.14.6 Structures

There are no structures at the site.

3.14.7 Safety

No significant hazards were noted at the site.
Figure 3.14-1. Upper Adit No. 1 at the Silver Leaf Mine with two caved branches of workings (Roll 214170, frame #16).
Figure 3.14-2. Adit No. 2 at the Silver Leaf Mine, looking south (Roll 214170, frame #19).
Figure 3.14-3. Adit No. 3 at the Silver Leaf Mine, looking north (Roll 214170, frame #17).
Figure 3.14-4. Water from Adit No. 3 going into a tributary of Gold Creek (Roll 214170, frame #18).
3.15 PERRY MINE (Site No. SP-17)

3.15.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Perry Mine is located in sec. 26, T. 53 N., R. 1 W. on a small tributary to Gold Creek. Access is from Road No. 2410, which joins the Bunco Creek road (USFS Road No. 332). The mine is on U.S. Forest Service land.

3.15.2 Geologic Features (Figure 2.2-1)

The property is in the Middle Member of the Wallace Formation on the Conjecture shear zone (Kun, 1974). It is probably an exploration site on the shear zone.

3.15.3 Site History

No history is available for this site.

3.15.4 Environmental Condition

3.15.4.1 Site Features

The site was visited by John Kauffman and William Rember on September 26, 1996. A video segment of the property is shown on the Lakeview videotape (index 2:11:45-2:15:24).

The Perry consists of a series of trenches on a clear-cut slope and at least one caved working (possibly two). The caved, dry adit is along the west edge of the clear cut about 100 feet above creek level. The dump at this adit measures 30 feet long, 15 feet wide, and about 60 feet thick on the face (Figures 3.15-1 and 3.15-2). The dump does not impinge on the creek. The possible caved adit is upslope about 200 feet in the timber, just beyond the clear cut. The site is heavily overgrown. It is at the end of a dozer cut, and the reason we think it may be a caved adit is because of a dump-like debris pile below the end of the cut. The adit was driven about due north into the hillside. The site covers about 1 acre.

3.15.4.2 Sample Locations

3.15.4.2.1 Soil

No soil samples were taken at this location.

3.15.4.2.2 Water

No water samples were collected from this site.

3.15.5 Structures

There are no structures left at this site.

3.15.6 Safety

No safety hazards were noted at this site.
Figure 3.15-1. Looking north up the face of the dump at the Perry Mine (Roll K4, frame #15).
Figure 3.15-2. A more distant view of the Perry dump, taken from creek level (Roll K4, frame #16).
3.16 PRINCESS PANAMA (Site No. SP-22)
Alternate names-Swastika, Shooneah Mining Co., Ltd.

3.16.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Princess Panama Mine is located in sec. 27, T. 53 N., R. 1 W. The property can be reached from Road No. 1180A, which is a spur road to USFS Road No. 1180. It is also possible to reach the mine from an unnumbered logging road that goes north and west from the Bunco Road (No. 332). This mine is just above the passable road from the Keep Cool to Idaho Lakeview mines. An old, overgrown road passes in front of the adit and crosses the dump. The property is on U.S. Forest Service land.

3.16.2 Geologic Features (Figure 2.2-1)

According to Kun’s (1974) geologic map, the mine is in the Middle Member of the Wallace Formation.

3.16.3 Site History

The Princess Panama Mining and Developing Company filed a report with the Idaho State Mine Inspector in 1913. The claims mentioned in the report were located 5½ miles south of Lakeview and included the St. Patrick, Birthday, and Mill Site. About 80 feet of work was done on the property that year.

3.16.4 Environmental Condition

3.16.4.1 Site Features

The mine was visited by John Kauffman and William Rember on September 4, 1996. A video segment showing the mine is on the Lakeview videotape (index 2:15:24-2:18:30).

This is a small working with a single caved, dry adit (Figure 3.16-1). The dump is overgrown with grasses, ferns, and a few small trees (Figure 3.16-2). Several large trees (2 feet in diameter) are growing out of the east end of the dump, but may have been there when material was piled around them. The dump measures 100 feet long, 45 feet wide, and 15 feet thick. The remains of a collapsed building were noted.

3.16.4.2 Sample Locations

3.16.4.2.1 Soil
No soil samples were taken at this site.

3.16.4.2.2 Water
No water samples were taken at this site.
3.16.5 Structures
There were no intact structures left at this site.

3.16.6 Safety
No significant hazards were noted at the property.
Figure 3.16-1. Princess Panama caved adit, looking south (roll 216380, frame #7).

Figure 3.16-2. Dump at the Princess Panama Mine, looking toward the adit (Roll 216380, frame #9).
3.17 BELLEVILLE PROSPECT (Site No. SP-23)

3.17.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

This mine is located in the NE ¼, sec. 33, T. 53 N., R. 1 W. It is about 80-100 feet downslope on an old overgrown road from the Bunco Road (USFS No. 332). The mine is on U.S. Forest Service land.

3.17.2 Geologic Features (Figure 2.2-1)

According to Kun (1974), the mine is in unaltered argillites and siltites of the Middle Member of the Wallace Formation. No specimens of sulfide minerals were found in the upper adit or dumps. The lower adit is caved at the portal.

3.17.3 Site History

A report was filed in 1963 with the Idaho Mine Inspector by the Bonner-Belleville Mining Company. The report notes that the property was developed by two tunnels; one of them was 700 feet long.

3.17.4 Environmental Condition

3.17.4.1 Site Features

The mine was visited by John Kauffman and William Rember on September 4, 1996. No video was taken at this site.

The Belleville Mine has one collapsed, dry adit (Figure 3.17-1). The dump is of moderate size, measuring about 60 feet long, 60 feet wide, and 60 feet thick on the nose. The area is overgrown with thick brush and small trees. A few timbers, boards, other trash, and a little scrap metal are on the dump (Figure 3.17-2).

3.17.4.2 Sample Locations

3.17.4.2.1 Soil
No soil samples were taken at this site.

3.17.4.2.2 Water
No water samples were collected at this site.

3.17.5 Structures
No structures were present at this site.

3.17.6 Safety
No significant hazards were noted at the site.
Figure 2.22-1. Sketch map of the Bellville mine, showing surface features.
Figure 3.17-2. The overgrown dump at the Bellville Mine in a heavy rain (Roll 216380, frame #6).
3.18 RENNIE PROSPECT (Site No. SP-27)
Alternate names- Robert Rennie, Comet

3.18.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Rennie prospect is located in sec. 35, T. 53 N., R. 1W. The mine is about 1/4 mile south of the New Rainbow Mine and 1/4 mile east of the Weber Mine and is accessible from Road No. 2410 (gated), which is a spur of the Bunco Road (USFS No. 332). According to Figure 2.1-2, the Rennie Prospect is on or near the boundary between U.S. Forest Service land and the block of patented claims associated with the Weber Mine.

3.18.2 Geologic Features (Figure 2.2-1)

According to Kun’s (1974) geologic map, the Rennie Prospect is probably in the Middle Member of the Wallace Formation.

3.18.3 Site History

U.S. Bureau of Mines records show 4 tons of ore were produced from the Comet claim in 1915. This material yielded 320 ounces of silver and 820 pounds of lead. There is no further mention of the property.

3.18.4 Environmental Condition

3.18.4.1 Site Features

This site was visited by John Kauffman and William Rember on September 26, 1996. A video segment showing the site is on the Lakeview videotape (index 218:30-2:21:25).

The Rennie Prospect consists of a single dry caved adit (Figure 3.18-1). The dump contains black (graphitic?) shale and is easily visible from Road No. 2410 (Figure 3.18-2). A second cut or short adit on a quartz vein was found on the road about 200 feet to the north of the first adit. Any dump material from the caved adit was removed during road construction.

3.18.4.2 Sample Locations

3.18.4.2.1 Soil
No soil samples were taken at this site.

3.18.4.2.2 Water
No water samples were collected at this site.
3.18.5 Structures
   No structures were left at this site.

3.18.6 Safety
   No safety hazards were noted at this site.
Figure 3.18-1. The brushy, caved portal of the adit at the Rennie Prospect. Note the rotten timbers. The view is looking south (Roll K5, frame #17).
Figure 3.18-2. Rennie Prospect, looking southwest at the waste dump from USFS Road 2410 (Roll K5, frame #18).
3.19 SHOSHONE SILVER (mill)

This mill is still active. A video segment showing the mill is on the Lakeview videotape (index 2:21:25-2:27:50).
3.20 LONE HAND MINE (Site No. SP-20)

3.20.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

The Lone Hand is at the head of Prospect Creek in sec. 29, T. 53 N., R. 1 W., above the Idaho Lakeview Mine. It is on a logging road that connects to the Bunco Road (USFS No. 332) and appears to be on patented ground.

3.20.2 Geologic Features (Figure 2.2-1)

According to the geology shown on Kun's (1974) map, the Lone Hand is in the Middle Member of the Wallace Formation. The site is on or near the Packsaddle Fault.

3.20.3 Site History

This mine is shown on Plates I and II of Sampson (1928). No other information is known about the site.

3.20.4 Environmental Condition

3.20.4.1 Site Features

This site was visited by John Kauffman and William Rember on September 9, 1996. No video was taken at this site.

It is not certain that this location is the Lone Hand. All we found was a bulldozer cut along a logging trail (Figure 3.20-1). The cut was about 200 feet long, 40 feet wide from the bank to the edge of the road, and about 15 feet high (Figure 3.20-2). Oxidized, mineralized material containing some quartz was present in the cut. Otherwise, there was no indication of workings.

3.20.4.2 Sample Locations

3.20.4.2.1 Soil

No soil samples were taken at this location.

3.20.4.2.2 Water

No water samples were taken at this location.

3.20.5 Structures

There are no structures at this site.

3.20.6 Safety

No hazards were noted at this site.
Figure 2.25-1 Sketch map of the Lone Hand mine, showing surface features.
Figure 3.20-2. Open cut at the probable site of the Lone Hand Mine (Roll 216380, frame #3).
3.21 UNNAMED LOCALITY (Site No. SP-7)
Alternate names- R9029602

3.21.1 Site Location and Access (Figures 2.1-1 and 2.1-2)

This mine is in the NE ¼, sec. 2, T. 53 N., R. 1 W. It is on North Gold Creek about ½ mile southeast of the Vulcan Mine and is adjacent to Road 278. The site is on U.S. Forest Service land.

3.21.2 Geologic Features (Figure 2.2-1)

According to Kun's (1974) geologic map, this property is probably in Cretaceous granodiorite.

3.21.3 Site History

Both SP-7 and R9029602 may be part of the Glasscock properties mentioned by Kun (1974). He noted that R. Glasscock of Lakeview had developed several small, high-grade ore shoots along a vein on "Vulcan Hill." "About five" adits had been driven along the vein. Some ore was shipped to the Conjecture mill, but no assay or production records were available to Kun.

3.21.4 Environmental Condition

3.21.4.1 Site Features

This site was visited by John Kauffman and William Rember on September 2, 1996. No video was taken at this property.

This site (SP-7) is possibly a continuation of the property designated as R9029602 (Figure 3.21-1). The portal of a single, open, dry adit (Figure 3.21-2) is in excellent shape with an extensive dump (120 feet long, 65 feet wide, and 15 feet thick). Part of the dump material appears to have been hauled away (Figure 3.21-3). The adit strikes about N. 20° W.

Site R9029602 has an adit and a shaft on the new USFS Road No. 278. Road construction has obliterated the dumps from both workings. The shaft is about 70 feet east of the open adit, which is along the side of the road. The adit strikes about N. 30° W. The entire area, including the road banks, is oxidized.

3.21.4.2 Sample Locations

3.21.4.2.1 Soil

No soil samples were collected from this site.
3.21.4.2.2 Water
   No water samples were collected from this site.

3.21.5 Structures
   There are no structures at this site.

3.21.6 Safety
   The open workings should be secured.
Figure 3.21-1 Sketch map of the unnamed R9029602 prospect, showing the surface features.
Figure 3.21-2. Open adit at unnamed prospect SP-7 (Roll 214169, frame #23).
Figure 3.21-3. Dissected dump at unnamed prospect SP-7 (Roll 214169, frame #24).
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Campbell, Stewart, 1925, Twenty-sixth annual report of the mining industry of Idaho for the year 1924: p. 79-80.

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Appendix A
Field Questionnaire
PART A
(To be completed for all identified sites)

LOCATION AND IDENTIFICATION

ID# __________ Site Name(s) __________
FS Tract # ___________ FS Watershed Code ___________
Forest ___________ District ___________
Location based on: GPS ___ Field Map ___ Existing Info ___ Other ___
Lat ___ Long ___ xutm ___ yutm ___ zutm ___
Quad Name ___ Principal Meridian ___________
Township ___ Range ___ Section ___ 1/4 ___ 1/4 ___ 1/4 ___ 1/4
State ___ County ___ Mining District ___________

Ownership of all disturbances:
___ National Forest (NF)
___ Mixed private and National Forest (or unknown)
___ Private.

If private only, impacts from the site on National Forest Resources are
___ Visually apparent ___ Likely to be significant ___ Unlikely or minimal

If all disturbances are private and Impacts to National Forest Resources are unlikely or minimal - STOP

PART B
(To be completed for all sites on or likely effecting National Forest lands)

SCREENING CRITERIA

Yes  No

___ 1. Mill site or Tailings present
___ 2. Adits with discharge or evidence of a discharge
___ 3. Evidence of or strong likelihood for metal leaching, or AMD (water stains, stressed or lack of vegetation, waste below water table, etc.)
___ 4. Mine waste in floodplain or shows signs of water erosion
___ 5. Residences, high public use area, or environmentally sensitive area (as listed in HRS) within 200 feet of disturbance
___ 6. Hazardous wastes/materials (chemical containers, explosives, etc)
___ 7. Open adits/shafts, highwalls, or hazardous structures/debris
___ 8. Site visit (If yes, take picture of site), Film number(s)

If yes, provide name of person who visited site and date of visit
Name: __________________ Date: ____________

If no, list source(s) of information (If based on personal knowledge, provide name of person interviewed and date):

If the answers to questions 1 through 6 are all No - STOP

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PART C
(To be completed for all sites not screened out in Parts A or B)

Investigator ____________________ Date ______
Weather ________________________

1. GENERAL SITE INFORMATION

*Take panoramic picture(s) of site, Film Number(s) ________________*
Size of disturbed area(s) ____ acres Average Elevation ____ feet
Access: ____ No trail ____ Trail ____ 4wd only ____ Improved road
____ Paved road
Name of nearest town (by road): ________________________________
Site/Local Terrain: ____ Rolling or flat ____ Foothills ____ Mesa ____ Mountains
____ Steep/narrow canyon
Local undisturbed vegetation *(Check all that apply): ____ Barren or sparsely vegetated
____ weeds/grasses ____ Brush ____ Riparian/marsh
____ Deciduous trees ____ Pine/spruce/fir
Nearest wetland/bog: ____ On site, ____ 0-200 feet, ____ 200 feet-2 miles, ____ > 2 miles
Acid Producers or Indicator Minerals: ____ Arsenopyrite, ____ Chalcopyrite, ____ Galena,
____ Iron Oxide, ____ Limonite, ____ Marcasite, ____ Pyrite, ____
Pyrrhotite, ____ Sphalerite, ____ Other Sulfide
Neutralizing Host Rock: ____ Dolomite, ____ Limestone, ____ Marble, ____ Other Carbonate

2. OPERATIONAL HISTORY

Dates of significant mining activity _______________________

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<tr>
<th>Commodity(s)</th>
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<tr>
<td>Production (ounces)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Years that Mill Operated</th>
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</tr>
</thead>
</table>

Mill Process: ____ Amalgamation, ____ Arrastre, ____ CIP (Carbon-in-Pulp), ____ Crusher only,
____ Cyanidation, ____ Flotation, ____ Gravity, ____ Heap Leach, ____ Jig Plant, ____ Leach,
____ Retort, ____ Stamp, ____ No Mill, ____ Unknown

<table>
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<tr>
<th>Commodity(s)</th>
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<tbody>
<tr>
<td>Production (ounces)</td>
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</table>

MILL PRODUCTION

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3. HYDROLOGY

Name of nearest Stream _________________ which flows into _________________
Springs (in and around mine site): ___ Numerous ___ Several ___ None
Depth to Groundwater __ ft, Measured at: ___ shaft/pit/hole ___ well ___ wetland
Any waste(s) in contact with active stream ___ Yes ___ No

4. TARGETS (Answer the following based on general observations only)

Surface Water
Nearest surface water intake ___ miles, Probable use _________________
Describe number and uses of surface water intakes observed for 15 miles downstream of site:

________________________________________________________________________

Wells
Nearest well ___ miles, Probable use _________________
Describe number and use of wells observed within 4 miles of site:

________________________________________________________________________

Population
Nearest dwelling ___ miles, Number of months/year occupied ___ months
Estimate number of houses within 2 miles of the site (Provide estimates for 0-200ft, 200ft-1mile, 1-2miles, if possible)

________________________________________________________________________

Recreational Usage
Recreational use on site: ___ High (Visitors observed or evidence such as tire tracks, trash, graffiti, fire rings, etc.; and good access to site), ___ Moderate (Some evidence of visitors and site is accessible from a poor road or trail), ___ Low (Little, if any, evidence of visitors and site is not easily accessible)
Nearest recreational area ___ miles, Name or type of area: _________________

5. SAFETY RISKS

___ Open adit/shaft, ___ Highwall or unstable slopes, ___ Unstable structures,
___ Chemicals, ___ Solid waste including sharp rusted items, ___ Explosives
6. MINE OPENINGS

Include in the following chart all mine openings located on or partially on National Forest lands. Also, include mine openings located entirely on private land if a point discharge from the opening crosses onto National Forest land. In this case, enter data for the point at which the discharge flows onto National Forest land; you do not need to enter information about the opening itself.

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Comments (When commenting on a specific mine opening, reference opening number used in Table 1):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Codes Applicable for all entries: NA = Not applicable, UNK = Unknown, OTHER = Explain in comments, NO = NO or none
Type of opening: ADIT = Adit, SHAFT = Shaft, Pit = Open Pit/Trench’ HOLE = Prospect Hole, WELL = Well
Ownership: NF = National Forest, MIX = National Forest and Private (Also, for unknown), PRV = Private
Condition (Enter all that apply): INTACT = Intact, PART = Partially collapsed or filled, COLP = Filled or collapsed, SEAL = Adit plug, GATE = Gated barrier,
Ground water (Water or evidence of water discharging from opening): NO = No water or indicators of water, FLOW = Water flowing, INTER = Indicators of intermittent flow, STAND = Standing water only (In this case, enter an estimate of depth below grade)
7. MINE/MILL WASTE

Include in the following chart all mine/mill wastes located on or partially on National Forest lands. Also, include mine/mill wastes located entirely on private land if it is visibly effecting or is very likely to be effecting National Forest resources. In this case enter data for the point at which a discharge from the waste flows onto National Forest land, or where wastes have migrated onto National forest land; only enter as much information about the waste as relevant and practicable.

### TABLE 2 - DUMPS, TAILINGS, AND SPOIL PILES

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</tr>
<tr>
<td>Waste Sample #</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Sample #</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Codes Applicable for all entries:**
- NA = Not applicable
- UNK = Unknown
- OTHER = Explain in comments
- NO = NO or none
- Mill Type: WASTE = Waste rock dump, MILL = Mill tailings
  - SPOIL = Overburden or spoil pile
  - HIGH = Highwall
  - PLACER = Placer or hydraulic deposit
  - POND = Settling pond or lagoon
  - ORE = Ore Stockpile
  - HEAP = Heap Leach
- Ownership: NF = National Forest
  - MIX = National Forest and Private (Also, for unknown)
  - PRV = Private
- Size of material (if composed of different size fractions, enter the sizes that are present in significant amounts):
  - FINE = Finer than sand
  - SAND = Sand
  - GRAVEL = > sand and < 2”, COBBLE = 2”-6”, BOULD = > 6”
- Wind Erosion, Potential for: HIGH = Fine, dry material that could easily become airborne, airborne dust, or windblown deposits
  - MOD = Moderate
  - Some fine material, or fine material that is usually wet or partially cemented
  - LOW = Little it any fines, or fines that are wet year-round or well cemented
- Vegetation (density on waste): DENSE = Ground cover > 75%
  - MOD = Ground cover 25% - 75%
  - SPARSE = Ground cover < 25%
  - BARREN = Barren
- Surface Drainage (Include all that apply): RILL = Surface flow channels mostly < 1’ deep
  - GULLY = Flow channels > 1’ deep
  - SEEP = Intermittent or continuous discharge from waste deposit
  - POND = Seasonal or permanent ponds on feature
  - BREACH = Breached
  - NO = No indicators of surface flow observe
- Indicators of Metals (Enter as many as exist):
  - NO = None
  - VEG = Absence of or stressed vegetation
  - STAIN = yellow, orange, or red precipitate
  - SALT = Salt deposits
  - SULF = Sulfides present
- Stability: EMER-imminent mass failure, LIKE = Potential for mass failure, LOW = mass failure unlikely
- Location w/ respect to Stream: IN = In contact with normal stream
  - NEAR = In riparian zone or floodplain
  - OUT = Out of floodplain

---

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8. SAMPLES

Take samples only on National Forest lands.

<table>
<thead>
<tr>
<th>TABLE 3 - WATER SAMPLES FROM MINE SITE DISCHARGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Number</td>
</tr>
<tr>
<td>Date sample taken</td>
</tr>
<tr>
<td>Sampler (Initials)</td>
</tr>
<tr>
<td>Discharging From</td>
</tr>
<tr>
<td>Feature Number</td>
</tr>
<tr>
<td>Indicators of Metal Release</td>
</tr>
<tr>
<td>Indicators of Sedimentation</td>
</tr>
<tr>
<td>Distance to stream (ft)</td>
</tr>
<tr>
<td>Sample Latitude</td>
</tr>
<tr>
<td>Sample Longitude</td>
</tr>
<tr>
<td>Field pH</td>
</tr>
<tr>
<td>Field SC</td>
</tr>
<tr>
<td>Flow (gpm)</td>
</tr>
<tr>
<td>Method of measurement</td>
</tr>
<tr>
<td>Photo Number</td>
</tr>
</tbody>
</table>

Comments: (When commenting on a specific water sample, reference sample number used in Table 3):

Codes Applicable for all entries: NA = Not applicable, UNK = Unknown, OTHER = Explain in comments, NO = NO or none
Discharging From: ADIT = Adit, SHAFT = Shaft, PIT = Pit/Trench, HOLE = Prospect Hole, WASTE = Waste rock dump, MILL = Mill tailings, SPOIL = Overburden or soil pile, HIGH = Highwall, PLACER = Placer or hydraulic deposit, POND = Settling pond or lagoon, WELL = Well
Feature Number: Corresponding number from Table 1 or Table 2 (Opening Number or Waste Number)
Indicators of Metal Release (Enter as many as exist): NO = None, YEG = Absence of, or stressed vegetation/organisms in and along drainage path, STAIN = yellow, orange, or red precipitate, SALT = Salt deposits, SUU = Sulfides present, TURB = Discolored or turbid discharge
Indicators of Sedimentation (enter as many as exist): NO = None, SLIGHT = Some sedimentation in channel, banks and channel largely intact, MOD = Sediment deposits in channel, affecting flow patterns, banks largely intact, SIGN = Sediment deposits in channel and/or along stream banks extending to nearest stream
Method of Measurement: EST = Estimate, BUCK = Bucket and time, METER = Flow meter
<table>
<thead>
<tr>
<th>Location relative to mine site/features</th>
<th>Upstream (Background)</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date sample taken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampler (Initials)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stream Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicators of Metal Release</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicators of Sedimentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Latitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Longitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field pH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow (gpm) Method of measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method of measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments: *(When commenting on a specific water sample, reference sample number used in Table 4):*

Codes Applicable for all entries: **NA** = Not applicable, **UNK** = Unknown, **OTHER** = Explain in comments, **NO** = NO or none

Indicators of Metal Release *(Enter as many as exist):* **NO** = None, **VEG** = Absence of, or stressed streamside vegetation/organisms in and along drainage path, **STAIN** = yellow, orange, or red precipitate, **SALT** = Salt deposits, **SULF** = Sulfides present, **TURB** = Discolored or turbid discharge

Indicators of Sedimentation *(Enter as many as exist):* **NO** = None, **SLIGHT** = Some sedimentation in channel, natural banks and channel largely intact, **MOD** = Sediment deposits in channel, affecting stream flow patterns, natural banks largely intact, **SIGN** = Sediment deposits in channel and/or along stream banks extending 1/2 a mile or more downstream

Method of Measurement: **EST** = Estimate, **BUCK** = Bucket and time, **METER** = Flow meter
TABLE 5 - WASTE SAMPLES

<table>
<thead>
<tr>
<th>Sample Number</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of sample</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampler (Initials)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feature Number</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Latitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Longitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments: (When commenting on a specific waste or soil sample, reference sample number used in Table 5):

Codes Applicable for all entries: NA = Not applicable, UNK = Unknown, OTHER = Explain in comments, NO = NO or none
Sample Type: SING = Single sample, COMP = composite sample (enter length)
Waste Type: WASTE = Waste rock dump, MILL = Mill tailings, SPOIL = Overburden or spoil pile, HIGH = Highwall, PLACER = Placer or hydraulic deposit, POND = Settling pond or lagoon sludge, ORE = Ore Stockpile, HEAP = Heap Leach
Feature Number: Corresponding number from Table 2 (Waste Number)
### TABLE 6 - SOIL SAMPLES

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Date of Sample</th>
<th>Sampler (Initials)</th>
<th>Sample Type</th>
<th>Sample Latitude</th>
<th>Sample Longitude</th>
<th>Likely Source of Contamination</th>
<th>Feature Number</th>
<th>Indicators of Contamination</th>
<th>Photo Number</th>
</tr>
</thead>
</table>

**Comments:** *(When commenting on a specific waste or soil sample, reference sample number used in Table 6):*

**Codes Applicable for all entries:** NA = Not applicable, UNK = Unknown, OTHER = Explain in comments, NO = NO or none

**Sample Type:** SING = Single sample, COMP = composite sample (enter length)

**Likely Source of Contamination:** ADIT = Adit, SHAFT = Shaft, PIT = Open Pit, HOLE = Prospect Hole, WASTE = Waste rock dump, MILL = Mill tailings, SPOIL = Overburden or spoil pile, PLACER = Placer or hydraulic deposit, POND = Settling pond or lagoon, ORE = Ore Stockpile, HEAP = Heap Leach

**Feature Number:** Corresponding number from Table 1 or 2 (Opening or Waste Number)

**Indicators of Contamination (Enter as many as exist):** NO = None, VEG = Absence of vegetation, PATH = Visible sediment path, COLOR = Different color of soil than surrounding soil, SALT = Salt crystals
9. HAZARDOUS WASTES/MATERIALS

<table>
<thead>
<tr>
<th>Waste Number</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Containment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition of Containment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Quantity of Waste</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments: (When commenting on a specific hazardous waste or site condition, reference waste number used in Table 7):

Codes Applicable for all entries: NA = Not applicable, UNK = Unknown, OTHER = Explain in comments, NO = NO or none

Type of Containment: NO = None, LID = drum/barrel/vat with lid, AIR = drum/barrel/vat without lid, CAN = cans/jars, LINE = lined impoundment, EARTH = unlined impoundment

Condition of Containment: GOOD = Container in good condition, leaks unlikely, FAIR = Container has some signs of rust, cracks, damage but looks sound, leaks possible, POOR = Container has visible holes, cracks or damage, leaks likely, BAD = Pieces of containers on site, could not contain waste

Contents: from label if available, or guess the type of waste, e.g., petroleum product, solvent, processing chemical.

Estimated Quantity of Waste: Quantity still contained and quantity released
10. STRUCTURES

For structures on or partially on National forest lands.

TABLE 8 - STRUCTURES

<table>
<thead>
<tr>
<th>Type</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Codes Applicable for all entries: NA = Not applicable, UNK = Unknown, OTHER = Explain in comments, NO = NO or none
Type: CABIN = Cabin or community service (store, church, etc.), MILL = mill building, MINE = building related to mine operation, STOR = storage shed, FLUME = Ore Chute/flume or tracks for ore transport
Number: Number of particular type of structure all in similar condition or length in feet
Condition: GOOD = all components of structure intact and appears stable, FAIR = most components present but signs of deterioration, POOR = major component (roof, wall, etc) of structure has collapsed or is on the verge of collapsing, BAD = more than half of the structure has collapsed

11. MISCELLANEOUS

Are any of the following present? (Check all that apply): 61 ~ __ Acrid Odor, __ Drums, __ Pipe, __ Poles, __ Scrap Metal, __ Overhead wires, __ Overhead cables, __ Headframes, __ Wooden Structures, __ Towers, __ Power Substations, __ Antennae, __ Trestles, __ Powerlines, __ Transformers, __ Tramways, __ Flumes, __ Tram Buckets, __ Fences, __ Machinery, __ Garbage

Describe any obvious removal actions that are needed at this site:

General Comments/Observations (not otherwise covered)
12. SITE MAP

Prepare a sketch of the site. Indicate all pertinent features of the site and nearby environment. Include all significant mine and surface water features, access roads, structures, etc. Number each important feature at the mine site and use these number throughout this form when referring to a particular feature (Tables 1 and 2). Sketch the drainage routes off the site into the nearest stream.
13. RECORDED INFORMATION

Owner(s) of patented land
Name: ___________________________________________________________
Address: _______________________________________________________
Telephone Number: _____________________________________________

Claimant(s)
Name: ___________________________________________________________
Address: _______________________________________________________
Telephone Number: _____________________________________________

Surface Water (From water rights)
Number of Surface Water Intakes within 15 miles downstream of site used for:
  ___ Domestic, ___ Municipal, ___ Irrigation, ___ Stock,
  ___ Commercial/Industrial, ___ Fish Pond, ___ Mining,
  ___ Recreation, ___ Other

Wells (From well logs)
Nearest well ___ miles
Number of wells within ___ 0-1/4 miles ___ 1/4-1/2 miles, ___ 1/2-1 mile
  ___ 1-2 miles ___ 2-3 miles ___ 3-4 miles of site

Sensitive Environments
List any sensitive environments (as listed in the HRS) within 2 miles of the site or along receiving
stream for 15 miles downstream of site (wetlands, wilderness, national/state park, wildlife refuge,
wild and scenic river, T&E or T&E habitat, etc):

______________________________________________________________

Population (From census data)
Population within ___ 0-1/4 miles ___ 1/4-1/2 miles ___ 1/2-1 mile
  ___ 1-2 miles ___ 2-3 miles ___ 3-4 miles of site

Public Interest
Level of Public Interest: ___ Low, ___ Medium, ___ High
Is the site under regulatory or legal action? ___ Yes, ___ No

Other sources of information (MILs #, MRDS #, other sampling data, etc):

______________________________________________________________
Appendix B
Database Fields
NEWLOC WÀ 1
ORANGENUM 451
MAPLOC 1
DEPOSIT Eagle Creek Mine

MRDSRBC
MILSREF 0160790528
PERIODPROD

ORE
COMMOD Au

LATITUDE 474325
LONGITUDE 1154916
HARDFILE N
MLA
NAME BAGLE CREEK MINE
SEC 33
SUBSEC NESE
TWN 051 N
RNG 005 E
DDMMSS 474325
DDDMSS 1154904
OPTYP SURFAC
STATUS PAST PRO
COMM01 GOLD
COMM02
COMM03
COMM04
COMM05
MAPNAME BURKE
QUAD WALLACE
POP 1KM
TOE M
YFC
MPF
SITENAME
DISTRICT
COUNTY
SECUAD
SECUADSCL
UTMNORTH
UTMEOAST
UTMZONE
COMMODIT
LAT
LON
TOWN
SECTION
RANGE
Appendix C
Geochemical Data
SEE
FOLDER:
Geochem_data
For data
Appendix D
Field Forms for Properties in the Study Area
SEE

FOLDER:

Field_forms

For data
Appendix E
1997 Waste Dump Samples
Introduction

On July 16, 1997, waste dump samples were collected by John Kauffman and Bill Rember from the five main properties in the Lakeview area (Table E-1). These include the Conjecture Mine, the Idaho Lakeview Mine, the New Rainbow Mine, the Weber Mine, and the Keep Cool Mine. Results of the sample analyses are discussed below. Please refer to the appropriate sections of the main body of this report for complete property descriptions.

Idaho Lakeview Mine

Three samples were collected from the Idaho Lakeview waste dump (Table E-1). Sample K07169701 was taken near the top of the north end of the dump from several small hand-dug pits in oxidized material. Sample K07169702 was also taken from the north end of the dump but from unoxidized material. Sample K07169703 was taken on the west side of the dump just above creek level where the creek has eroded part of the dump; both oxidized and unoxidized material were included in this sample.

Results

K07169701 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (2,800 ppm), cadmium (3.0 ppm), copper (110 ppm), lead (4,500 ppm), and zinc (330 ppm) in the element screen. In the TCLP metal screen, lead and barium were the only metals which showed significant leaching.

K07169702 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (4,700 ppm), cadmium (9.8 ppm), copper (120 ppm), lead (1,500 ppm), and zinc (2,600 ppm) in the element screen. In the TCLP metal screen, arsenic, cadmium, lead, and barium showed significant amounts of leaching.

K07169703 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (2,400 ppm), cadmium (3.2 ppm), copper (130 ppm), lead (2,700 ppm), and zinc (410 ppm) in the element screen. In the TCLP metal screen, cadmium and barium showed significant amounts of leaching.

Conjecture Mine

Three samples were collected from the Conjecture Mine waste dump (Table E-1). Sample K07169704 was taken from coarse, oxidized material on the east side of, and near the southeast end of, the washout. This oxidized material constitutes less than 1 percent of the total waste rock in the dump. Sample K07169705 was taken from unoxidized material on the east side of the washout above the collapsed part of the culvert. Sample K07169706 was taken from piles of oxidized material just north of the caved adits on the east side of the valley.
Table E-1. Dump samples in the Lakeview mining district (Gold Creek drainage).

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>Pb</th>
<th>Mn</th>
<th>Hg</th>
<th>Ni</th>
<th>Zn</th>
<th>Cu</th>
<th>Fe</th>
<th>Cr</th>
<th>Cd</th>
<th>Ba</th>
<th>As</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>K07169701</td>
<td>Idaho Lakeview waste dump (SP-19), oxidized material on north end of dump</td>
<td>NA</td>
<td>37,000</td>
<td>4,500</td>
<td>110</td>
<td>110</td>
<td>8</td>
<td>30</td>
<td>NA</td>
<td>NA</td>
<td>2,800.00</td>
<td>29</td>
<td>54</td>
</tr>
<tr>
<td>K07169702</td>
<td>Idaho Lakeview waste dump (SP-19), unoxidized material on north end of dump</td>
<td>NA</td>
<td>30,000</td>
<td>1,500</td>
<td>120</td>
<td>120</td>
<td>17</td>
<td>17</td>
<td>NA</td>
<td>NA</td>
<td>4,700.00</td>
<td>54</td>
<td>9.80</td>
</tr>
<tr>
<td>K07169703</td>
<td>Idaho Lakeview dump (SP-19), probable &quot;hot&quot; sample from toe of dump by creek</td>
<td>NA</td>
<td>31,000</td>
<td>2,700</td>
<td>130</td>
<td>130</td>
<td>6</td>
<td>17</td>
<td>NA</td>
<td>NA</td>
<td>2,400.00</td>
<td>26</td>
<td>3.20</td>
</tr>
<tr>
<td>K07169704</td>
<td>Conjecture dump (SP-18), oxidized material (&lt;1% of dump)</td>
<td>NA</td>
<td>180</td>
<td>5,600</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>140</td>
<td>NA</td>
<td>NA</td>
<td>1,100.00</td>
<td>69</td>
<td>6</td>
</tr>
<tr>
<td>K07169705</td>
<td>Conjecture dump (SP-18), unoxidized material</td>
<td>NA</td>
<td>1,900.00</td>
<td>150</td>
<td>41</td>
<td>41</td>
<td>38</td>
<td>38</td>
<td>NA</td>
<td>NA</td>
<td>200.00</td>
<td>140</td>
<td>3.90</td>
</tr>
<tr>
<td>K07169706</td>
<td>Conjecture (SP-18), side dump (small dumps on east side just north of east adits)</td>
<td>NA</td>
<td>66,000</td>
<td>5,600</td>
<td>180</td>
<td>180</td>
<td>17</td>
<td>22</td>
<td>NA</td>
<td>NA</td>
<td>1,500.00</td>
<td>89</td>
<td>5.00</td>
</tr>
<tr>
<td>K07169707</td>
<td>New Rainbow dump (SP-24), where dump is cut along Gold Creek Road</td>
<td>NA</td>
<td>32,000</td>
<td>1,200</td>
<td>92</td>
<td>92</td>
<td>2</td>
<td>63</td>
<td>NA</td>
<td>NA</td>
<td>740.00</td>
<td>280</td>
<td>7.20</td>
</tr>
<tr>
<td>K07169708</td>
<td>Weber dump (SP-25), main dump on downhill side of Forest Service Road</td>
<td>NA</td>
<td>3,700</td>
<td>3,400.00</td>
<td>370</td>
<td>370</td>
<td>12</td>
<td>78</td>
<td>NA</td>
<td>NA</td>
<td>470.00</td>
<td>370</td>
<td>12.00</td>
</tr>
<tr>
<td>K07169709</td>
<td>Keep Cool dump (SP-21), about midway down slope from Forest Service Road</td>
<td>NA</td>
<td>3,900.00</td>
<td>3,400.00</td>
<td>360</td>
<td>360</td>
<td>15</td>
<td>84</td>
<td>NA</td>
<td>NA</td>
<td>220.00</td>
<td>59</td>
<td>15.00</td>
</tr>
<tr>
<td>K07169710</td>
<td>Keep Cool dump (SP-21), several hundred feet south of K07169709</td>
<td>NA</td>
<td>5,800</td>
<td>2,500.00</td>
<td>390</td>
<td>390</td>
<td>12</td>
<td>38</td>
<td>NA</td>
<td>NA</td>
<td>460.00</td>
<td>66</td>
<td>12.00</td>
</tr>
</tbody>
</table>

Clark Fork Superfund Background Levels (ppm/kg):

<table>
<thead>
<tr>
<th></th>
<th>As</th>
<th>Cd</th>
<th>Pb</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Mean Soil</td>
<td>6.7</td>
<td>0.7</td>
<td>20.0</td>
</tr>
<tr>
<td>Helena Valley Mean Soil</td>
<td>16.5</td>
<td>0.2</td>
<td>11.5</td>
</tr>
<tr>
<td>Missoula Lake Bed Sediments</td>
<td>NA</td>
<td>0.2</td>
<td>34.0</td>
</tr>
<tr>
<td>Blackfoot River</td>
<td>4.0</td>
<td>&lt;0.1</td>
<td>NA</td>
</tr>
<tr>
<td>Phytotoxic Concentration</td>
<td>100.0</td>
<td>100.0</td>
<td>1000.0</td>
</tr>
</tbody>
</table>

Explanation

Below Detection Limit is --
Not analyzed equals NA
Table E-2. Toxicity Characteristic Leaching Procedure (TCLP) for dump samples from the Lakeview mining district (Gold Creek drainage).

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>As (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Pb (ppm)</th>
<th>Hg (ppm)</th>
<th>Se (ppm)</th>
<th>Ag (ppm)</th>
<th>Ba (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K07169701</td>
<td>Idaho Lakeview waste dump (SP-19), oxidized material on north end of dump</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>4.800</td>
<td>ND</td>
<td>---</td>
<td>0.340</td>
<td></td>
</tr>
<tr>
<td>K07169702</td>
<td>Idaho Lakeview waste dump (SP-19), unoxidized material on north end of dump</td>
<td>0.950</td>
<td>0.110</td>
<td>0.093</td>
<td>1.600</td>
<td>ND</td>
<td>---</td>
<td>0.270</td>
<td></td>
</tr>
<tr>
<td>K07169703</td>
<td>Idaho Lakeview dump (SP-19), probable &quot;hot&quot; sample from toe of dump by creek</td>
<td>---</td>
<td>0.025</td>
<td>---</td>
<td>ND</td>
<td>---</td>
<td>---</td>
<td>0.240</td>
<td></td>
</tr>
<tr>
<td>K07169704</td>
<td>Conjecture dump (SP-18), oxidized material (&lt;1% of dump)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>ND</td>
<td>---</td>
<td>---</td>
<td>0.520</td>
<td></td>
</tr>
<tr>
<td>K07169705</td>
<td>Conjecture dump (SP-18), unoxidized material</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>2.100</td>
<td>ND</td>
<td>---</td>
<td>2.100</td>
<td></td>
</tr>
<tr>
<td>K07169706</td>
<td>Conjecture (SP-18), side dump (small dumps on east side just north of east adits)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>2.200</td>
<td>ND</td>
<td>---</td>
<td>0.380</td>
<td></td>
</tr>
<tr>
<td>K07169707</td>
<td>New Rainbow dump (SP-24), where dump is cut along Gold Creek Road</td>
<td>0.041</td>
<td>0.031</td>
<td>---</td>
<td>1.400</td>
<td>ND</td>
<td>---</td>
<td>1.700</td>
<td></td>
</tr>
<tr>
<td>K07169708</td>
<td>Weber dump (SP-25), main dump on downhill side of Forest Service road</td>
<td>0.083</td>
<td>0.064</td>
<td>1.300</td>
<td>ND</td>
<td>---</td>
<td>---</td>
<td>2.000</td>
<td></td>
</tr>
<tr>
<td>K07169709</td>
<td>Keep Cool dump (SP-21), about midway down slope from Forest Service road</td>
<td>0.072</td>
<td>0.058</td>
<td>13.000</td>
<td>ND</td>
<td>---</td>
<td>---</td>
<td>1.100</td>
<td></td>
</tr>
<tr>
<td>K07169710</td>
<td>Keep Cool dump (SP-21), several hundred feet south of K07169709</td>
<td>0.180</td>
<td>0.160</td>
<td>110.000</td>
<td>ND</td>
<td>---</td>
<td>---</td>
<td>0.430</td>
<td></td>
</tr>
</tbody>
</table>

**EXPLANATION**

Blank space equals no analysis
Not Detected is ND
Below Detection Limit is ---

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>As (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Se (mg/L)</th>
<th>Ag (mg/L)</th>
<th>Ba (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.050</td>
<td>0.005</td>
<td>0.100</td>
<td>0.050</td>
<td>0.002</td>
<td>0.05</td>
<td></td>
<td>2.000</td>
</tr>
<tr>
<td>Secondary MCL</td>
<td></td>
<td></td>
<td></td>
<td>0.1</td>
<td>0.002</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.360</td>
<td>0.004 - 0.009</td>
<td>1.7 - 3.1</td>
<td>0.082 - 0.2</td>
<td>0.0024</td>
<td>0.0012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.190</td>
<td>0.001 - 0.002</td>
<td>0.21 - 0.37</td>
<td>0.003 - 0.008</td>
<td>0.000012</td>
<td>0.00012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.49</td>
<td>0.02</td>
<td>0.03</td>
<td>0.50</td>
<td>0.0017</td>
<td>0.65</td>
<td>0.27</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Results

K07169704 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (1,100 ppm), cadmium (6.0 ppm), copper (140 ppm), lead (1,800 ppm), and zinc (540 ppm) in the element screen. In the TCLP metal screen, only barium showed a significant amount of leaching.

K07169705 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (200 ppm), cadmium (3.9 ppm), copper (41 ppm), lead (150 ppm), and zinc (230 ppm) in the element screen. In the TCLP metal screen, lead and barium showed significant amounts of leaching.

K07169706 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (1,500 ppm), cadmium (5.0 ppm), copper (180 ppm), lead (5,600 ppm), and zinc (450 ppm) in the element screen. In the TCLP metal screen, lead and barium showed significant amounts of leaching.

New Rainbow Mine

One sample was collected from the New Rainbow Mine waste dump (Table E-1). Sample K07169707 was taken along Gold Creek Road where some of the dump material has been removed, probably for use in road construction. No oxidized material was present on the dump.

Results

K07169707 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (740 ppm), cadmium (7.2 ppm), chromium (63 ppm), copper (92 ppm), lead (1,200 ppm), and zinc (1,500 ppm) in the element screen. In the TCLP metal screen, cadmium, lead, and barium showed significant amounts of leaching.

Weber Mine

One sample was collected at the Weber Mine waste dump from a series of shallow hand-dug pits (Table E-1). Sample K07169708 was taken below Forest Service Road 1017 near the north edge of the dump.

Results

K07169708 – Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (470 ppm), cadmium (12.0 ppm), chromium (78 ppm), copper (370 ppm), lead (3,700 ppm), and zinc (4,400 ppm) in the element screen. In the TCLP metal screen, cadmium, lead, and barium showed significant amounts of leaching.
**Keep Cool Mine**

Two samples were collected from the Keep Cool Mine waste dump (Table E-1). Sample K07169709 was taken from gray, unoxidized material one level above the main adit. Sample K07169710 was taken from oxidized material located about 250 feet south of K07169709 where the logging skid road switches back up the hill.

**Results**

**K07169709** — Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (220 ppm), cadmium (15.0 ppm), chromium (84 ppm), copper (360 ppm), lead (1,100 ppm), and zinc (5,400 ppm) in the element screen. In the TCLP metal screen, cadmium, lead, and barium showed significant amounts of leaching.

**K07169710** — Compared to expected background values (Tables 1.5-3, 1.5-4, and 1.5-5), the sample has elevated values of arsenic (460 ppm), cadmium (12.0 ppm), copper (600 ppm), lead (5,800 ppm), and zinc (5,000 ppm) in the element screen. In the TCLP metal screen, cadmium, chromium, lead, and barium showed significant amounts of leaching.