Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Idaho Panhandle National Forest: Volume IX, Section D: Sandpoint Ranger District, Bonner and Boundary Counties, Idaho

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Field Inspection conducted by John Kauffman, William Rember, Ted Erdman, and Earl Carroll


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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 that could impact U.S. 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 area inventoried was the Panhandle National Forests. This volume presents work that was done in the Sandpoint Ranger District. Appendix E contains a list of all reports prepared for this project. 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 (Summit mining district) in Shoshone County, field examination of properties in the Gold Creek drainage (Lakeview mining district) in Bonner County, and preparation of reports discussing the ownership and operational history of selected mines. Field work in the summer of 1997 covered properties in the Coeur d'Alene River basin surrounding the Coeur d'Alene mining district that had not been examined the previous summer. Properties north and south of the Coeur d'Alene River drainage were examined during the 1998 field season.

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

1. Systematically identify all mine sites with possible human health, environmental, and/or safety related problems that either are on or affecting 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 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 include 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 the 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₋ₓS). 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; chalcopyrite, CuFeS₂; galena, PbS; tetrahedrite, (CuFe)₁₂Sb₄S₁₃; 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(OH)₆] and jarosite [KFe₃(SO₄)₂(OH)₆] will precipitate at a 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)₂CO₃] form when CO₃²⁻ 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 chalcocite [Cu₂S], bornite [Cu₄FeS₄], chalcopyrite [CuFeS₂], 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. Frankelite 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 acid mine drainage may ultimately control the 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. 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 area, 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 IGS 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></td>
<td>1. Mill site or tailings present.</td>
</tr>
<tr>
<td></td>
<td>2. Adits with discharge or evidence of discharge.</td>
</tr>
<tr>
<td></td>
<td>3. 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></td>
<td>4. Mine waste in floodplain or shows signs of water erosion.</td>
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<tr>
<td></td>
<td>5. Residences, high public use area, or environmentally sensitive area (as listed in HRS) within 200 feet of the disturbance.</td>
</tr>
<tr>
<td></td>
<td>6. Hazardous wastes/materials (chemical containers, explosives, etc.)</td>
</tr>
<tr>
<td></td>
<td>7. 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 surface 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. 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 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, Stream Sediment, and Mine Waste Sampling Procedures

At sites identified as having a potential problem, the geologist collected soil, rock, stream sediment, 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, stream sediment, 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 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 stream beds). 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. Two 125-ml samples were collected.
One sample was left raw and the other was acidified with 0.1N nitric acid. Both samples were stored in a secured ice box. The samples remained under constant refrigeration and security until submitted for analysis.

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, reference water-quality data at a particular mine site was restricted to upstream surface water samples. However, in some drainages reference samples were collected at sites with no visible contamination and no known mining activity upstream from the sampling location. Reference 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 200.9), Lead (EPA Test 200.9), and Mercury (EPA Test 245.1).
Water Samples (raw and filtered 0.45 micron filter)—Dissolved Metal Screen (EPA Test 200.7).
Soil and Waste Material—Element Screen (EPA Test 3050/6010), Leachable Metals [Toxicity Characteristic Leaching Procedure (TCLP) for Metals] Screen (EPA Test 1311/6010).

1.5.5 Standards

EPA and various state agencies have developed human health and environmental standards for various metals. In an attempt 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>0.012/0.021</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 both rock samples from the parent formation and soil samples from above the parent material. The median results from these analyses are presented in Tables 1.5-3 and 1.5-4, which show data for the Prichard, Burke, Revett, St. Regis, and Wallace 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 are still useful, especially for estimating background values. For example, an average sample of soil above 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 no detectible arsenic. 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).

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
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>.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>.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>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>3.1</td>
<td>3.3</td>
<td>3.8</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Magnesium (percent)</td>
<td>0.61</td>
<td>0.60</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Calcium (percent)</td>
<td>0.57</td>
<td>0.59</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Titanium (percent)</td>
<td>0.56</td>
<td>0.49</td>
<td>0.5</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Manganese (ppm)</td>
<td>1,285</td>
<td>1,373</td>
<td>1,730</td>
<td>1,809</td>
<td>1,377</td>
</tr>
<tr>
<td>Barium (ppm)</td>
<td>647</td>
<td>647</td>
<td>616</td>
<td>684</td>
<td>586</td>
</tr>
<tr>
<td>Beryllium (ppm)</td>
<td>1.4</td>
<td>1.1</td>
<td>1</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Cobalt (ppm)</td>
<td>14</td>
<td>10</td>
<td>8.8</td>
<td>9.5</td>
<td>9.4</td>
</tr>
<tr>
<td>Chromium (ppm)</td>
<td>43</td>
<td>32</td>
<td>34</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>Molybdenum (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Niobium (ppm)</td>
<td>9</td>
<td>9</td>
<td>---</td>
<td>---</td>
<td>8</td>
</tr>
<tr>
<td>Nickel (ppm)</td>
<td>29</td>
<td>21</td>
<td>20</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>Strontium (ppm)</td>
<td>159</td>
<td>178</td>
<td>157</td>
<td>164</td>
<td>154</td>
</tr>
<tr>
<td>Vanadium (ppm)</td>
<td>98</td>
<td>90</td>
<td>97</td>
<td>90</td>
<td>94</td>
</tr>
<tr>
<td>Mercury (ppm)</td>
<td>0.13</td>
<td>0.09</td>
<td>0.08</td>
<td>0.1</td>
<td>0.13</td>
</tr>
<tr>
<td>Copper (ppm)</td>
<td>21</td>
<td>20</td>
<td>29</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>Lead (ppm)</td>
<td>54</td>
<td>35</td>
<td>41</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td>140</td>
<td>89</td>
<td>77</td>
<td>86</td>
<td>115</td>
</tr>
<tr>
<td>Silver (ppm)</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Cadmium (ppm)</td>
<td>1.3</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Arsenic (ppm)</td>
<td>10</td>
<td>8.6</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Antimony (ppm)</td>
<td>1</td>
<td>1</td>
<td>1.8</td>
<td>1.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Sulfur (percent)</td>
<td>0.029</td>
<td>0.035</td>
<td>0.053</td>
<td>0.049</td>
<td>0.046</td>
</tr>
<tr>
<td>No. of Samples</td>
<td>1,705</td>
<td>573</td>
<td>699</td>
<td>1,586</td>
<td>2,298</td>
</tr>
</tbody>
</table>
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. It should be noted that the sampling for this study was of a reconnaissance nature only, sufficient for outlining possible problem areas for future study. Sampling density was not sufficient to provide a statistically valid description of any specific site.

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 database compatible with other studies under way by the U.S. Forest Service.

1.5.7 Sample and Site Identification Numbers

All water, tailings, and dump samples were assigned unique numbers. These were constructed according to the following system: 1) an initial letter code identifying the person who took the sample (usually the first letter of the last name); 2) one or two digits for the month (some sample numbers contain a leading zero); 3) two digits for the day on which the sample was taken; 4) the last two digits in the year in which the sample was taken (i.e., “98,” if the samples was taken in 1998); and 5) one to three digits, including leading zeros, identifying the individual sample. Site numbers for properties that did not have a database identification number assigned to them were generated in the same manner.
2.0 SANDPOINT RANGER DISTRICT, BONNER COUNTY, IDAHO

2.1 INTRODUCTION

This volume of the Idaho Panhandle National Forests report describes fifty-four properties in the Sandpoint Ranger District of the Kaniksu National Forest, which includes the mining areas around Lake Pend Oreille in Bonner County, Idaho. Twenty properties discussed in this volume reported production, and four of these had over 1,000 tons of total output. The study area extends from the district boundary on the west to the district boundary [the drainage divide between the Kootenai River (on the eastern side of the divide) and Clark Fork River and Lake Pend Oreille (on the western side of the divide)] or the Idaho-Montana state line on the east. The northern boundary of the district is roughly parallel to the Boundary-Bonner county line. The southern boundary is the Bonner-Shoshone county line. Access to the area is by paved and unpaved roads from U.S. Highway 95, which traverses the western side of the area in a north-south direction, and State Highway 200, which follows the Clark Fork River and the northern edge of Lake Pend Oreille. Most of the secondary drainages, especially those with past mining activity, have dirt roads.

The study area is in the Sandpoint District of the Kaniksu National Forest, and most of the land is administered by the U.S. Forest Service (USFS). There are enclaves of private land, mostly on patented mining claims, and of state land. The part of the Sandpoint Ranger District that includes the Gold Creek drainage was discussed in Volume II of the report on abandoned and inactive mines in the Idaho Panhandle National Forests.

The fifty-four mines and prospects described in this volume are located on twelve 7.5-minute topographic maps (U.S. Geological Survey). The locations of these properties are shown in Figure 2.1-1. Elevations in the study area range from about 2,062 feet on Lake Pend Oreille to 6,744 feet at Mount Pend Oreille on the eastern border of the study area. The area is heavily forested with dense brush and conifers, and the topography is generally very steep.

2.1.1 Summary of the Sandpoint Study Area

There were fifty-four mining properties (Table 2.1.1-1) examined in the Sandpoint Ranger District. Of these mines, nineteen have the potential to have an environmental impact on or near USFS lands. Nine of these properties have water discharges that exceed one or more water quality standards, three properties have waste rock impinging on an active drainage, and six properties have both water quality concerns and waste rock impinging on an active waterway. In addition, mill tailings were found at three sites; at one of these three sites, mill tailings were the only potential environmental problem noted. Of the twenty-one sites discussed in this section of the report (Section D of Volume IX), one property has water discharges that exceed one or more water quality standards and waste rock impinging on an active waterway. In addition, mill tailings were found at one site.
Table 2.1-1. Summary of properties visited in the Sandpoint District. The properties are arranged according to site number. Most sites were visited in 1998, although some were visited in 1997 or 1999. Properties shown in gray are discussed in Sections A, B, or C of this volume.

**Explanation:**

**Site Number:** Idaho Geological Survey file number, or field designation number.

**Surface Owner:** FS = Forest Service; BLM = Bureau of Land Management; S = State; P = Private or Patented claims; ? where ownership is uncertain

**Water/Solid Sample:** numbers indicate the number of samples collected.

**Environmental Concerns:** W = water; D = waste dump; T = mill tailings. Environmental concerns are noted as follows: W - samples of adit water or seeps from waste dumps that exceed one or more water quality standards in the Dissolved Metals Screen, the Total Recoverable Metals Screen, or the arsenic, lead or mercury tests; D or T - dump or tailings samples that exceed background or environmental standards for one or more elements in the Element Screen, and/or dump or tailings samples that show significant leaching of one or more metals in the TCLP for Metals Screen.

**Physical Conditions:** AO = open adit; AC = caved or otherwise closed adit; AG = gated adit; SO = open shaft; SC = caved shaft; IsO = internal shaft, open; T = trench or bulldozer cut; P = prospect pit; OP = open pit.

Numbers indicate how many of each are at the site; queried when type or condition of workings is uncertain or unknown.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Mine Name</th>
<th>Surface Owner</th>
<th>Water Samples</th>
<th>Solid Samples</th>
<th>Environmental Concerns</th>
<th>Physical Conditions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA-170</td>
<td>Dougherty Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2P</td>
</tr>
<tr>
<td>SA-172</td>
<td>Flume Creek Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>OP</td>
</tr>
<tr>
<td>SA-180</td>
<td>Marguerite Prospect</td>
<td>FS or P ?</td>
<td></td>
<td></td>
<td></td>
<td>1AO (IsO); 1AC; 1SC ?</td>
</tr>
<tr>
<td>SA-181</td>
<td>Trestle Creek Claims</td>
<td>FS or P ?</td>
<td></td>
<td></td>
<td></td>
<td>1AC ?</td>
</tr>
<tr>
<td>SA-184</td>
<td>Lightning Peak Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>Several P</td>
</tr>
<tr>
<td>SA-194</td>
<td>Auxer Mine</td>
<td>FS</td>
<td>4</td>
<td>1</td>
<td>W</td>
<td>1AC; T (with AC?)</td>
</tr>
<tr>
<td>SA-198</td>
<td>Delorah Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AO</td>
</tr>
<tr>
<td>SA-199</td>
<td>Campbell Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SA-200</td>
<td>Little Jim Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>SA-203</td>
<td>Regal Group</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>SA-205</td>
<td>Goat Mountain Prospect</td>
<td>FS</td>
<td>4</td>
<td>2</td>
<td>W, D</td>
<td>1AO</td>
</tr>
<tr>
<td>SA-206</td>
<td>Lucky Strike Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
</tbody>
</table>
Table 2.1-1 (continued). Summary of properties visited in the Sandpoint District.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Mine Name</th>
<th>Surface Owner</th>
<th>Water Samples</th>
<th>Solid Samples</th>
<th>Environmental Concerns</th>
<th>Physical Conditions/Comments</th>
</tr>
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<tbody>
<tr>
<td>SA-207</td>
<td>Ponderosa Group</td>
<td>FS</td>
<td></td>
<td></td>
<td>3AO; 3AC; 1SC; several P</td>
<td></td>
</tr>
<tr>
<td>SA-209</td>
<td>Gabriel Mine</td>
<td>P ? FS ?</td>
<td></td>
<td></td>
<td>1AC</td>
<td></td>
</tr>
<tr>
<td>SA-211</td>
<td>Homestake Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>2AO</td>
<td></td>
</tr>
<tr>
<td>SA-223/SA-224</td>
<td>Lawrence Mine/</td>
<td>FS</td>
<td>2</td>
<td>2</td>
<td>26AO; 16AC; 3AG; numerous P and T</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Little Senator Prospect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA-226</td>
<td>Ralph Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td>1AC; 1AC?</td>
<td></td>
</tr>
<tr>
<td>SA-229</td>
<td>Weir Prospect</td>
<td>P ?</td>
<td></td>
<td></td>
<td>1AC</td>
<td></td>
</tr>
<tr>
<td>SA-234</td>
<td>Sulfide Mine</td>
<td>P &amp; FS</td>
<td></td>
<td></td>
<td>1AO; 2SC</td>
<td></td>
</tr>
<tr>
<td>SA-244</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td>1</td>
<td>D</td>
<td>1AG</td>
<td></td>
</tr>
<tr>
<td>SA-245</td>
<td>Payrock Sunrise Mine</td>
<td>FS</td>
<td>3</td>
<td>W</td>
<td>5AO; 1SO (water filled)</td>
<td></td>
</tr>
<tr>
<td>SA-246</td>
<td>Unnamed Prospect (part of Payrock)</td>
<td>FS</td>
<td></td>
<td></td>
<td>2AG (FS gates)</td>
<td></td>
</tr>
<tr>
<td>SA-259</td>
<td>Hope and Faith Shaft</td>
<td>S</td>
<td></td>
<td></td>
<td>1SO</td>
<td></td>
</tr>
<tr>
<td>SA-260</td>
<td>Catherine Mine</td>
<td>S</td>
<td>1</td>
<td>1</td>
<td>3AO; 2AC</td>
<td></td>
</tr>
<tr>
<td>SA-261</td>
<td>Brown Bear Mine</td>
<td>S, FS</td>
<td>3</td>
<td>W</td>
<td>1AG; 3AO; 4AC</td>
<td></td>
</tr>
<tr>
<td>SA-262</td>
<td>Iron Mask Mine</td>
<td>S</td>
<td></td>
<td></td>
<td>2AO</td>
<td></td>
</tr>
<tr>
<td>SA-264</td>
<td>Stemwinder Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>1AO; 1SO</td>
<td></td>
</tr>
<tr>
<td>SA-266</td>
<td>Black Jack Mine</td>
<td>FS</td>
<td>1</td>
<td>1</td>
<td>6AC; 1AO; 1SO; 1SC</td>
<td></td>
</tr>
<tr>
<td>SA-267</td>
<td>Talache Mine</td>
<td>P</td>
<td>1</td>
<td>W</td>
<td>1AG</td>
<td></td>
</tr>
<tr>
<td>SA-268</td>
<td>Surprise Mine</td>
<td>P &amp; FS ?</td>
<td></td>
<td></td>
<td>1AO; 1AC</td>
<td></td>
</tr>
<tr>
<td>SA-269</td>
<td>Blue Bird Mine</td>
<td>FS ?</td>
<td>1</td>
<td>W</td>
<td>2AO; 1AG; 1SC; several P and T</td>
<td></td>
</tr>
<tr>
<td>SA-271</td>
<td>Anderson Prospect</td>
<td>FS</td>
<td>1</td>
<td>1</td>
<td>W, D</td>
<td>1AC</td>
</tr>
</tbody>
</table>
Table 2.1-1 (continued). Summary of properties visited in the Sandpoint District.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Mine Name</th>
<th>Surface Owner</th>
<th>Water Samples</th>
<th>Solid Samples</th>
<th>Environmental Concerns</th>
<th>Physical Conditions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA-272</td>
<td>Snowbird Mine</td>
<td>FS</td>
<td>2</td>
<td>1</td>
<td>W, D</td>
<td>1AO</td>
</tr>
<tr>
<td>SA-273</td>
<td>Better Times Prospect</td>
<td>FS</td>
<td>1</td>
<td></td>
<td>W</td>
<td>1AO</td>
</tr>
<tr>
<td>SA-274</td>
<td>Wisconsin Prospect</td>
<td>FS</td>
<td>1</td>
<td></td>
<td>D</td>
<td>1AG</td>
</tr>
<tr>
<td>SA-276</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AO</td>
</tr>
<tr>
<td>SA-277</td>
<td>Maiden Rock</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AG (FS gates)</td>
</tr>
<tr>
<td>SA-278</td>
<td>American Eagle</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SA-279</td>
<td>M B Prospect</td>
<td>FS</td>
<td>1</td>
<td></td>
<td>D</td>
<td>1AC</td>
</tr>
<tr>
<td>SA-286</td>
<td>Green Monarch Mine</td>
<td>FS</td>
<td>1</td>
<td></td>
<td></td>
<td>1AG</td>
</tr>
<tr>
<td>SA-289</td>
<td>Moss Prospect</td>
<td>P ?</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>SA-291</td>
<td>Bumble Bee Prospect</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td>No workings found</td>
</tr>
<tr>
<td>SA-293</td>
<td>Phil Sheridan Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>SA-297</td>
<td>Valid Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AO; 1T</td>
</tr>
<tr>
<td>SA-298</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>Quarry</td>
</tr>
<tr>
<td>SA-299</td>
<td>Falls Creek Mine</td>
<td>FS</td>
<td>4</td>
<td>2</td>
<td>W, D, T</td>
<td>1AO</td>
</tr>
<tr>
<td>SA-307</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AC; 1SO</td>
</tr>
<tr>
<td>E9079901</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>ISO</td>
</tr>
<tr>
<td>R8199801</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td>1</td>
<td></td>
<td></td>
<td>1T, mill site</td>
</tr>
<tr>
<td>R8199804</td>
<td>Unnamed Prospect</td>
<td>P ?</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>K9109802</td>
<td>Unnamed Prospect (part of Payrock)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AG (FS gate); 1AO; 3SC</td>
</tr>
<tr>
<td>K9109803</td>
<td>Unnamed Prospect (part of Payrock)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>K9149803</td>
<td>Unnamed Prospect</td>
<td>FS &amp; P</td>
<td>1</td>
<td></td>
<td>W</td>
<td>1AC</td>
</tr>
<tr>
<td>K10079801</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td>1</td>
<td></td>
<td>W</td>
<td>1AG (FS gate)</td>
</tr>
<tr>
<td>K10079804</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>K10079805</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1P</td>
</tr>
</tbody>
</table>
Table 2.1-1 (continued). Summary of properties visited in the Sandpoint District.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Mine Name</th>
<th>Surface Owner</th>
<th>Water Samples</th>
<th>Solid Samples</th>
<th>Environmental Concerns</th>
<th>Physical Conditions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reference sample (On Mosquito Creek at mouth of canyon below Scotchman Peak)</td>
<td>---</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference sample (On Webb Creek)</td>
<td>---</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference sample (On Cascade Creek just east of Lightning Creek Road)</td>
<td>---</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference sample (On East Fork Creek ¼ mile east of Lightning Creek Road)</td>
<td>---</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference sample (On North Fork of Wellington Creek in Auxor Basin, 1 mile east of Round Top Mountain)</td>
<td>---</td>
<td>1</td>
<td></td>
<td>W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference sample (On tributary to Rattle Creek, ½ mile south of Rattle Creek)</td>
<td>---</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference sample (On tributary to Strong Creek where pack trail crosses tributary)</td>
<td>---</td>
<td>1</td>
<td></td>
<td>W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reference sample (on Pearl Creek, where FS road crosses creek)</td>
<td>---</td>
<td>1</td>
<td></td>
<td>W</td>
<td></td>
</tr>
</tbody>
</table>
Of the fifty-four sites discussed in this volume, thirty-six have open adits or shafts. Fifteen of these properties have multiple open workings. Several of these openings pose significant safety hazards. Of the twenty-one sites discussed in this section of the report (Section D of Volume IX), ten had open adits or shafts, and three properties had multiple openings.

2.2 GEOLOGY

The most recent general reference showing the geology of the Sandpoint area is Aadland and Bennett (1979). The geology and ore deposits of the area are discussed in Anderson (1930, 1947), Savage (1967), and a number of unpublished reports on individual deposits. Gott and Cathrall (1980) discussed the geochemistry of the Coeur d'Alene district, which is underlain by many of the same rock units as the Sandpoint area. A brief description of the geologic framework of the area follows.

Most of the mines and prospects in the study area are hosted by metasedimentary rocks of the Belt Supergroup of Precambrian age (Figure 2.2-1) or in Precambrian diabase dikes that have intruded the Prichard Formation. The characteristics of the various units comprising the supergroup are shown in Table 2.2-1. Key references to the Prichard are Cressman (1982) and Cressman (1989). Hobbs and others (1965) described the Belt Supergroup units in the Coeur d'Alene area, and Harrison and Jobin (1963) discussed these rocks in part of the study area. Recent work on various units in the Belt Supergroup is summarized in Roberts (1986) and Berg (1993). The Purcell sills and related mineral deposits are discussed in Kuiilsgaard (1951) and Miller (1973); both these publications describe areas north of the Sandpoint district.

Granitic rocks of Cretaceous or early Tertiary age intrude the Belt Supergroup throughout most of the area (Aadland and Bennett, 1979). A large mass of these granitic rocks (the Selkirk igneous complex) intrudes the area west and northwest of the study area (Miller, 1982; Aadland and Bennett, 1979).

The Hope fault, a regional northwest-trending fault zone with an estimated 18,000-22,000 feet of vertical offset and 10-16 miles of right-lateral movement, crosses the study area (Savage, 1967; Harrison and Jobin, 1963; Anderson, 1930). The Purcell trench, which marks the location of a regional thrust fault, cuts through the area from north to south (Miller, 1982; Anderson, 1930; Savage, 1967). South of the Hope fault, the study area is broken by northeast- and north-northwest-trending block faults. This block faulting is present to a lesser extent north of the Hope fault (Harrison and Jobin, 1963; Aadland and Bennett, 1979). A third group of faults, usually showing minor displacement, are mineralized (Harrison and Jobin, 1963).

2.3 ECONOMIC GEOLOGY

2.3.1 General Characteristics of the Ore

The metal mines in the district are hosted by metasedimentary rocks of the Belt Supergroup of Precambrian age (Figure 2.2-1). Most of the mines are lead-zinc-silver deposits, sometimes
Figure 2.2-1. Geology of the Sandpoint Ranger District, Idaho (Aadland and Bennett, 1979). pCm = Precambrian rocks of uncertain age; pCp = Middle Proterozoic Prichard Formation; pCrv = Middle Proterozoic Ravalli Group, undifferentiated; pCb = Middle Proterozoic Burke Formation; pCr = Middle Proterozoic Revett Formation; pCs = Middle Proterozoic St. Regis Formation; pCw = Middle Proterozoic Wallace Formation; pCs = Middle Proterozoic Striped Peak Formation; pCl = Middle Proterozoic Libby Formation; pCmg = Middle Proterozoic metadiorite, diabase, and quartz diorite dikes and sills; Kd = Cretaceous diabase and diorite dikes and sills; Ks, Kg = Cretaceous granitic rocks; Tsp, Tsq = Tertiary granitic rocks; Tdg = Tertiary granodiorite and dacite porphyry dikes; Qg = Quaternary glacial deposits; Qal = Quaternary stream alluvium.
Table 2.2-1. Generalized section of the Belt Supergroup (modified from 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>Libby Formation</td>
<td>Laminated black argillite and white siltite, green to gray cherty argillite and siltite, and green to tan silty limestone and dolomite. Mud cracks and ripple marks abundant. Top eroded (Harrison and Jobin, 1963).</td>
<td>1,000+</td>
</tr>
<tr>
<td></td>
<td>Striped Peak</td>
<td>Interbedded quartzite and argillite with some arenaceous dolomitic beds. Purplish gray and pink to greenish gray. Ripple marks, mud cracks common. Top eroded [in Coeur d'Alene area].</td>
<td>1,500+</td>
</tr>
<tr>
<td></td>
<td>Formation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wallace</td>
<td>Upper part</td>
<td>Mostly medium- to greenish-gray finely laminated argillite. Some arenaceous 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</td>
<td>Upper part Light greenish-yellow to light green-gray argillite; thinly laminated. Some carbonate-bearing beds.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formation</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>1,400-2,000</td>
</tr>
<tr>
<td></td>
<td>Revett Quartzite</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></td>
<td>Burke Formation</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></td>
<td>Prichard</td>
<td>Upper part 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>Formation</td>
<td>Lower part 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>
containing copper and gold, or silver-copper deposits with lesser amounts of lead, zinc, and gold. Gold was the primary ore mineral in a few prospects (Anderson, 1930; Savage, 1967). One group of deposits is in the Prichard Formation, and some of these mines are associated with dioritic or diabasic dikes and sills. Another major group of mines is in the Wallace Formation. However, mineral deposits in the study area occur in all units of the Belt Supergroup. Many of the prospects in this report were worked in the early 1900s, and geological and historical information is not uniformly available for all properties. Quartz veins, fissure fillings, mineralized shear zones, and replacement deposits have been described. Most of the gold deposits in the area occur along shear zones or in quartz veins in basic sills (Savage, 1967; Anderson, 1930). Production was recorded from twenty mines in the study area, and four of these produced over 1,000 tons of ore. Production was reported from five of the mines in this section of the report (Section D of Volume IX), but none of these properties produced over 1,000 tons of ore.

2.3.2 Summary of Mill Development

The location and history of ore processing mills in the study area is important because a major source of environmental problems in many mining camps is old mill tailings disposal sites. These problems include high metal loadings, which could contaminate waterways, and fine sediment, which could increase loading of the streams or provide a source of wind-blown material. At one time or another, mills were present at the following properties in the study area (ranked by decreasing quantity of mill tailings noted at the site):

Talache Mine — flotation tailings
Site R8199801 — jig and flotation tailings
Lawrence Mine — jig tailings
Falls Creek Mine — flotation tailings
Sulfide Mine

The Talache mill began operation at the end of February 1922 at a rate of 50 tons per day (tpd), and production increased to 150 tpd by the end of June. Production continued at that rate for the next year. Ore shipments were discontinued in mid-1923, and all operations were suspended on October 31, 1926, after which time most of the equipment was moved to southern Idaho. In 1953, portions of the Talache mine dump were being milled in a small flotation mill constructed below the lowest of the Talache dumps.

A large amount of jig and flotation tailings were found at Site No. R8199801. It is not certain what mine was associated with this mill site.

A 50-tpd gravity concentrator was installed at the Lawrence Mine in 1913. The mill operated steadily for the next six years and intermittently thereafter.

In 1918 a 50-tpd flotation mill was built at the Falls Creek Mine. Several test runs were made, and a small amount of production was reported. Costs were said to have exceeded the returns on the milled ore.

A 25-tpd mill was built at the Sulfide Mine. This mill probably never operated.
2.4 HYDROLOGY AND HYDROGEOLOGY

The study area covers the Forest Service lands in the watershed of Lake Pend Oreille (Figure 2.1-1). The Clark Fork River enters Idaho from Montana and flows west-northwest to the town of Clark Fork, where it enters Lake Pend Oreille. Most of the smaller drainages in the study area flow into the lake.

As noted, a number of the lead-zinc mines in the study area are hosted by rocks of the Prichard Formation. These rocks also contain significantly higher values of base metals than some of the other Belt rocks. Table 1.5-3 (based on 727 samples taken in the Coeur d’Alene mining district) shows that rocks in the Prichard Formation contain 60 ppm zinc, 34 ppm lead, 3 percent iron, 22 ppm copper, and 0.5 ppm cadmium, and soils developed on the Prichard reflect this metal content (Table 1.5-4, based on 1,705 samples) with 140 ppm zinc, 54 ppm lead, 3.1 percent iron, 21 ppm copper, 1.3 ppm cadmium, and 10 ppm arsenic. Tables 1.5-3 and 1.5-4 show similar data for the other formations in the Belt Supergroup in the Coeur d’Alene mining district. As noted above, all formations in the Belt Supergroup are hosts for mineral deposits.

To test whether the high metal content from the Belt Supergroup, especially the Prichard Formation, was impacting stream waters, eight reference water samples were collected. The chemical analyses for these sample are shown in Tables 2.4-1 and 2.4-2, along with water quality standards suggested by the Environmental Protection Agency (EPA). The following reference water samples were collected:

- E10199801—Tributary to Strong Creek, where the pack trail crosses the tributary
- K9089805—Pearl Creek, where the FS road crosses the creek
- R09099706—North Fork Wellington Creek, in Auxor Basin 1 mile east of Round Top Mountain
- R10059801—Tributary to Rattle Creek, ½ mile east of Lightning Creek Road
- R8079801—Mosquito Creek, at the mouth of the canyon below Scotchman Peak
- R8089801—Webb Creek
- R8199803—East Fork Creek, ¼ mile east of Lightning Creek Road
- R8209801—Cascade Creek, just east of Lightning Creek Road

Samples E10199801, K9089805, R8199803, and R8209801 exceed the Aquatic Life Chronic standard for cadmium in the total recoverable metals screen. Sample R09099706 equals or exceeds both Aquatic Life standards for cadmium in the dissolved metals screen.

2.5 SUMMARY OF THE SANDPOINT RANGER DISTRICT

2.5.1 Summary of Environmental Observations

Most of the samples from properties with water discharge exceeded EPA water standards for one or more elements (Tables 2.5-1 and 2.5-2). Water quality variances include significant amounts of manganese, iron and mercury from the Payrock Sunrise Mine; zinc from the Snowbird Mine,
Table 2.4-1. Dissolved metals in reference water samples from the Sandpoint Ranger District. Numbers in bold-face type exceed one or more water quality standards.

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>Al (ppm)</th>
<th>As (ppm)</th>
<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E10199801</td>
<td>Tributary to Strong Creek, where pack trail crosses tributary</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.0074</td>
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<td>---</td>
</tr>
<tr>
<td>K9089805</td>
<td>Pearl Creek, where FS road crosses creek</td>
<td>---</td>
<td>0.0660</td>
<td>---</td>
<td>---</td>
<td>0.0033</td>
<td>---</td>
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</tr>
<tr>
<td>R09099706</td>
<td>North Fork Wellington Creek, in Auxor Basin 1 mile east of Round Top Mountain</td>
<td>---</td>
<td>0.0100</td>
<td>0.0042</td>
<td>---</td>
<td>0.0180</td>
<td>0.0045</td>
<td>0.0035</td>
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<tr>
<td>R8079801</td>
<td>Mosquito Creek, at mouth of canyon below Scotchman Peak</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>0.0030</td>
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<tr>
<td>R8089801</td>
<td>Webb Creek</td>
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<td>---</td>
<td>---</td>
<td>0.0011</td>
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<tr>
<td>R8199803</td>
<td>East Fork Creek, 1/4 mile east of Lightning Creek Road</td>
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<td>0.0014</td>
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<tr>
<td>R8209801</td>
<td>Cascade Creek, just east of Lightning Creek Road</td>
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<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td>0.0044</td>
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<td>0.0690</td>
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<td>Tributary to Rattle Creek, 1/4 mile east of Lightning Creek Road</td>
<td>0.020</td>
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<td>---</td>
<td>0.0028</td>
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**EXPLANATION**
Blank space equals no analysis
Below Detection Limit is ---

**WATER QUALITY STANDARDS**

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<thead>
<tr>
<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
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<td>0.005</td>
<td>0.100</td>
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<tr>
<td>Aquatic Life, Acute</td>
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<td>0.018-0.034</td>
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<td>Aquatic Life, Chronic</td>
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<td>0.16-0.28</td>
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</table>

Estimated Detection Level (33% confidence)

|                      | 0.015     | 0.0005    | 0.0004    | 0.0020    | 0.0060    | 0.0028    | 0.0015    | 0.0049    | 0.0007    | 0.0005    | 0.010     |
Table 2.4-2. Total recoverable metals in reference water samples from the Sandpoint Ranger District. Numbers in bold-face type exceed one or more water quality standards.

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<th>FIELD NO.</th>
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<th>Al (ppm)</th>
<th>As (ppm)</th>
<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<tr>
<td>E10199801</td>
<td>Tributary to Strong Creek, where pack trail crosses tributary</td>
<td>0.0008</td>
<td>0.0030</td>
<td>0.0030</td>
<td>---</td>
<td>---</td>
<td>0.0021</td>
<td>---</td>
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</tr>
<tr>
<td>K9089805</td>
<td>Pearl Creek, where FS road crosses creek</td>
<td>---</td>
<td>0.0670</td>
<td>0.0030</td>
<td>0.0077</td>
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<td>0.1200</td>
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<td>0.0073</td>
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<td>0.0049</td>
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<tr>
<td>R09099706</td>
<td>North Fork Wellington Creek, in Auxor Basin 1 mile east of Round Top Mountain</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.0020</td>
<td>---</td>
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</tr>
<tr>
<td>R8079801</td>
<td>Mosquito Creek, at mouth of canyon below Scotchman Peak</td>
<td>---</td>
<td>0.0030</td>
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<td>---</td>
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<td>---</td>
<td>0.0022</td>
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<tr>
<td>R8089801</td>
<td>Webb Creek</td>
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<td>---</td>
<td>---</td>
<td>0.0260</td>
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<td>---</td>
<td>0.0009</td>
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</tr>
<tr>
<td>R8199803</td>
<td>East Fork Creek, ¼ mile east of Lightning Creek</td>
<td>---</td>
<td>0.0040</td>
<td>0.0020</td>
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<td>0.0036</td>
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<tr>
<td>R8209801</td>
<td>Cascade Creek, just east of Lightning Creek Road</td>
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<td>0.0020</td>
<td>0.0030</td>
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<td>---</td>
<td>0.0860</td>
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<td>0.0250</td>
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<td>0.0900</td>
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</tr>
<tr>
<td>R10059801</td>
<td>Tributary to Rattle Creek, ½ mile south of Rattle Creek</td>
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<td>0.0060</td>
<td>---</td>
<td>0.0110</td>
<td>---</td>
<td>0.0470</td>
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<td>---</td>
<td>---</td>
<td>0.0058</td>
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</tr>
</tbody>
</table>

**EXPLANATION**

- Blank space equals no analysis
- mg/L = ppm
- Below Detection Limit is ---

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
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<tbody>
<tr>
<td>Primary MCL</td>
<td>0.0500</td>
<td>2.0000</td>
<td>0.005</td>
<td>0.100</td>
<td>0.000</td>
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<td>Secondary MCL</td>
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<td>0.018-0.034</td>
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<td>0.002</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
<td>0.00012</td>
<td>0.16-0.28</td>
<td>0.11-0.19</td>
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<tr>
<td>Aquatic Life, Acute</td>
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<td>0.009</td>
<td>0.18-0.34</td>
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<tr>
<td>Aquatic Life, Chronic</td>
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<td>Estimated Detection Level (33% confidence)</td>
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Table 2.5-1. Dissolved metals in water samples from the Sandpoint Ranger District. Numbers in bold-face type exceed one or more water quality standards. Properties shown in gray are discussed in sections A, B, and C of this report.

<table>
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<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>Al (ppm)</th>
<th>As (ppm)</th>
<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
</tr>
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<tbody>
<tr>
<td>K9079801</td>
<td>Black Jack Mine (SA-266), Adit 3, water</td>
<td>0.027</td>
<td>0.1100</td>
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<td>---</td>
<td>0.0042</td>
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<td>Snowbird Mine (SA-272), adit water</td>
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<td>0.0350</td>
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<td>K9109801</td>
<td>Payrock Sunrise Mine (SA-245), pond at shaft</td>
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<td>0.0370</td>
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**EXPLANATION:**
Blank space equals no analysis
Below Detection Limit is ---

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th>Level</th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
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<td>0.050</td>
<td>2.000</td>
<td>0.005</td>
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<td>1.000</td>
<td>0.050</td>
<td>0.002</td>
<td>0.100</td>
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<tr>
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<td>1.7-3.1</td>
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<td>1.000</td>
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<td>0.0024</td>
<td>1.4-2.5</td>
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<td>0.21-0.37</td>
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<td>0.003-0.008</td>
<td>0.000012</td>
<td>0.16-0.28</td>
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<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.190</td>
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<td>0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.000012</td>
<td>0.16-0.28</td>
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**Estimated Detection Level (33% confidence):**

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<th>Cr (mg/L)</th>
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<th>Zn (mg/L)</th>
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<td>0.16-0.28</td>
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<tr>
<td>Aquatic Life, Acute</td>
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<td>0.190</td>
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<td>0.21-0.37</td>
<td>0.012-0.021</td>
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<tr>
<td>Aquatic Life, Chronic</td>
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<td>0.190</td>
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<td>0.21-0.37</td>
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mg/L = ppm
Table 2.5-1 (continued). Dissolved metals in water samples from the Sandpoint Ranger District.

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<th>As (ppm)</th>
<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
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<th>Cu (ppm)</th>
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<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<td>K10079802</td>
<td>Unnamed Prospect (K10079801), adit water</td>
<td>0.015</td>
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<td>---</td>
<td>0.0072</td>
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<td>R09099701</td>
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<td>0.0120</td>
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<tr>
<td>R8079802</td>
<td>Regal Mine (SA-203), upstream</td>
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<td>0.0009</td>
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<td>0.0028</td>
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<tr>
<td>R8079804</td>
<td>Regal Mine (SA-203), adit water</td>
<td>0.023</td>
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<td>0.0028</td>
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<tr>
<td>R8089802</td>
<td>Goat Mountain Prospect (SA-205), adit water</td>
<td>0.019</td>
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<tr>
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<td>0.0030</td>
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**EXPLANATION:**
Blank space equals no analysis
Below Detection Limit is ---

**WATER QUALITY STANDARDS**

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<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
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<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
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<td>0.050</td>
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<tr>
<td>Secondary MCL</td>
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<td>1.7-3.1</td>
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<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.360</td>
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<td>0.21-0.37</td>
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Table 2.5-2. Total recoverable metals in water samples from the Sandpoint Ranger District. Numbers in bold-face type exceed one or more water quality standards. Properties shown in gray are discussed in sections A, B, and C of this report.

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<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
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<th>Pb (ppm)</th>
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<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<td>K9079801</td>
<td>Black Jack Mine (SA-266), Adit 3, water</td>
<td>0.0039</td>
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<td>Anderson Prospect (SA-271), adit water</td>
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**EXPLANATION**

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

**WATER QUALITY STANDARDS**

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<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
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<th>Ni (mg/L)</th>
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<td>0.100</td>
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<td>0.05-0.2</td>
<td>0.05-0.2</td>
<td>0.05-0.2</td>
<td>0.05-0.2</td>
<td>0.05-0.2</td>
<td>0.05-0.2</td>
<td>0.05-0.2</td>
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<td>0.05-0.2</td>
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<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.3600</td>
<td>0.004-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.082-0.2</td>
<td>0.0024</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
<td>0.11-0.19</td>
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</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.1900</td>
<td>0.001-0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.000012</td>
<td>0.16-0.28</td>
<td>0.11-0.19</td>
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<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.0005</td>
<td>0.001</td>
<td>0.002</td>
<td>0.0047</td>
<td>0.150</td>
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<td>0.0049</td>
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<td>0.00005</td>
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Table 2.5-2 (continued). Total recoverable metals in water samples from the Sandpoint Ranger District.

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<th>Al (ppm)</th>
<th>As (ppm)</th>
<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<tbody>
<tr>
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<td>Unnamed Prospect (K.10079801), adit water</td>
<td>0.0008</td>
<td>0.010</td>
<td>---</td>
<td>0.0100</td>
<td>---</td>
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<td>0.0160</td>
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<tr>
<td>R09099701</td>
<td>Auxer Mine (SA-194), adit water</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>0.0050</td>
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<tr>
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<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>0.041</td>
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<td>---</td>
<td>---</td>
<td>0.0030</td>
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<td>0.020</td>
<td>0.0110</td>
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<tr>
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<td>Regal Mine (SA-203), upstream</td>
<td>---</td>
<td>0.004</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.019</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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</tr>
<tr>
<td>R8079804</td>
<td>Regal Mine (SA-203), adit water</td>
<td>0.0058</td>
<td>0.005</td>
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<td>---</td>
<td>---</td>
<td>0.051</td>
<td>---</td>
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<td>0.0039</td>
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<td>0.0031</td>
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<tr>
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<td>0.053</td>
<td>0.0058</td>
<td>0.0017</td>
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</tr>
<tr>
<td>R8089804</td>
<td>Goat Mountain Prospect (SA-205), upstream</td>
<td>0.0007</td>
<td>0.006</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.026</td>
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<td>0.0015</td>
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<tr>
<td>R8089805</td>
<td>Goat Mountain Prospect (SA-205), downstream</td>
<td>---</td>
<td>0.005</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.020</td>
<td>0.0061</td>
<td>0.0024</td>
<td>0.013</td>
<td>0.0051</td>
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<tr>
<td>R8099801</td>
<td>Lawrence Mine (SA-223), Adit 2, water</td>
<td>0.0015</td>
<td>0.044</td>
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<td>---</td>
<td>---</td>
<td>0.0560</td>
<td>0.0046</td>
<td>0.016</td>
<td>0.0370</td>
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<tr>
<td>R10019801</td>
<td>Lawrence Mine (SA-223), Adit 7, water</td>
<td>---</td>
<td>0.065</td>
<td>0.0061</td>
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<td>0.0780</td>
<td>0.0029</td>
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<td>0.0420</td>
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<td>---</td>
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<td>0.0069</td>
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<td>0.027</td>
<td>---</td>
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<td>---</td>
<td>0.0095</td>
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</table>

**EXPLANATION**

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

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
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</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.0500</td>
<td>2.000</td>
<td>0.005</td>
<td>0.100</td>
<td>0.0500</td>
<td>0.002</td>
<td>0.10</td>
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<tr>
<td>Secondary MCL</td>
<td>0.05-0.2</td>
<td>1.600</td>
<td>0.300</td>
<td>0.050</td>
<td>5.000</td>
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<td></td>
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</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.3600</td>
<td>0.004-0.009</td>
<td>0.04-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.082-0.2</td>
<td>0.0024</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
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<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.1900</td>
<td>0.001-0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.000012</td>
<td>0.16-0.28</td>
<td>0.11-0.19</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.0005</td>
<td>0.001</td>
<td>0.002</td>
<td>0.0047</td>
<td>0.150</td>
<td>0.019</td>
<td>0.0049</td>
<td>0.0006</td>
<td>0.0005</td>
<td>0.012</td>
<td>0.0028</td>
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</tbody>
</table>
and mercury from the Better Times and Anderson Prospects. Cadmium in excess of one or more water quality standards is the most prevalent water quality variance in the Sandpoint district. At eleven out of the seventeen properties sampled, cadmium exceeds one or more standards. Usually, one or more other elements also exceed at least one standard in these samples. The elements detected in the water samples are also found in the rock units underlying the drainages.

2.5.2 Mine Waste Samples

Samples were collected from most of the properties where the mine waste dump impinged on an active waterway (Tables 2.5-3 and 2.5-4). As expected, many of these samples contain metal loadings, including arsenic, copper, lead, and zinc, which exceed the Clark Fork Superfund Background Levels. Samples of mill tailings were collected from three of the mines examined in this volume. As expected, these samples also contain high metal loadings, particularly of copper, lead, zinc, and in some samples, arsenic.
Table 2.5-3. Element screen for dump and tailings samples from properties in the Sandpoint Ranger District. Properties shown in gray are discussed in sections A, B, and C of this report.

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>Al (ppm)</th>
<th>As (ppm)</th>
<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<tbody>
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<td>Dump Samples</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>K9079802</td>
<td>Black Jack Mine (SA-266), Adit 7, dump</td>
<td>NA</td>
<td>1,200</td>
<td>130.0</td>
<td>15.0</td>
<td>11.0</td>
<td>410.0</td>
<td>32,000</td>
<td>3,600</td>
<td>4,900</td>
<td>NA</td>
<td>19.0</td>
<td>920.0</td>
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<td>K9079804</td>
<td>Anderson Prospect (SA-271), dump</td>
<td>NA</td>
<td>200</td>
<td>640.0</td>
<td>5.20</td>
<td>11.0</td>
<td>290.0</td>
<td>29,000</td>
<td>870</td>
<td>5,000</td>
<td>NA</td>
<td>24.0</td>
<td>290.0</td>
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<tr>
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<td>Snowbird Mine (SA-272), dump</td>
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<td>380</td>
<td>220.0</td>
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<td>7.7</td>
<td>120.0</td>
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<td>32</td>
<td>NA</td>
<td>7.8</td>
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<tr>
<td>K9089807</td>
<td>Wisconsin Prospect (SA-274), dump</td>
<td>NA</td>
<td>6,500</td>
<td>64.0</td>
<td>32.00</td>
<td>28.0</td>
<td>440.0</td>
<td>280,000</td>
<td>43,000</td>
<td>340</td>
<td>NA</td>
<td>48.0</td>
<td>4,100.0</td>
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<tr>
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<td>91</td>
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<td>13.0</td>
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<td>Catherine Mine (SA-260), Adit 1, dump</td>
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<td>13.0</td>
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<td>29.0</td>
<td>94.0</td>
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<td>44.0</td>
<td>470.0</td>
<td>55,000</td>
<td>10,000</td>
<td>9,400</td>
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<td>9,100.0</td>
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<tr>
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<td>80</td>
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<td>20.0</td>
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<tr>
<td>R8089807</td>
<td>Goat Mountain Prospect (SA-205), upper dump</td>
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<td>100</td>
<td>81.0</td>
<td>2.10</td>
<td>26.0</td>
<td>47.0</td>
<td>34,000</td>
<td>68</td>
<td>550</td>
<td>NA</td>
<td>35.0</td>
<td>130.0</td>
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Tailings Samples

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<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<tr>
<td>R09109703</td>
<td>Falls Creek Mine (SA-299), flotation tailings</td>
<td>NA</td>
<td>5,900</td>
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<td>300.0</td>
<td>38,000</td>
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<td>NA</td>
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<tr>
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<td>Lawrence Mine (SA-223), flotation tailings</td>
<td>NA</td>
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<td>470.0</td>
<td>68.00</td>
<td>31.0</td>
<td>64.0</td>
<td>50,000</td>
<td>35,000</td>
<td>5,700</td>
<td>NA</td>
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<td>6,800.0</td>
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<tr>
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<td>Lawrence Mine (SA-223), jig tailings</td>
<td>NA</td>
<td>350</td>
<td>170.0</td>
<td>41.00</td>
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<td>51.0</td>
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<td>29,000</td>
<td>7,700</td>
<td>NA</td>
<td>24.0</td>
<td>5,000.0</td>
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<td>160.0</td>
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<td>8,000</td>
<td>1,700</td>
<td>NA</td>
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Clark Fork Superfund Background Levels (\(\text{mg/kg}\times 10^{-6}\) - ppm)

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<th>Cd</th>
<th>Pb</th>
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<td>U.S. Mean Soil</td>
<td>6.7</td>
<td>0.7</td>
<td>20.0</td>
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<tr>
<td>Helena Valley Mean Soil</td>
<td>16.5</td>
<td>0.2</td>
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<tr>
<td>Missoula Lake Bed Sediments</td>
<td>NA</td>
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<tr>
<td>Blackfoot River</td>
<td>4.0</td>
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<tr>
<td>Phytotoxic Concentration</td>
<td>100.0</td>
<td>100.0</td>
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</table>

Explanation

Below Detection Limit is ---

Not analyzed equals NA
Table 2.5-4  Toxicity Characteristic Leaching Procedure for dump and tailings samples from properties in the Sandpoint Ranger District. Properties shown in gray are discussed in sections A, B, and C of this report.

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>As (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
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<tr>
<td>K9079802</td>
<td>Black Jack Mine (SA-266), Adit 7, dump</td>
<td>---</td>
<td>0.098</td>
<td>---</td>
<td>1.100</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>Anderson Prospect (SA-271), dump</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>2.200</td>
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<tr>
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<td>0.053</td>
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<td>42.000</td>
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<td>---</td>
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<td>K9109804</td>
<td>Unnamed Prospect (SA-244), dump</td>
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<td>---</td>
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<td>1.600</td>
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<tr>
<td>K9159802</td>
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<td>0.506</td>
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<td>R8089806</td>
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<td>---</td>
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<td>---</td>
<td>0.916</td>
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<tr>
<td>R8089807</td>
<td>Goat Mountain Prospect (SA-205), upper dump</td>
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Tailings Samples

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<th>Pb (ppm)</th>
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<td>23.000</td>
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<td>0.100</td>
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<td>R8099802</td>
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<td>0.078</td>
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<td>---</td>
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<td>---</td>
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<td>---</td>
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EXPLANATION

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

WATER QUALITY STANDARDS

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<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>
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<td>Primary MCL</td>
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<td>Secondary MCL</td>
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<td>Aquatic Life, Acute</td>
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<td>0.0017</td>
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</table>
3.0 SANDPOINT DISTRICT MINE DESCRIPTIONS

3.33 FLUME CREEK PROSPECT (Site No. SA-172)
Alternate name—Plume Creek ("Plume" is probably a misspelling of "Flume," since Flume Creek is just west of the prospect).

On the video segment, it is identified as the "Plum Creek or Thistle Creek Prospect."

3.33.1 Site Location and Access (Figure 2.1-1)

The Flume Creek Prospect is on the eastern edge of the northernmost spur of Trestle Ridge, in the NW¼ of the SW¼, section 16 (unsurveyed), T. 58 N., R. 2 E., on the Mount Pend Oreille and Trestle Peak 7.5-minute quadrangles (Figure 3.33-1). It is labeled "Open Pit Mine" on both maps. Access is via FS Road 275 about 12 miles up Trestle Creek to FS Road 1091, the Lunch Peak Road. The prospect is about 2 miles up FS Road 1091 at the head of Smorgasbord Creek. The site is on Forest Service land.

3.33.2 Geologic Features (Figure 2.2-1)

This prospect is underlain by northeast-striking, southeasterly dipping units of the Prichard Formation which are intruded by diorite sills (Savage, 1967, Plate 2B). Both syenite and lamprophyre (or diorite) intrusions were noted on the surface during the site visit.

3.33.3 Site History
Nothing is known of the history of this site.

3.33.4 Environmental Conditions

3.33.4.1 Site Features

The Flume Creek prospect was visited by William Rember on August 7, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 00:00:56-00:04:45). Documenting photographs are Roll R1, frames 5-11.

This property consists of two large open pits or bulldozed areas (Figure 3.33-2) that appear to have had recent exploration and/or reclamation work. The large, upper area has recently been smoothed, although a few mounds and troughs remain on the uphill edge (Figure 3.33-3). The lower area, which also appears to have been smoothed, is smaller than the upper area. A trench or pit is on the upper (southeast) edge of the area (Figure 3.33-4) and appears to be a prospect on a syenite dike, which is also exposed in the bulldozed portions of both areas. Lengths of cut timber are scattered at the base of the slope formed by the material removed from the prospect (Figure 3.33-5). The disturbed area for these prospects covers at least 20 acres.
3.33.4.2 Sample Locations

3.33.4.2.1 Solid Samples
No waste dump samples were collected at this site.

3.33.4.2.2 Water Samples
No water samples were collected at this site.

3.33.5 Structures
There are no structures at this site.

3.33.6 Safety
There are no safety hazards at this site.
Figure 3.33-1. Location of the Flume Creek Prospect, Bonner County, Idaho (U.S. Geological Survey Mount Pend Oreille and Trestle Creek 7.5-minute topographic maps).
Figure 3.33-2. Sketch of the Flume Creek Prospect.
Figure 3.33-3. Reclaimed(?), large, upper bulldozed area at the Flume Creek Prospect (Roll R1, frame #5).

Figure 3.33-4. Looking south at the short trench or prospect pit (above the front of the pickup) along the upper (southeast) edge of the lower bulldozed area at the Flume Creek Prospect (Roll R1, frame #10).
Figure 3.33-5. Lengths of cut timber scattered on the slope below the lower bulldozed area (Roll R1, frame #11).
3.34 HOMESTAKE MINE (Site No. SA-211)

3.34.1 Site Location and Access (Figure 2.1-1)

The Homestake Mine is 4-5 miles northeast of Clark Fork in the SW¼ of the SE¼, section 29, T. 56 N., R. 3 E., on the Scotchman Peak 7.5-minute quadrangle (Figure 3.34-1). The site is marked by a prospect symbol on the topographic map. Access from Clark Fork is on FS Road 276 northeast to FS Road 1058. The prospect is about 1.5 miles northeast of this junction, about 500-600 feet above Mosquito Creek, and is on Forest Service land.

3.34.2 Geologic Features (Figure 2.2-1)

Anderson (1930, p. 112-113) reported the following information on this prospect:

The Homestake prospect lies at the base of Scotchman Peak in Sec. 29, T. 56 N., R. 3 E., several hundred yards north of the Hope fault on some cliffs of thick-bedded Prichard quartzite. The sedimentary beds have been considerably disturbed and show a drag against the Hope fault. The trend of the bedding changes from N. 10° E. to N. 40° E. near the Hope fault, but the dip remains about the same, 15° S.E.

The deposit differs from others on Goat Mountain in that the mineral is disseminated through a system of minor fractures and joint planes in the quartzite and not in bedded veins or fissures. The sulfide is mainly galena with only subordinate sphalerite. The galena occurs in tiny seamlets one-eighth to one-half inch wide or in lenses one inch wide to three or four inches long, widely scattered through a zone several hundred feet wide. The galena also fills in and replaces the quartzite in certain small brecciated zones.

3.34.3 Site History

The Homestake Mining and Development Company, Ltd., was incorporated in 1908. In 1915, the company held one patented claim, which was developed by a tunnel. The company forfeited its corporate charter in 1915. In 1927, the prospect had several tunnels, the longest of which was 140 feet long (Anderson, 1930). U.S. Bureau of Mines mapping showed three tunnels, which were 156 feet, 21 feet, and 10 feet long (IGS mineral property files).

3.34.4 Environmental Conditions

3.34.4.1 Site Features

The Homestake Mine was visited by William Rember on August 7, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 00:04:50-00:07:51). Documenting photographs are Roll R1, frames 12-14.
This mine has two open adits. Adit 1, the upper of the two, is on the steep rocky slope about 100 feet above and to the east of Adit 2 (Figure 3.34-2). The adit is open, but it is only about 30 feet long (Figure 3.34-3). The waste dump is small and has a minor amount of iron staining. Adit 2 is also open. It is probably the site that is shown as a prospect on the topographic map. The adit was driven about N. 67° E. along a quartz stringer in a near-vertical shear zone. The adit is 5-6 feet high and 3½ feet wide (Figure 3.34-4). Rock rubble on the adit floor indicates the back tends to spall off, although no large piles of collapsed material are apparent. The waste dump is 60 feet long down the slope and about 10 feet wide, but it forms only a thin veneer about 1 foot thick on the slope. The 10-foot adit mentioned in the IGS mineral property files was not found. The disturbed area at these two adits covers less than 0.5 acre.

3.34.4.2 Sample Locations

3.34.4.2.1 Solid Samples
No waste dump samples were collected at this site.

3.34.4.2.2 Water Samples
No samples were collected at this site, although a background sample (R8079801) was collected from Mosquito Creek about ½ mile southeast of the prospect where the creek reaches the flatter ground at the base of the steep ridge beneath Scotchman Peak.

<table>
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<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity (µS)</th>
<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>Mosquito Creek, background</td>
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<td>48</td>
<td>7.57</td>
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3.34.4.2.3 Analytical Results

Water Samples (Tables 2.5-1 and 2.5-2)

Background sample R8079801 does not exceed any water quality standards.

3.34.5 Structures

There are no structures at this site.

3.34.6 Safety

The open adits present the only potential hazards at this site, particularly from falling rocks. However, neither adit appears to be prone to massive caving or collapse. Poor air quality in Adit 2 could also be a potential hazard.
Figure 3.34-1. Location of the Homestake Mine, Bonner County, Idaho (U.S. Geological Survey Scotchman Peak 7.5-minute topographic map).
Figure 3.34-2. Sketch of the Homestake Mine.
Figure 3.34-3. Looking north into Adit 1 of the Homestake Mine. The adit is about 30 feet in length (Roll R1, frame #12).
Figure 3.34-4. Looking north into open Adit 2 of the Homestake Mine. The adit was driven along a nearly-vertical fracture, seen on the left wall (Roll R1, frame #13).
3.35 REGAL GROUP (Site No. SA-203)

3.35.1 Site Location and Access (Figure 2.1-1)

The Regal Group is about 1 mile up Regal Creek from Lightning Creek in the SW¼ of the NW¼, section 17, T. 56 N., R. 3 E., on the Scotchman Peak 7.5-minute quadrangle (Figure 3.35-1). Access from Clark Fork is on FS Road 419 (Lightning Creek Road) about 5.5-6 miles north to Regal Creek. An old foot trail from FS Road 419 at Lightning Creek leads up to the site. The prospect is on Forest Service land.

3.35.2 Geologic Features (Figure 2.2-1)

Anderson (1930, p. 109) described the deposit as follows:

The deposit has some unusual features, particularly in structure, for a steeply dipping vein, which trends in the direction of the stream, occupies the fissure with a lamprophyre dike and sends off mineralized bedded seams or branches. A number of such seams occur, but only two of them are large enough to be worthy of description. This unique deposit is in some massive quartzitic beds of the Prichard formation whose general trend is about N. 35° E. and dip 17° S.E.

The fissure vein strikes N. 40° W. and dips 55° to 65° to the northeast. It follows the lamprophyre dike for several hundred feet, but lower on the creek the dike swings more to the west and the vein continues without change into the quartzite. The vein occurs on both sides of the lamprophyre, which has the composition of minette, with particularly large plates of biotite in a very fine grained base. It also sends stringers into the dike or across the dike. For the greater distance the wide part of the vein is at the footwall side where it ranges from two inches to four feet, and is widest just below the junction of the bedded seams. The vein filling is pure quartz with scattered cubes of pyrite. It shows minor degrees of replacement of wall fragments, but its character is dominantly fissure filling.

The mineralization with sulfides is confined wholly to the bedded seams with deposition beginning at the crotch and continuing for a dozen feet or more between the bedding planes, but with decreasing quantity and thickness of sulfides and quartz. The sulfides consist of about half pyrrhotite and the remainder of sphalerite and galena with very minor but variable amounts of pyrite, arsenopyrite, and chalcopyrite.

3.35.3 Site History

Anderson (1930, p. 108) noted:

The veins had been known for some time and been prospected in a desultory fashion, but it was not until late in 1927 that, under the management of the Regal
Mining Company, a road was begun up the nearly precipitous slope of Goat Mountain and active development started.

The Regal Mining Corporation was incorporated in 1928. By 1930, the two tunnels on the property were 70 feet and 350 feet long. The company forfeited its corporate charter in 1932.

U.S. Bureau of Mines mapping in 1974 found an open 140-foot adit, a caved adit 70 feet below the open adit, and the start of an adit across the creek from a compressor house and a bunkhouse (IGS mineral property files).

3.35.4 Environmental Conditions

3.35.4.1 Site Features

The Regal Group was visited by William Rember on August 7, 1998. A video segment describing the prospect is on the Sandpoint District Videotape (Tape 4, index 00:07:56-00:11:00). Documenting photographs are Roll R1, frames 15-17.

An open adit was found along Regal Creek beside a waterfall (Figures 3.35-2 and 3.35-3). This adit matches the description of the 140-foot adit mapped by the U.S. Bureau of Mines. The mouth of the adit is partially blocked by stream gravel (Figure 3.35-4). Behind the gravel pile, the adit is filled with water. A minor seep flows from beneath the gravel and into the stream. The present opening may be some distance behind the original portal. Ore car rails extend 50 feet from the opening, and it looks like the roof of part of the adit has collapsed (Figure 3.35-5). The collapsed debris supports a healthy stand of devil's club. All of the waste dump has been washed away. The other adits were not found. The disturbed area is less than 0.25 acre.

3.35.4.2 Sample Locations

3.35.4.2.1 Solid Samples

No waste dump samples were collected at this site. The dump has been washed away by the creek.

3.35.4.2.2 Water Samples

Sample R8079804 was collected from the water seeping out of the adit. Sample R8079802 was taken from Regal Creek above the mine. No downstream sample was collected at this site.
<table>
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<th>Sample No.</th>
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<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>R8079802</td>
<td>Regal Mine, upstream</td>
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<td>52</td>
<td>7.37</td>
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### 3.35.4.2.3 Analytical Results

Water Samples (Tables 2.5-1 and 2.5-2)

No water quality standards are exceeded in either of the two water samples.

#### 3.35.5 Structures

The compressor house and the bunkhouse mentioned in U.S. Bureau of Mines report in the IGS mineral property files were not found.

#### 3.35.6 Safety

The open adit is the only potential safety hazard, although it is filled with water. The trail to the mine does not appear to receive heavy recreational use.
Figure 3.35-1. Location of the Regal Group, Bonner County, Idaho (U.S. Geological Survey Scotchman Peak 7.5-minute topographic map).
Figure 3.35-2. Sketch of the Regal adit.
Figure 3.35-3. Looking southeast at the opening into the Regal adit. Regal Creek forms a cascading waterfall at the left (Roll R1, frame #16).
Figure 3.35-4. Close-up of the Regal adit. The mouth of the adit is partially blocked by stream gravel. Behind the gravel pile, the adit is filled with water (Roll R1, frame #17).
Figure 3.35-5. Looking southeast toward the Regal adit. Ore car rails can be seen along the creek at the lower right, just below the devil's club. The adit opening is below the lower of the two dead trees (Roll R1, frame #15).
3.36 LUCKY STRIKE MINE (Site No. SA-206)
Alternate name—Webb Canyon Mine.

3.36.1 Site Location and Access (Figure 2.1-1)

The Lucky Strike Mine, known locally as the Webb Canyon Mine, is beside a waterfall on Webb Creek in the NE¼ of the SW¼, section 19, T. 56 N., R. 3 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.36-1). Access is via a trail up Webb Canyon that originates at the private residence owned by the Newcomers. The prospect is on Forest Service land.

3.36.2 Geologic Features (Figure 2.2-1)

Anderson (1930, p. 111) described the geology of the property as follows:

Four veins have been discovered on the property, all of them of the fissure type and within the massive quartzite members of the upper Prichard. Below the outcrop, the Prichard consists of a series of banded shales and quartzites cut by several lamprophyre dikes and a dioritic sill. The beds have been greatly disturbed by a system of minor faults, but they hold an average trend of N. 10° W. and a dip of 30° N.E.

The mineralization is like that on other parts of Goat Mountain and consists mainly of quartz and scattered grains or masses of sulfides composed of pyrite, pyrrhotite, sphalerite, chalcopyrite, and galena. In addition some of the veins have considerable calcite. As additional evidence of the high temperatures at which the minerals were deposited is the occurrence of biotite and hornblende in at least one of the veins. Sphalerite is next to pyrrhotite in abundance and it has an exceedingly black color. Marcasite is an interesting secondary mineral, for it replaces the pyrrhotite in concentric shells.

The vein highest on the mountain strikes N. 50° W. and dips 60° S.W. This one is about fourteen inches wide and is filled mainly with honey-combed quartz stained with iron oxides. A vein lower in the mountain has been prospected by tunnel for about 50 feet. This vein strikes N. 40° W. and dips 40° S.W. It is from eight to 10 inches wide and contains quartz with scattered grains and masses of sulphides.

3.36.3 Site History

The Lucky Strike prospect was staked in 1909 by W. Webb (IGS mineral property files). The Lucky Strike Mining Company (W. W. Webb, president and manager) was incorporated in 1913. By 1916, the property had two tunnels and about 240 feet of development on five claims. By 1922, the property had increased to eight claims. The tunnels were 207 feet and 37 feet long. In 1924, a third tunnel was started; the tunnels were 12 feet, 50 feet, and 237 feet long. Only assessment work was done for the next few years. In 1939, the total development was 535 feet,
and the three tunnels were 15 feet, 50 feet, and 325 feet long. In the company's 1939 report to the Idaho Inspector of Mines, Mr. Webb indicated he was getting old and wanted to quit. The company forfeited its corporate charter in December 1939.

3.36.4 Environmental Conditions

3.36.4.1 Site Features

The Lucky Strike Mine was visited by William Rember on August 8, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 00:11:04-00:14:31). Documenting photographs are Roll R1, frames 18-23.

One adit, a flume, some old equipment, and a collapsed cabin along the west side of Webb Creek were found at the Lucky Strike Mine (Figure 3.36-2). Webb Creek forms a waterfall over a cliff beside the adit (Figure 3.36-3). The adit is open but partially blocked at the portal with rock rubble and gravel. According to local residents, the blockage occurred three years ago during high water. The remaining opening is about 2 feet long and 1 1/2 feet high, and it has warm air flowing from it. An ore car is inside the adit (Figure 3.36-4). All of the waste dump has been washed away by Webb Creek. On the slope above the adit and waterfall is a flume (Figure 3.36-5) that extends about 150 feet below the mine to a belt-driven Ingersoll-Rand compressor (Figure 3.36-6). Next to the compressor is a Pelton wheel flume nozzle that was evidently used to power the compressor (Figure 3.36-7). The collapsed cabin is about 200 feet downstream from the compressor. A pile of thin-walled pipe, probably used for the flume, is stacked next to the cabin (Figure 3.36-8). A considerable amount of other scrap and garbage, including ore car wheels, cans, and bed springs, is scattered around the cabin site. The disturbed area, including the cabin and compressor sites, covers less than 1 acre.

3.36.4.2 Sample Locations

3.36.4.2.1 Solid Samples

No waste dump samples were collected at this site. The dump has been washed away by Webb Creek.

3.36.4.2.2 Water Samples

A background water sample (R8089801) was collected above the mine on Webb Creek.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity (μS)</th>
<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R8089801</td>
<td>Webb Creek, background</td>
<td>17</td>
<td>54</td>
<td>7.0</td>
<td>2 ft. wide, 1 ft. deep</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3.36.4.2.3 Analytical Results

Water Samples (Tables 2.5-1 and 2.5-2)

Background sample R8089801 from Webb Creek does not exceed any water quality standards.

3.36.5 Structures

The collapsed cabin below the mine is the only structure at the site. According to local residents, it collapsed three years ago from exceptionally heavy snowfall.

3.36.6 Safety

Although the adit opening is large enough to crawl into, the rock appears to be relatively stable and not prone to collapse. The property is relatively inaccessible to the general public because private land must be crossed to reach the site.
Figure 3.36-1. Location of the Lucky Strike Mine, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.36-2. Sketch of the Lucky Strike Mine.
Figure 3.36-3. Looking north toward the Lucky Strike adit. The opening is at the base of the rock outcrop behind the rock rubble at the lower left (Roll R1, frame #19).

Figure 3.36-4. View inside the Lucky Strike adit. An ore car is visible behind the rock rubble and gravel that partially blocks the mouth of the adit (Roll R1, frame #18).
Figure 3.36-5. Looking north up the waterfall on Webb Creek next to the Lucky Strike adit. The flume from Webb Creek above the adit to the old compressor below the adit can be seen through the trees and brush in the upper part of the photograph (Roll R1, frame #20).
Figure 3.36-6. Old belt-driven compressor in the brush below the adit at the Lucky Strike Mine (Roll R1, frame #21).

Figure 3.36-7. Flume nozzle and other scrap metal near the old compressor at the Lucky Strike Mine. The nozzle apparently powered a Pelton wheel which, in turn, powered the compressor (Roll R1, frame #22).
Figure 3.36-8. Collapsed cabin at the Lucky Strike Mine. The pipe in the foreground is the same as that used for the flume (Roll R1, frame #23).
3.37 GOAT MOUNTAIN PROPERTY (Site No. SA-205)
Alternate name—North Idaho Mining and Development Company.

This property is identified as the Fullgarth Prospect (SA-202) on the video segment. However, the Fullgarth Prospect is a minor property located further to the north along Lightning Creek Road.

3.37.1 Site Location and Access (Figure 2.1-1)

The Goat Mountain Property is about 3½-4 miles north of Clark Fork along the east side of Lightning Creek Road (FS Road 419) in the SW¼ of the SW¼, section 13, T. 56 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.37-1). The mine is beside the road and, according to the U.S. Forest Service map, is on Plum Creek Timber Company land adjacent to Forest Service land.

3.37.2 Geologic Features (Figure 2.2-1)

Anderson (1930, p. 110) described the geology of the Goat Mountain Property as follows:
Both fissure and bedded veins occur on the property, with most of the sulphides in the bedded seams. The country rock is a particularly dense quartzitic facies of the Prichard formation with several thin sills of intrusive quartz diorite of pre-Cambrian (?) age. The veins, however, are in the quartzites, which are difficult and expensive to drill. The fissures approximately parallel the main Hope fault and have generally a quartz filling with scattered crystals of pyrite. The bedded veins are without gouge seams and they have apparently been formed by replacement along very minor slippage joints conformable with the bedding. The vein material consists mainly of quartz with granules or scattered masses of pyrrhotite, pyrite, sphalerite, and galena. The quartzitic wall shows hydrothermal alteration and in places contains disseminations of pyrrhotite.

At least six bedded veins, conformable with the bedding, and which strike N. 55° W. and dip 24° N.E. are exposed within a vertical distance of several hundred feet. These range from one to 10 inches in thickness and contain quartz with minor amounts of sulfides.

3.37.3 Site History

Anderson (1930, p. 110) reported:
Most of the early work was done on a camp and a long cross-cut tunnel from the base of the mountain along Lightning Creek in an attempt to explore a vein that crops about 2,000 feet above on the steep mountainside. More than 900 feet of tunnels were driven, but the attempt was unsuccessful, as only small unmineralized fault fissures and a narrow quartz vein were encountered. With the revival of
interest in mining in 1926 and 1927 operations were again started by the Goat Mountain Mining Company, a new organization, and prospecting was transferred to the outcrop.

Early work on the Goat Mountain property consisted of a 900-foot adit beside the Lightning Creek road. This adit was driven by the Interstate-Sullivan Mining Co. (IGS mineral property files). Interstate-Sullivan was incorporated in 1918 and forfeited its charter in 1919.

In 1926, the Goat Mountain Mining Company (incorporated in 1926) began working the property. This company started driving a tunnel on the outcrop, some 1,600 feet above the lower tunnel (IGS mineral property files). By 1928, Goat Mountain's tunnel was 200 feet long. In 1929 or 1930, the property was leased to the North Idaho Mining and Development Company (incorporated in 1929). In 1930, the property had 1,139 feet of development including three tunnels (850 feet, 200 feet, and 40 feet long). In August 1930, North Idaho leased the property to a group of individuals who incorporated as the Goat Mountain Leasing Company in 1931. Goat Mountain Mining forfeited its corporate charter in 1931, and Goat Mountain Leasing forfeited its charter the following year.

North Idaho forfeited its charter in 1933, had the charter reinstated in 1935, and forfeited it again in 1941. The company appears to have done little or no work on the Goat Mountain property after leasing it in 1930.

3.37.4 Environmental Conditions

3.37.4.1 Site Features

The Goat Mountain Prospect was visited by William Rember on August 8, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 00:14:35-00:18:34). On the video segment, the property is identified as the Fullgarth Prospect. Documenting photographs are Roll R1, frames 25-26, and Roll R2, frames 1-2.

The adit at this prospect is a few feet east of the edge of the new Lightning Creek Road and has a sizeable waste dump that extends down across the old road to the creek (Figure 3.37-2). The adit, driven about S. 75° E., is open and has a trickle of water at about 1 gallon per minute flowing from the portal (Figure 3.37-3). The water flows through a culvert under the new road and seeps into gravels on the old road below. Inside, a few supporting timbers are leaning or lying on the floor, but mostly the adit is unsupported (Figure 3.37-4). The adit opening is over 7 feet high and 6 feet wide, and inside is 7½-10 feet high and about the same width. The waste dump has been modified by construction of both the old and new Lightning Creek roads, and by erosion of some material by the creek. The remaining dump measures about 50 feet across the top and extends down the slope from the road about 150 feet. The overall thickness, however, probably averages no more than 10 feet. The toe of the dump, overlying nearly horizontal beds of the Prichard Formation, has been eroded by Lightning Creek (Figure 3.37-5). A minor seep trickles out from under the dump and into the creek. The disturbed area covers about 1 acre.
3.37.4.2 Sample Locations

3.37.4.2.1 Solid Samples

Two samples were collected from the waste dump, one from the lower part of the dump (R8089806) and one from the upper part (R8089807).

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R8089806</td>
<td>Goat Mountain Property, upper part of waste dump</td>
<td>Yes</td>
</tr>
<tr>
<td>R8089807</td>
<td>Goat Mountain Property, lower part of waste dump</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.37.4.2.2 Water Samples

Sample R8089802 was collected from the water flowing from the adit. Sample R8089803 was collected from the seep below the dump. Sample R8089804 was taken about 100 feet upstream from the adit on Lightning Creek. Sample R8089805 was taken about 100 feet downstream from the dump on Lightning Creek.

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Location</th>
<th>Specific Conductivity ($\mu S$)</th>
<th>Temperature ($^\circ$ F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R8089802</td>
<td>Goat Mountain Property adit</td>
<td>149</td>
<td>50</td>
<td>7.74</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>R8089803</td>
<td>Goat Mountain Property, dump seep</td>
<td>154</td>
<td>52</td>
<td>7.34</td>
<td>0.1</td>
<td>Yes</td>
</tr>
<tr>
<td>R8089804</td>
<td>Goat Mountain Property, upstream</td>
<td>20</td>
<td>68</td>
<td>6.9</td>
<td>20 ft. wide, 2 ft. deep</td>
<td>Yes</td>
</tr>
<tr>
<td>R8089805</td>
<td>Goat Mountain Property, downstream</td>
<td>20</td>
<td>68</td>
<td>6.8</td>
<td>---</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.37.4.2.3 Analytical Results

Solid Samples (Tables 2.5-3 and 2.5-4)

Sample R8089806 from the lower portion of the dump exceeds background and environmental levels for arsenic, cadmium, copper, and lead in the element screen. Sample R8089807 from the
upper part of the dump exceeds background and environmental levels for arsenic, cadmium, copper, iron, nickel, and lead in the element screen.

Water Samples (Tables 2.5-1 and 2.5-2)

The dump seep sample (R8089803) and the downstream sample (R8089805) exceed the lower limit of the Aquatic Life Chronic standard for lead in the EPA 200.9 - Lead test.

3.37.5 Structures
No structures were found at this site.

3.37.6 Safety

The open adit is only a few feet from the edge of the Lightning Creek Road, a well-traveled road a few miles from Clark Fork. The rock appears relatively competent and stable, but caving, collapse, and poor air quality are safety considerations.
Figure 3.37-1. Location of the Goat Mountain Property, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.37-2. Sketch of the Goat Mountain Property.
Figure 3.37-3. Looking east at the opening of the Goat Mountain adit along Lightning Creek Road. Water trickles from the adit at about 1 gallon per minute (Roll R1, frame #25).
Figure 3.37-4. View inside the Goat Mountain adit. The adit is 7½-10 feet high and mostly self-supporting (Roll R1, frame #24).
Figure 3.37-5. Looking east at the toe of the Goat Mountain waste dump, which overlies nearly horizontal beds of the Prichard Formation along Lightning Creek (Roll R2, frame #2).
3.38 UNNAMED PROSPECT (Site No. R8199801)

3.38.1 Site Location and Access (Figure 2.1-1)

This prospect or old mill site, labeled “Open Pit Mine” on the topographic map, is just north of the junction of Lightning Creek and East Fork Creek, near the center of the W1/2, section 32 (unsurveyed), T. 57 N., R. 3 E., on the Scotchman Peak 7.5-minute quadrangle (Figure 3.38-1). The site, on Forest Service land, is about 7½ miles north of Clark Fork and has a short access road off the East Fork Creek Road.

3.38.2 Geologic Features (Figure 2.2-1)

This site is underlain by the Prichard Formation, which is composed of argillite, siltite, and quartzite (Aadland and Bennett, 1979).

3.38.3 Site History

Nothing is known of the history of this site.

3.38.4 Environmental Conditions

3.38.4.1 Site Features

This site was visited by William Rember on August 19, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 00:18:38-00:24:17). Documenting photographs are Roll R2, frames 16-19.

Although this site is labeled “Open Pit Mine” on the topographic map, the open disturbed area (Figure 3.38-2) appears to be a millsite rather than a mine. No evidence was found for either surface excavation or underground workings. The access road terminates at the northeast end of the open area at what appears to be a loading (or, in this case, an unloading) chute or platform elevated above several concrete abutments or footings that may be the remains of a mill. Pea-size rock material around the footings may be jig tails, although below the millsite is an open area of probable flotation tailings (Figure 3.38-3). This area is about 120 feet long and 90 feet wide; the thickness could not be determined. At the time of the site visit, this fine-grained material was considered to be either flotation tailings or fine sediments deposited during the Missoula flood episodes (identified as the “Bonneville” flood on the video) because they are deposited around glacial boulders. However, a sample of the material (see section 3.38.4.2, below) confirmed the material to be tailings. On the west side of the access road are piles of rock with numerous sulfide-containing quartz fragments (Figures 3.38-4 and 3.38-5), as well as two piles of crushed ore (Figure 3.38-6). The disturbed area covers at least 10 acres.
3.38.4.2 Sample Locations

3.38.4.2.1 Solid Samples

Sample R8199802 was collected from the fine material below the millsite.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R8199802</td>
<td>Site No. R8199801 flotation tailings</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.38.4.2.2 Water Samples

There is no water on the site, but a background water sample (R8199803) was collected 500-600 feet east of the Lightning Creek Road on East Fork Creek.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity (μs)</th>
<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R8199803</td>
<td>Background, East Fork Creek</td>
<td>18</td>
<td>58</td>
<td>7.2</td>
<td>10 ft. wide, 1 ft. deep</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.38.4.2.3 Analytical Results

Solid Samples (Tables 2.5-3 and 2.5-4)

The sample of the suspected flotation tailings (R8199802) exceeds background and environmental levels for arsenic, cadmium, chromium, copper, iron, manganese, nickel, lead, and zinc in the element screen. Significant amounts of cadmium and lead, as well as lesser amounts of chromium, were leaching from the sample in the TCLP for metals screen.

Water Samples (Tables 2.5-1 and 2.5-2)

Background sample R8199803 exceeds the Aquatic Life Chronic standard for cadmium in the total recoverable metals screen.

3.38.5 Structures

No structures remain standing at this site. Some partly intact wooden framing above the millsite was probably part of an ore unloading ramp or chute. Concrete footings, scrap metal, and piles of old boards are most likely the remains of the mill.
3.38.6 Safety
No safety hazards were found at this site.
Figure 3.38-1. Location of Unnamed Prospect Site No. R8199801, Bonner County, Idaho (U.S. Geological Survey Scotchman Peak 7.5-minute topographic map).
Figure 3.38-2. Sketch of Unnamed Prospect Site No. R8199801.
Figure 3.38-3. Open, flat area covered with probable flotation tailings at Site No. R8199801 (Roll R2, frame #16).

Figure 3.38-4. Pile of sulfide-rich quartz vein fragments west of the access road at Site No. R8199801 (Roll R2, frame #18).
Figure 3.38-5. Close-up of sulfide-rich quartz vein fragment at Site No. R8199801 (Roll R2, frame #19).

Figure 3.38-6. Looking north at two piles of crushed ore along the west side of the access road at Site No. R8199801 (Roll R2, frame #17).
3.39 UNNAMED PROSPECT (Site No. R8199804)

This prospect is identified as the Gabriel (SA-209) on the video segment. It was later determined that the Gabriel is actually about ¼ mile further to the southeast (see Section 3.53). Therefore this site has been given a separate site number. It may be a prospect related to the Ponderosa Group (SA-207).

3.39.1 Site Location and Access (Figure 2.1-1)

The prospect is about 3 miles north of Clark Fork at the base of the southwest slope of Goat Mountain in the NE¼ of the SW¼, section 24, T. 56 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.39-1). The site is about ½ mile east of the Lightning Creek Road on private property just south of National Forest land.

3.39.2 Geologic Features (Figure 2.2-1)

This prospect is near the Hope fault and is underlain by the Prichard Formation, which is composed of argillite, siltite, and quartzite (Aadland and Bennett, 1979).

3.39.3 Site History
Nothing is known of the history of this prospect.

3.39.4 Environmental Conditions

3.39.4.1 Site Features

The prospect was visited by William Rember on August 19, 1998. A video segment describing the prospect is on the Sandpoint District Videotape (Tape 4, index 00:24:22-00:26:16). Documenting photographs are Roll R2, frames 20-21.

This prospect consists of a caved adit and small waste dump. The adit was driven northeastward into the slope and is marked by a shallow trough on the slope above the waste dump. The dump measures 30 feet long, 18 feet wide, and 5 feet thick. It is overgrown with numerous trees 10-12 inches in diameter (Figure 3.39-2). An enamel water pitcher, a barrel hoop, and a pile of rusted tin cans are at the toe of the dump. The disturbed area covers less than 0.25 acre.

3.39.4.2 Sample Locations

3.39.4.2.1 Solid Samples
No waste dump samples were collected at this site.

3.39.4.2.2 Water Samples
No water samples were collected at this site.
3.39.5 Structures
   No structures were found at this site.

3.39.6 Safety
   There are no safety hazards at this site.
Figure 3.39-1. Location of Unnamed Prospect Site No. R8199804, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.39-2. Large trees growing on the waste dump of Unnamed Prospect R8199804, looking east (Roll R2, frame #20).
3.40 MOSS PROSPECT (Site No. SA-289)

3.40.1 Site Location and Access (Figure 2.1-1)

The Moss Prospect is on the South Fork delta tributary of the Clark Fork River in the SW¼ of the SE¼, section 5, T. 55 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.40-1). The adit is just south of the Army Corp of Engineers Johnson Creek boat ramp and about 20 feet above the road along the South Fork. Access to the South Fork road is blocked by a locked gate at the bridge across the Derr Creek slough (Figure 3.40-2). The National Forest map shows this site as a narrow strip of private property adjacent to Forest Service land to the south and the Derr Island Wildlife Management Area (State land) to the north.

3.40.2 Geologic Features (Figure 2.2-1)

Anderson (1930, p. 105) described the geology of the prospect as “in the area of St. Regis rocks that lie between the creek [Johnson Creek] and the Packsaddle fault.” However, Savage (1967, Figure 2b) mapped the rocks as Wallace Formation. The mineralization occurs along a fault striking N. 45° E. and dipping 30° SE. The fissure contains small amounts of arsenopyrite, pyrite, sphalerite, galena, and chalcopyrite accompanied by siderite, calcite, and quartz (Anderson, 1930). When visited for this project, the adit appeared to be following a dacite dike with small quartz stringers.

3.40.3 Site History

The Moss Prospect was located in 1926. By the following summer, the tunnel was 55 feet long (Anderson, 1930).

3.40.4 Environmental Conditions

3.40.4.1 Site Features

The Moss Prospect was visited by William Rember on August 19, 1998. A video segment describing the prospect is on the Sandpoint District Videotape (Tape 4, index 00:26:18-00:29:24). Documenting photographs are Roll R2, frames 22-23.

The prospect consists of an open, dry adit that has no supporting timbers (Figure 3.40-3). A foot trail leads from the road up to the adit (Figure 3.40-4). The adit was driven south-southeast and is at least 100 feet long. No waste dump remains at this site; it may have been removed by construction of the road along the South Fork tributary. The disturbed area is less than 0.25 acre.

3.40.4.2 Sample Locations

3.40.4.2.1 Solid Samples

No waste dump samples were collected at this site.

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3.40.4.2.2 Water Samples
No water samples were collected at this site.

3.40.5 Structures
There are no structures at this site.

3.40.6 Safety
The open adit is known to most of the local residents. The worn foot trail leading to the adit confirms that the site is frequently visited.
Figure 3.40-1. Location of the Moss Prospect, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.40-2. Sketch of the Moss Prospect.
Figure 3.40-3. View inside the open, dry adit of the Moss Prospect (Roll R2, frame #22).
Figure 3.40-4. Looking south at the opening of the Moss Prospect adit. A worn foot path leads from the access road to the adit (Roll R2, frame #23).
3.41 PONDEROSA GROUP (Site No. SA-207)

3.41.1 Site Location and Access (Figure 2.1-1)

The Ponderosa Group is in the E½, section 24, T. 56 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.41-1). There is no access other than by foot up the steep slope above Cascade Creek. The workings are between elevations of about 3,400 feet and 4,000 feet; all are on Forest Service land.

3.41.2 Geologic Features (Figure 2.2-1)

Anderson (1930, p. 112) describes the deposit as follows:

Both fissures and bedded veins occur. They are greatly similar to those on the adjoining claims [Lucky Strike] and are in the same rocks [Prichard]. The fissure veins approximately parallel the Hope fault and strike N. 30° W. and dip steeply southwest with downthrow on the south side. The bedded veins are entirely conformable with the sedimentary formations and trend N. 45° W. and dip 20° N.E.

The mineralization is mainly quartz with scattered granules of pyrrhotite and galena, characteristic of both types of veins.

3.41.3 Site History

The Ponderosa Mining Company was incorporated in 1927, although the company's annual reports to the Idaho Inspector of Mines in 1928 claimed that the company was still being organized. In June 1928, the company reported five tunnels (50 feet, 17 feet, 14 feet, and two that were 10 feet long) and an 18-foot vertical shaft. Later reports listed fewer claims, fewer tunnels, and different lengths for the tunnels. In 1930, the mine reportedly had four tunnels (50 feet, 20 feet, and two that were 10 feet long). Ponderosa forfeited its corporate charter in 1932. However, the company’s manager, Compton I. White, took over the claims. White continued to do the annual assessment work and to file sporadic annual reports until at least 1952. In that year, the property had five tunnels and a 15-foot vertical shaft. The total development was 130 feet.

3.41.4 Environmental Conditions

3.41.4.1 Site Features

The prospect consists of three groups of workings, designated the upper, middle, and lower group, shown on a U. S. Bureau of Mines site map (Figure 3.41-2 [the elevations shown on the map are relative; actual elevations are roughly 200 feet higher than shown]). The upper group consists of a caved shaft and three adits, one of which is open. The middle group consists of a caved "adit," more likely a cut dug along a vein, and a shallow prospect pit. The lower group consists of two open adits on a cliff face (the upper of these is identified as the McWilliams Prospect on the video sequence).

The upper workings consist of a caved shaft connected by a short stope to Adit 1, caved Adit 2 directly below the shaft, and caved Adit 3, offset slightly to the west and below Adit 2 (Figure 3.41-3). These are at an elevation of approximately 3,900-3,950 feet. The caved shaft forms a pit about 3-4 feet deep (Figure 3.41-4) at the lower end of a north-south notch cut into the outcrop (Figures 3.41-5 and 3.41-6). A thin veneer of waste rock extends down the slope below the shaft for about 20 feet. At the top of the notch, Adit 1 extends westward along a vein for about 25-30 feet (Figure 3.41-7). The adit has more of the character of a narrow stope than a typical adit opening. A thin veneer of waste rock is on the slope below the adit adjacent to the notch above the shaft. The waste rock from the shaft extends down the slope over the portal of caved Adit 2. The waste dump for Adit 2 has a small flat top about 8 feet in diameter, but extends down the slope for at least 30 feet (Figure 3.41-8). The dump width on the slope is about 20 feet, and the overall thickness is about 5 feet. Adit 3, offset about 20 feet to the west and 20 feet below Adit 2, is also caved and has a very small waste dump. Several hundred feet below Adit 3 is a small prospect pit. A claim corner tag was found on a tree near the pit. The total disturbed area at the upper workings covers less than 0.5 acre.

The middle workings consist of a caved "adit," designated Adit 4, and a shallow prospect pit (Figure 3.41-9) on a bench above a 40-foot cliff. These are about 600 feet southwest of the upper workings at an elevation of about 3,600 feet. The "adit" is more a trench dug along a vein than an adit, and it does not appear to have ever continued further than the northern end of the trench. The south end of the cut is about 6 feet wide and 8 feet deep (Figure 3.41-10). A bridge of bedrock separates the southern end from the northern end, which is also about 6-8 feet deep and terminates with a slight overhang (Figure 3.41-11). Waste rock is piled along the rim of the trench on both sides. Rock rubble in front of the adit contains quartz vein fragments with sparse galena and pyrrhotite. A minor amount of material is also dispersed on the slope below the cliff. A few feet west of the north end of the trench is a circular pit about 10 feet in diameter and 4-5 feet deep (Figure 3.41-12). The disturbed area covers less than 0.25 acre.

The lower workings are about 400 feet southeast of the middle group at an elevation of 3,400-3,500 feet. There are two open adits on a near-vertical rock outcrop (Figure 3.41-13). Adit 5, near the top of the outcrop, is about 35 feet in length (Figure 3.41-14). This adit is identified as the McWilliams Prospect on the video segment. The adit follows a 4-inch wide quartz vein containing pyrite and galena. In places, the galena makes up over 2½ inches of the vein width. The vein continues into the face at the end of the adit. Adit 6 is directly below Adit 5 near the base of the outcrop and is reported to be 15 feet in length (USBM information in IGS mineral
property files). The waste rock from both workings forms a thin veneer on the talus slope at the
base of the cliff (Figure 3.41-15). The disturbed area is minimal.

3.41.4.2 Sample Locations

3.41.4.2.1 Solid Samples
No waste dump samples were collected at this site.

3.41.4.2.2 Water Samples
No water samples were collected at this site.

3.41.5 Structures

The collapsed remains of a cabin are about 50 yards west of the middle workings. A few old cans
are scattered around the site.

3.41.6 Safety

At the upper workings, Adit 1 is open but narrow and not easy to enter. The shaft is caved and is
not a hazard. Although the two adits at the lower workings are open and visible from the
Lightning Creek Road, they are short and not easily accessible.
Figure 3.41-1. Location of the Ponderosa Prospect, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.41-2. Sketch of the Ponderosa Prospect workings (from USBM map in IGS mineral property files).
Figure 3.41-3. Sketch of the upper workings at the Ponderosa Prospect.
Figure 3.41-4. Pit of the caved shaft at the upper workings of the Ponderosa Prospect (1999 Roll K22, frame #11).
Figure 3.41-5. Looking north at the cut of the caved shaft at the Ponderosa Prospect (1999 Roll K22, frame #10).
Figure 3.41-6. View up the cut above the shaft at the Ponderosa Prospect. Adit 1 extends off to the left at the top of the cut (1999 Roll K22, frame #12).
Figure 3.41-7. Looking west into Adit 1 at the Ponderosa Prospect (1999 Roll K22, frame #13).
Figure 3.41-8. Looking south down the face of the waste dump for Adit 2 at the Ponderosa Prospect (1999 Roll K22, frame #15).
Figure 3.41-9. Sketch of the middle workings at the Ponderosa Prospect.
Figure 3.41-10. Looking north at the south part of the trench of Adit 4 at the Ponderosa Prospect (1999 Roll K22, frame #16).

Figure 3.41-11. Looking north at the north end of the trench of Adit 4 at the Ponderosa Prospect. The apparent opening is a shaded part of the cut with a 2-foot overhang (1999 Roll K22, frame #17).
Figure 3.41-12. Shallow pit a few feet west of the north end of the trench of Adit 4 at the Ponderosa Prospect (1999 Roll K22, frame #18).
Figure 3.41-13. Sketch of the lower workings at the Ponderosa Prospect.
Figure 3.41-14. View inside Adit 5 at the Ponderosa Prospect. The adit is about 30-35 feet long (Roll R2, frame #25).
Figure 3.41-15. View to the south down the cliff face below Adit 5 at the Ponderosa Prospect. The thin veneer of the waste rock from Adits 5 and 6 is on the talus slope below the cliff (Roll R2, frame #24)
3.42 BUMBLE BEE PROSPECT (Site No. SA-291)
Alternate name—Sinnemaki Prospect; Middle Mtn. Copper Mining and Milling Co.

3.42.1 Site Location and Access (Figure 2.1-1)

The Bumble Bee Prospect is on the west side of Johnson Creek in the NW¼ of the NE¼, section 19, T. 55 N., R. 2 E., on the Packsaddle Mountain 7.5-minute quadrangle (Figure 3.42-1). An adit symbol is marked on the topographic map at this location. Access to the site is on FS Road 278 to its junction with FS Road 1018. This latter road crosses the northeast nose of Johnson Peak from West Johnson Creek into the main Johnson Creek drainage. The adit is several hundred feet below the road on Forest Service land.

3.42.2 Geologic Features (Figure 2.2-1)

McConnel (1950) reported the following information:

The veins shown are one to 36 inches wide and contain mostly quartz and ankerite, with sporadic concentrations of pyrite and chalcopyrite.

The veins lie in gently dipping beds of the Wallace formation, the rock being very thin-bedded to lamenated [sic] black and greenish-gray argillite and minor thin beds of quartzite.

3.42.3 Site History

By 1927, the Bumble Bee had already been relocated a number of times (Anderson, 1930). In 1913, the Middle Mountain Copper Mining & Milling Company had a prospect with 1,200 feet of development, a cabin, and a blacksmith shop in this general area. McConnel (1950) indicated the Bumble Bee claims were owned by Matt Sinnemaki since 1939 or 1940, when Sinnemaki had purchased the claims from Sven Anderson.

3.42.4 Environmental Conditions

3.42.4.1 Site Features

This site was visited by William Rember and Ted Erdman on October 3, 1998. A video segment describing the site is on the Sandpoint District Videotape (Tape 4, index 00:48:46-00:50:48). Documenting photographs are Roll R3, frames 17-19.

McConnel (1950) mapped the geology of an adit located about 30 feet from Johnson Creek. Three additional tunnels, all caved, were west of this adit.

Nothing was found at the location of the adit symbol on the map or in the area noted by McConnel. Some malachite float was noted in Johnson Creek below a large slump on the talus
slopes, but there was no evidence of any workings. The talus slump may be at the location of the adits described in Anderson (1930) and mapped by McConnel (1950). A log cabin was found near where the adit symbol is shown on the map, and a flat area above the cabin that was used as a logging deck is at the location marked by the adit symbol on the topographic map. However, again no workings were found. It is possible that the logging operation obliterated the adit(s). An old road along Johnson Creek leads to the cabin site. The presence of the old road, the cabin, and the malachite mineralization are consistent with the presence of an old mine or prospect in this vicinity.

3.42.4.2 Sample Locations

3.42.4.2.1 Solid Samples
   No waste dump samples were collected at this site.

3.42.4.2.2 Water Samples
   No water samples were collected at this site.

3.42.5 Structures

The log cabin was well-constructed and has withstood even the heavy snowfall of the past few years (Figure 3.42-2). The walls and roof are still intact. There is a considerable amount of recent garbage, plastic jugs, and other debris around the cabin. Inside the cabin are the rusted remains of a barrel stove, a wooden chair, bed springs, and other crude furniture (Figure 3.42-3). A collapsed outhouse is nearby in the trees.

3.42.6 Safety
   No safety hazards were found at this site.
Figure 3.42-1. Location of the Bumble Bee Prospect, Bonner County, Idaho (U.S. Geological Survey Packsaddle Mountain 7.5-minute topographic map).
Figure 3.42-2. Well-constructed log cabin at the Bumble Bee Prospect (Roll R3, frame #17).

Figure 3.42-3. View inside the log cabin at the Bumble Bee Prospect. The barrel was used as a wood stove. Most of the interior is in poor condition (Roll R3, frame #19).
3.43 RALPH PROSPECT (Site No. SA-226)
Alternate name—Wickstrom Group(?).

3.43.1 Site Location and Access (Figure 2.1-1)

This prospect is on the south side of Mosquito Creek, about ½ mile east-northeast of the University of Idaho Clark Fork Field Campus, in the northeast corner of the NE¼, section 1, T. 55 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.43-1). Access is on the old Mosquito Creek Road about ½ mile past the turnoff to the Lawrence Mine. The prospect is at the base of the slope and is on Forest Service land.

3.44.2 Geologic Features (Figure 2.2-1)

This prospect is in rocks of the Striped Peak Formation (Aadland and Bennett, 1979). Grains and granules of galena and sphalerite were scattered in a brecciated, porous fissure filling of siderite. Crystals of pyrite and seams of quartz were also present in the veins (Anderson, 1930).

3.44.3 Site History

In 1927, Anderson (1930) noted that the Ralph Prospect had been discovered many years earlier and worked sporadically since its discovery.

3.44.4 Environmental Conditions

3.44.4.1 Site Features

This prospect was visited by John Kauffman and Ted Erdman on April 27, 1999. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 00:50:52-00:56:45). No photographs were taken at this site.

One caved adit and a second probable caved adit were found near the base of the slope south of the Old Mosquito Creek Road (now a trail), just west of the east section line of section 1 (Figure 3.43-2). A caved adit with old timbers and a waste dump are about 75 feet uphill from what may be a second caved adit. The waste dump of the upper adit is about 150 feet long, 20 feet wide, and 10 feet thick. It is covered with a dense growth of small hemlock trees. A old slump on the slope below the caved adit may have covered a second, lower adit at the base of the slope. An area about 100 feet long and possibly 15-20 feet wide appears to be raised about 4-5 feet above the surrounding flat at the base of the slope. However, this “pad” is extremely brushy and may be the remnants of an access road. A very minor seep is present at location of the possible adit. The disturbed area is less than 0.5 acre.
3.43.4.2 Sample Locations

3.43.4.2.1 Solid Samples
No waste dump samples were collected at this site.

3.43.4.2.2 Water Samples
No water samples were collected at this site.

3.43.5 Structures
No structures were found at this site.

3.43.6 Safety
There are no safety hazards at this site.
Figure 3.43-1. Location of the Ralph Prospect, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.43-2. Sketch of the Ralph Prospect.
3.44 LIGHTNING PEAK PROSPECT (Site No. SA-184)
Alternate name—Patchen Mine; Patcher Group; Old Dam Claims.

3.44.1 Site Location and Access (Figure 2.1-1)

The Lightning Peak Prospect is high on the nose of the ridge southeast of the junction of Lightning Creek and Rattle Creek, in the SW¼ of the NW¼, section 1 (unsurveyed), T. 57 N., R. 2 E., on the Trestle Peak 7.5-minute quadrangle (Figure 3.44-1). A mine symbol is shown near this location on the National Forest map. No access roads or trails were found; the prospect was reached by hiking up the ridge. The prospect is on Forest Service land.

3.44.2 Geologic Features (Figure 2.2-1)

The prospect is in rocks of the Precambrian Prichard Formation near a Precambrian diorite or diabase dike or sill (Aadland and Bennett, 1979). It is on a 2-inch-wide quartz vein parallel to the bedding of the host quartzite. The vein is exposed for at least 100 feet and trends N. 10° E., and dips 35° SE.

3.44.3 Site History

The U.S. Bureau of Mines examined this property in 1944 to determine if the government should build an access road to the prospect. The workings included several trenches and a 17-foot incline on the vein (IGS mineral property files).

3.44.4 Environmental Conditions

3.44.4.1 Site Features

The Lightning Peak Prospect was visited by William Rember and Ted Erdman on October 5, 1998. A video segment describing the site is on the Sandpoint District Videotape (Tape 4, index 00:56:49-00:59:24). Documenting photographs are Roll R4, frames 3-4.

Although a mine symbol is shown on the National Forest map near this location, only two small prospect pits, about 50 feet apart, were found on the west side of the knoll labeled “5223 T” on the topographic map. The incline noted by the Forest Service in the access road examination was not found. The pits were dug on a 2-inch wide quartz vein that parallels the bedding of the quartzite host rock (Figure 3.44-2). The pits are only a few feet deep and several feet across. The disturbed area is less than 0.1 acre.

3.44.4.2 Sample Locations

3.44.4.2.1 Solid Samples

No waste dump samples were collected at this site.

114
3.44.4.2.2 Water Samples

No water samples were collected at this site. However, a background water sample (R10059801) was taken from a tributary of Rattle Creek about 1 mile east of this site and ½ mile south of Rattle Creek at an elevation of about 4820 feet.

<table>
<thead>
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<th>Sample No.</th>
<th>Location</th>
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<th>Temperature (° F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>40</td>
<td>8.22</td>
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3.44.4.2.3 Analytical Results

Water Samples (Tables 2.5-1 and 2.5-2)

Background sample R10059801 does not exceed any water quality standards.

3.44.5 Structures

No structures were found at this site.

3.44.6 Safety

There are no safety hazards at this site.
Figure 3.44-1. Location of the Lightning Peak Prospect, Bonner County, Idaho (U.S. Geological Survey Trestle Peak 7.5-minute topographic map).
Figure 3.44-2. Very small, hand-dug prospect pit on a 3-inch wide quartz vein at the Lightning Peak Prospect (Roll R4, frame #3).
3.45 WEIR PROSPECT (Site No. SA-229)

3.45.1 Site Location and Access (Figure 2.1-1)

The Weir Prospect is about 3 miles west of Clark Fork and about 1 mile west of Sugarloaf Mountain. The exact location is uncertain, but it is probably in the SW¼ of the SE¼, section 5 (unsurveyed), T. 55 N., R. 3 E., on the Scotchman Peak 7.5-minute quadrangle (Figure 3.45-1). Access is on the Mosquito Creek Road east from Clark Fork to FS Road 2295, then southeast on this road about 2 miles. The prospect is just east of the road on a low ridge. This part of section 5 appears to be private land, according to the National Forest map.

3.45.2 Geologic Features (Figure 2.2-1)

Anderson (1930) reported indications of mineralization along a northeast-trending brecciated zone that crosses a quartz monzonite porphyry dike which intrudes the quartzite and shale of the Striped Peak Formation. The dike is approximately parallel to the Hope fault. The brecciated zone shows some silicification and other evidence of hydrothermal alteration.

3.45.3 Site History

The prospect had a small surface cut when Anderson visited it in 1927 (Anderson, 1930).

3.45.4 Environmental Conditions

3.45.4.1 Site Features

The Weir Prospect was visited by Ted Erdman and Earl Carroll on October 17, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 00:59:28-01:01:22). Photographs were taken, but the camera failed to operate properly and the pictures did not turn out.

This prospect consists of a caved adit driven southward into a low hill protruding above the surrounding flat. A long, narrow waste dump is associated with the adit (Figure 3.45-2). Little evidence of the portal remains except for a brushy, overgrown shallow trough on the slope. The waste dump is 80 feet long, about 10 feet wide, and 15 feet thick. Except for a narrow strip on the surface, the dump is overgrown with cedar trees and brush. The disturbed area covers less than 0.25 acre.

3.45.4.2 Sample Locations

3.45.4.2.1 Solid Samples

No waste dump samples were collected at this site.

118
3.45.4.2.2 Water Samples
No water samples were collected at this site.

3.45.5 Structures
No structures were found at this site.

3.45.6 Safety
There are no safety hazards at this site.
Figure 3.45-1. Location of the Weir Prospect, Bonner County, Idaho (U.S. Geological Survey Scotchman Peak 7.5-minute topographic map).
Figure 3.45-2. Sketch of the Weir Prospect.
3.46 TRESTLE CREEK CLAIMS (Site No. SA-181)
Alternate name—Pondera Mining and Power Co., Ltd.

3.46.1 Site Location and Access (Figure 2.1-1)

The Trestle Creek Claims are high on the slope north of Trestle Creek, about 2 miles northeast of the town of Trestle Creek, in the NW¼ of the SE¼, section 10, T. 57 N., R. 1 E., on the Trout Peak 7.5-minute quadrangle (Figure 3.46-1). Access is on FS Road 275 (Trestle Creek Road) about 2 miles to a jeep trail exiting off the north side of the road. The prospect is either on old patented claims now belonging to one of the timber companies, or is on Forest Service land.

3.46.2 Geologic Features (Figure 2.2-1)

This prospect is in rocks of the Prichard Formation in an area with many dikes and small intrusive bodies of Cretaceous granodiorite. The Trestle Creek Claims are north of the Hope fault, and numerous smaller faults have been mapped near the prospect (Aadland and Bennett, 1979).

3.46.3 Site History

These claims are one of several groups of patented claims that were held by Pondera Mining and Power Company, Ltd. (incorporated in 1912). The company began the patenting process on the claims around 1915. No work appears to have been done after the claims were patented, and the company forfeited its corporate charter in 1954.

3.46.4 Environmental Conditions

3.46.4.1 Site Features

The Trestle Creek Claims prospect was visited by Ted Erdman and Earl Carroll on October 18, 1998. A video segment describing the prospect is on the Sandpoint District Videotape (Tape 4, index 01:01:25-01:03:36). Photographs were taken, but the camera failed to operate properly and the pictures did not turn out.

Two adit symbols and a prospect symbol are shown on the topographic map at this location, but only one adit was found, probably the lower of the two shown on the map. The adit, at the base of a ledge 5-7 feet high along the steep slope, is completely caved (Figure 3.46-2). A 1-foot by 1-foot opening at the portal location only extends in about an arm length. The waste dump is about 10 feet across on top and extends down the slope about 40 feet. The overall thickness is probably no more than 5 feet. The disturbed area covers about 0.1 acre.

3.46.4.2 Sample Locations

3.46.4.2.1 Solid Samples

No waste dump samples were collected at this site.
3.46.4.2.2 Water Samples
   No water samples were collected at this site.

3.46.5 Structures
   No structures were found at this site.

3.46.6 Safety

   No safety hazards were found at this site, although only one of the two adits shown on the
topographic map was found.
Figure 3.46-1. Location of the Trestle Creek Claims, Bonner County, Idaho (U.S. Geological Survey Trout Peak 7.5-minute topographic map).
Figure 3.46-2. Sketch of the Trestle Creek Claims.
3.47 MARGUERITE PROSPECT (Site No. SA-180)
Alternate names—Bonner Property; Bonner Mining Company Prospect; Bonner vein.

3.47.1 Site Location and Access (Figure 2.1-1)

The Marguerite Prospect is about 2 miles northeast of the town of Trestle Creek, near the center of the S1/2, section 10, T. 57 N., R. 1 E., on the Trout Peak 7.5-minute quadrangle (Figure 3.47-1). The workings are near the Trestle Creek Claims described in the previous section (section 3.46). Two adit symbols shown on the topographic map accurately mark the location of the workings. Access is by the Trestle Creek Road northeast about 2 miles from the town of Trestle Creek to a jeep road that exits off the north side of the road. The prospects are above the jeep trail about 1 mile from the Trestle Creek Road, and are either on Forest Service land or on patented claims now held by one of the timber companies.

3.47.2 Geologic Features (Figure 2.2-1)

Anderson (1930, p. 124-125) describes the geology of the Bonner property, which according to Savage (1967) is the same as the Marguerite, as follows:

The vein is mainly a filling of a fissure, but this process has been accompanied by replacement. The vein occurs wholly within the Prichard formation, which has been considerably shattered and faulted from the force of the granodiorite intrusion that lies on the opposite side of the ridge. Several intrusion faults of considerable magnitude occur nearby, and several porphyry dikes and lamprophyres outcrop in the vicinity of the vein. One of the lamprophyres is reported to cut the vein. The vein has a general trend of N. 15° E. and a flattened dip to the east, ranging from 30° to nearly horizontal. The quartzite wall rock has been hydrothermally altered and has sericite, chlorite, biotite, and disseminated grains of pyrite and pyrrhotite in it.

The principal vein filling is quartz and it is accompanied by variable amounts of pyrrhotite, the most abundant sulphide, and lesser quantities of pyrite, sphalerite, galena, chalcopyrite, calcite, and feldspar. These are essentially the products of a single stage of deposition whose general sequence has been given elsewhere. Calcite occurs in large rhombohedral crystals in certain parts of the vein only. The tenor of the ore is unknown. The chief content is reported to be gold, but its associations were not determined. Some of the pure pyrrhotite was assayed for gold and silver, and was found to contain neither.

The vein is very irregular in form, swelling and pinching in both strike and dip and changing its direction as well. Consequently the tunnel along it is exceedingly crooked, in fact more crooked than was necessary. The vein ranges from 18 inches to five feet wide, but the average is between three and four feet. It has been followed for about 650 feet in the lower tunnel and then lost because of faulting.
Throughout this distance it carries uniformly distributed amounts of sulphides. The vein is everywhere frozen to the walls and has no gouge except where disturbed by post-mineral movement.

3.47.3 Site History

In 1913, this prospect was held by the Marguerite Gold Mining & Milling Company. The property consisted of six full and three fractional claims. Development totaled about 1,100 feet of workings.

In 1927, Anderson (1930) reported 200-foot and 1,650-foot tunnels at the property. The Bonner Mining Company (not incorporated) was organized around this time and, based on the correlation of the two properties by Savage (1967), apparently staked its claims over the old Marguerite claims. In 1930, the company reported three tunnels (1,300 feet, 300 feet, and 50 feet) and a total of 1,750 feet of workings.

3.47.4 Environmental Conditions

3.47.4.1 Site Features

The Marguerite Prospect was visited by Ted Erdman and Earl Carroll on October 18, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 01:03:40-01:10:57). Photographs were taken but the camera failed to operate properly and the pictures did not turn out.

Two adits were found at the Marguerite Prospect, both shown by adit symbols on the topographic map. Adit 1, the upper of the two adits, is open and dry (Figure 3.47-2). Several leaning timbers frame the portal, but the adit is untimbered inside. About 35 feet inside the portal is a vertical shaft filled with water to about 15 feet below the adit floor. There is a narrow flat area in front of the portal that forms the top surface of the waste dump. The waste rock was dumped down the slope on top of coarse talus. The dump forms a relatively thin veneer, no more than 10 feet thick, that extends down the slope about 40 feet and spreads out to 20 feet across. Iron oxides tint the waste rock orange-brown in contrast to the gray-brown color of the talus. About 50 feet north of and on strike with the adit is a pit or shallow shaft about 10 feet deep with steep side walls. The disturbed area covers less than 1 acre.

Adit 2 is about 100 feet lower in elevation and 800 feet southwest of Adit 1. The caved adit forms a tapered, brushy trough on the slope above a long narrow waste dump (Figure 3.47-3). The dump is about 70 feet long, 15 feet wide, and 15 feet thick. A minor amount of iron oxide vein material is on the surface of the dump, but the remainder of the waste rock is unoxidized with no mineralization. The disturbed area covers less than 0.75 acre.
3.47.4.2 Sample Locations

3.47.4.2.1 Solid Samples
   No waste dump samples were collected at this site.

3.47.4.2.2 Water Samples
   No water samples were collected at this site.

3.47.5 Structures
   No structures were found at this site.

3.47.6 Safety

   Although the rock is relatively stable, the open adit is dangerous because of the shaft inside. The water in the shaft is well below the level of the adit floor. The pit or shallow shaft on the slope above the adit is less dangerous but still a hazard.
Figure 3.47-1. Location of the Marguerite Prospect, Bonner County, Idaho (U.S. Geological Survey Trout Peak 7.5-minute topographic map).
Figure 3.47-2. Sketch of Adit 1 of the Marguerite Prospect.
Figure 3.47-3. Sketch of Adit 2 of the Marguerite Prospect.
3.48 LITTLE JIM PROSPECT (Site No. SA-200)

3.48.1 Site Location and Access (Figure 2.1-1)

The Little Jim Prospect is several miles northeast of Hope on the slope east of Strong Creek, near the center of the S 1/2 of the SW 1/4, section 19 (unsurveyed), T. 57 N., R. 2 E., on the Trout Peak 7.5-minute quadrangle (Figure 3.48-1). FS Trail 444, which is actually a gated road, follows the west side of Strong Creek for several miles, then crosses the creek and switches back and forth up the slope on the east side of the creek. The tunnel is between the fifth and sixth switchbacks and is marked by an adit symbol on the topographic map. The prospect is on Forest Service land.

3.48.2 Geologic Features (Figure 2.2-1)

J. W. Tabor’s 1949 map of the Little Jim Prospect (IGS mineral property files) shows the adit driven along a northeast-trending, northwest-dipping quartz vein in a diorite intrusion. The country rock is Prichard Formation (Aadland and Bennett, 1979).

3.48.3 Site History

The adit was about 110 feet long in 1949, when it was mapped by J. W. Tabor (IGS mineral property files).

3.48.4 Environmental Conditions

3.48.4.1 Site Features

The Little Jim Prospect was visited by Ted Erdman and Earl Carroll on October 19, 1998. A video segment describing the site is on the Sandpoint District Videotape (Tape 4, index 01:11:01-01:13:03). Photographs were taken, but the camera failed to operate properly and the pictures did not turn out.

The prospect consists of an open adit beside the trail (Figure 3.48-2). The portal has log timbers framing the opening, but the interior does not appear to have any supports. Piles of rock debris can be seen on the floor, but otherwise the adit is open. The waste dump is obscure, and it probably was incorporated into the road and dispersed on the steep slope below the road.

3.48.4.2 Sample Locations

3.48.4.2.1 Solid Samples

No waste dump samples were collected at this site.
3.48.4.2.2 Water Samples

Although no water samples were collected at the prospect, a background water sample (E10199801) was taken from a tributary drainage of Strong Creek along the trail west of the prospect.

<table>
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<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity (μS)</th>
<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>42</td>
<td>7.85</td>
<td>5 ft. wide, 2 in. deep</td>
<td>Yes</td>
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</tbody>
</table>

3.48.4.2.3 Analytical Results

Water Samples (Tables 2.5-1 and 2.5-2)

Sample E10199801 exceeds the Aquatic Life Chronic standard for cadmium in the total recoverable metals screen.

3.48.5 Structures

No structures were found at this site.

3.48.6 Safety

The open adit is the only safety hazard at this site. The trail passing this adit receives heavy recreational use by hikers as well as all-terrain vehicle, mountain bike, and trail bike enthusiasts.
Figure 3.48-1. Location of the Little Jim Prospect, Bonner County, Idaho (U.S. Geological Survey Trout Peak 7.5-minute topographic map).
Figure 3.48-2. Sketch of the Little Jim Prospect.
3.49 DOUGHERTY PROSPECT (Site No. SA-170)

3.49.1 Site Location and Access

The Dougherty Prospect is along the divide ridge between South Callahan Creek and upper Lightning Creek, in the NW¼ of the NE¼, section 1 (unsurveyed), T. 58 N., R. 2 E., on the Mount Pend Oreille 7.5-minute quadrangle (Figure 3.49-1). The workings are about 1½ miles southeast of Mount Pend Oreille and can be reached from Lightning Creek Road (FS Road 419) 19.4 miles northeast from Main Street in Clark Fork to FS Trail 51. Follow Trail 51 approximately 2 miles to Darling Lake, then ¾ mile cross-country to the prospect just south of the ridge crest. The prospect is on Forest Service land.

3.49.2 Geologic Features

The prospect is a fissure replacement vein in quartzite of the Prichard Formation and in a Precambrian quartz diorite sill. Most of the mineralization is in the quartz diorite. The ore is predominantly galena with some chalcopyrite in a gangue of garnet, epidote, quartz, pyrite, and other minerals (Anderson, 1930).

3.49.3 Site History

The Dougherty Prospect was probably located in the late nineteenth century, but little work was done on the property. By 1927, the workings included several surface cuts and a 65-foot shaft (Anderson, 1930).

3.49.4 Environmental Conditions

3.49.4.1 Site Features

The Dougherty Prospect was visited by Ted Erdman on September 4, 1999. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 01:13:08-01:16:11). Documenting photographs are Roll E23, frames 1-2.

Although a 65-foot shaft is reported at this property (Anderson, 1930), only two shallow prospects were found. One shallow pit and an east-west trending cut are near the crest of the ridge (Figure 3.49-2). The pit is only a few feet deep and has a small pile of excavated rubble on the south edge. The short cut is also only a few feet deep (Figure 3.49-3) and has a small pile of excavated rock on the slope below (Figure 3.49-4). The disturbed area at this site is minimal.

3.49.4.2 Sample Locations

3.49.4.2.1 Solid Samples

No waste dump samples were taken at this site.
3.49.4.2.2 Water Samples
   No water samples were collected at this site.

3.49.5 Structures
   There are no structures at this prospect.

3.49.6 Safety

The shaft reported by Anderson (1930) was not found. The small prospects that were found do not constitute a hazard.
Figure 3.49-1. Location of the Dougherty Prospect, Bonner County, Idaho (U.S. Geological Survey Mount Pend Oreille 7.5-minute topographic map).
Figure 3.49-2. Sketch of the Dougherty Prospect.
Figure 3.49-3. Looking east at the small prospect cut at the Dougherty Prospect (Roll E23, frame #1).
Figure 3.49-4. Looking west along the small prospect cut at the Dougherty Prospect. Note the pile of excavated rubble on the slope below (Roll E23, frame #2).
3.50 DELORAH MINE (Site No. SA-198)

3.50.1 Site Location and Access

The Delorah Mine is about 1,200 feet above the valley floor of Spring Creek, in the NW¼ of the SE¼ of the SW¼, section 10, T. 56 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.50-1). Access is on Highway 200 approximately 0.2 mile east of mile marker 48 to the Spring Creek Road, then eastward on the Spring Creek Road 5.3 miles to an old road (shown on the topographic map as a four-wheel-drive road) that cuts back to the northwest. This old road continues 0.4 miles to Spring Creek, where vehicle access ends. The old road can be followed on foot up the slope approximately ¾ mile through several switchbacks to two open adits. Both of the adits are shown on the topographic map west of Becker Draw at an elevation of 3700 feet. These workings are on Forest Service land.

3.50.2 Geologic Features

The Delorah Mine is in rocks of the Prichard Formation north of the Hope fault (Aadland and Bennett, 1979). The replacement vein consists of quartz with abundant pyrite. The ore minerals were galena and sphalerite (Springer, 1962).

3.50.3 Site History

The claims were originally staked by Ernie Becker, apparently around 1920. By the early 1960s, they had been restaked by Harold Pratt as the Dlorah (or Delorah; Springer, 1962).

3.50.4 Environmental Conditions

3.50.4.1 Site Features

The Delorah Mine was visited by Ted Erdman on September 5, 1999. A video segment describing the property is on the Sandpoint District Videotape (Tape 4, index 01:16:16-01:21:48). Documenting photographs are Roll E23, frames 3-9.

Two open adits with combined waste dumps and two prospect pits are at the end of the old access road (Figure 3.50-2). Although some caved rubble is in front of Adit 1 (Figure 3.50-3), an opening 4 feet wide and 1½ feet high provides access into the adit (Figure 3.50-4). Adit 2 also has a low pile of rock debris in front of the portal, but it has a much larger opening that is easily accessible (Figure 3.50-5). Inside, the adit is roughly 4 feet wide and 6 feet high (Figure 3.50-6). The waste dump for the two adits is 50 feet long parallel to the slope, 35 feet wide, and about 15 feet thick (Figures 3.50-7 and 3.50-8). Two upright logs with two cross beams are on the edge of the dump in front of Adit 2 (Figure 3.50-9). The function of this structure is unknown.

A large prospect cut is on the slope above Adit 1, and a smaller prospect pit is on the slope above Adit 2.

The disturbed area at this site is less than 1.0 acre.
3.50.4.2 Sample Locations

3.50.4.2.1 Solid Samples
   No waste dump samples were collected at this site.

3.50.4.2.2 Water Samples
   No water samples were collected at this site.

3.50.5 Structures

   Except for the two upright beams with cross members, there are no structures at this site.

3.50.6 Safety

   Both of the adits are open and could easily be entered. The size of the waste dump indicates the
   adits are relatively long.
Figure 3.50-1. Location of the Delorah Mine, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.50-2. Sketch of the Delorah Mine.
Figure 3.50-3. Looking north at Adit 1 at the Delorah Mine (Roll E23, frame #3).

Figure 3.50-4. Close-up of the opening into Adit 1 at the Delorah Mine (Roll E23, frame #4).
Figure 3.50-5. Looking north at Adit 2 at the Delorah Mine (Roll E23, frame #7).
Figure 3.50-6. View inside Adit 2 at the Delorah Mine (Roll E23, frame #8).
Figure 3.50-7. Looking south across the waste dump for the two adits at the Delorah Mine (Roll E23, frame #5).

Figure 3.50-8. Looking east along the edge of the waste dump at the Delorah Mine (Roll E23, frame #6).
Figure 3.50-9. Looking south from Adit 2 at the Delorah Mine toward the log structure on the edge of the dump (Roll E23, frame #9).
3.51 CAMPBELL MINE (Site No. SA-199)
Alternate names—Beaver Dam; Complex.

3.51.1 Site Location and Access

The Campbell Mine is north of Spring Creek in the SE¼ of the NW¼ of the SE¼, section 9, T. 56 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.51-1). Access is on Highway 200 to 0.2 mile east of mile marker 48, then on Spring Creek Road 2.8 miles eastward to Mr. Stan Allen’s driveway (2765 Spring Creek Road). The Allen residence is 0.2 mile from the road. The mine, on Forest Service land, is about ¼ mile northeast of the Allen residence and about 600 feet above the valley floor.

3.51.2 Geologic Features

The Campbell Mine is in rocks of the Prichard Formation north of the Hope fault (Aadland and Bennett, 1979). The mineralization occurs in a shear zone in an altered lamprophyre stock. The most abundant mineral is pyrite, accompanied by minor amounts of chalcopyrite, galena, and sphalerite (Anderson, 1930).

3.51.3 Site History

The Campbell Mine was one of the oldest in the district (Anderson, 1930). The property was discovered around 1905, and about 100 feet of tunnel were driven on each side of a dike (IGS mineral property files).

Beaver Dam Mining, Milling & Water-Power Company, Limited, was incorporated in 1907. By 1913, the property had about 500 feet of development. The company forfeited its corporate charter in 1914.

The property was relocated in 1927, but the tunnels were caved at the portals at that time (Anderson, 1930). By 1965, the east tunnel was still accessible, but the west tunnel had caved completely and was no longer recognizable (IGS mineral property files).

3.51.4 Environmental Conditions

3.51.4.1 Site Features


The adit, shown on the topographic map, is caved. A large slump on the slope marks the adit location (Figures 3.51-2 and 3.51-3). The waste dump is 20 feet long and 10 feet wide. It
spreads for several hundred feet down the steep slope (Figure 3.51-4). The thickness on the slope is about 5 feet. The disturbed area is less than 0.1 acre.

3.51.4.2 Sample Locations

3.51.4.2.1 Solid Samples
   No waste dump samples were collected at this site.

3.51.4.2.2 Water Samples
   No water samples were collected at this site.

3.51.5 Structures
   No structures were found.

3.51.6 Safety
   There are no safety hazards at this site.
Figure 3.51-1. Location of the Campbell Mine, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.51-2. Sketch of the Campbell Mine.
Figure 3.51-3. Looking north at the slump on the slope at the caved adit at the Campbell Mine (Roll E23, frame #10).

Figure 3.51-4. Looking west along the slope at part of the waste dump for the Campbell Mine (Roll E23, frame #11).
3.52 UNNAMED PROSPECT (Site No. E9079901)

3.52.1 Site Location and Access

This unnamed prospect, a shaft, is in the extreme southwest corner of section 36, T. 56 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.52-1). Access is on foot from the Mosquito Creek Road. The shaft is on Forest Service land about 1.2 miles northeast of Highway 200 in the town of Clark Fork, and about 400 feet above Mosquito Creek Road. The section corner, marked with a brass cap, is just west of the shaft (Figure 3.52-2).

3.52.2 Geologic Features

This prospect is in rocks of the Striped Peak Formation south of the Hope fault (Aadland and Bennett, 1979).

3.52.3 Site History

Nothing is known of the history of this site. It may have been an air shaft for the nearby Pier and Cady Mine (SA-222).

3.52.4 Environmental Conditions

3.52.4.1 Site Features

This site was visited by Ted Erdman on September 7, 1999. A video segment describing the site is on the Sandpoint District Videotape (Tape 4, index 01:24:20-01:28:25). Documenting photographs are Roll E23, frames 12-14.

The location of the shaft was provided by Mr. Alan Kiebert of Hope, Idaho. The shaft is open and has no warning signs, although some orange flagging has been draped over bushes near the opening (Figures 3.52-3 and 3.52-4). The waste dump (Figure 3.52-5) is 30 feet long, 20 feet wide, and 4 feet thick. The disturbed area covers less than 0.1 acre.

3.52.4.2 Sample Locations

3.52.4.2.1 Solid Samples

No waste dump samples were collected at this site.

3.52.4.2.2 Water Samples

No water samples were collected at this site.

3.52.5 Structures

No structures were found at this site.
3.52.6 Safety

The shaft is open to an undetermined depth and is a serious hazard. There are no warning signs, and the opening is not fenced.
Figure 3.52-1. Location of Unnamed Prospect Site No. E9079901, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Clark Fork
Field Campus

Figure 3.52-2. Sketch of Unnamed Prospect E9079901.
Figure 3.52-3. View into the open shaft at Site No. E9079901, looking north (Roll E23, frame #12).
Figure 3.52-4. Looking west across the open shaft at Site No. E9079901. A National Forest boundary sign is on the tree in the background. A strand of orange flagging is draped over the brush near the shaft (Roll E23, frame #13).
Figure 3.52-5. Looking west at the side of the waste dump for the shaft at Site No. E9079901. The town of Clark Fork is in the distance (Roll E23, frame #14).
3.53 GABRIEL MINE (Site No. SA-209)

3.53.1 Site Location and Access

The Gabriel Mine is in the extreme northeast corner of section 25, T. 56 N., R. 2 E., on the Clark Fork 7.5-minute quadrangle (Figure 3.53-1). Access is on Lightning Creek Road (FS Road 419) 2.3 miles north of Clark Fork to a narrow dirt road, then east on the dirt road 1.0 mile to a driveway leading to a log house. The mine is near the foot of the slope approximately 600 feet northeast of the house. The mine appears to be on private land very near the National Forest boundary to the north.

3.53.2 Geologic Features

The Gabriel Mine is in rocks of the Prichard Formation just north of the Hope fault (Aadland and Bennett, 1979).

3.53.3 Site History

Nothing is known of the history of this site.

3.53.4 Environmental Conditions

3.53.4.1 Site Features


This prospect consist of a caved adit and a long waste dump near the base of the front of the Hope fault (Figure 3.53-2). A long trough on the slope marks the location of the adit (Figure 3.53-3). The waste dump, built out parallel to the slope, is 250 feet long, 50 feet wide, and 20 feet thick (Figure 3.53-4). The surface is covered with a thick stand of small trees (Figure 3.53-5). Near the southeast end of the dump, sections of white plastic pipe extend from a small drainage to a stock tank below the dump. The disturbed area covers about 0.1 to 0.25 acre.

3.53.4.2 Sample Locations

3.53.4.2.1 Solid Samples

No waste dump samples were collected at this site.

3.53.4.2.2 Water Samples

No water samples were collected at this site.

3.53.5 Structures

No structures were found at this site.
3.53.6 Safety
There are no safety hazards at this site.
Figure 3.53-1. Location of the Gabriel Mine, Bonner County, Idaho (U.S. Geological Survey Clark Fork 7.5-minute topographic map).
Figure 3.53-2. Sketch of the Gabriel Mine.
Figure 3.53-3. Looking north at the trough on the slope at the caved Gabriel adit (Roll E23, frame #15).
Figure 3.53-4. Looking northwest along the edge of the Gabriel waste dump (Roll E23, frame #17).

Figure 3.53-5. Looking southeast across the surface of the sapling-covered surface of the Gabriel waste dump (Roll E23, frame #16).
REFERENCES


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McConnel, R.H., 1950, Memorandum to J. B. Haffner, dated October 14, 1950, discussing the Bumblebee Prospect: 1 p. [copy available in Idaho Geological Survey's mineral property files.]


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
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, Chalcopryite, Galena,
Iron Oxide, Limonite, Marcasite, Pyrite,
Pyrriotite,
Sphalerite, Other Sulfide

Neutralizing Host Rock: Dolomite, Limestone, Marble, Other Carbonate

2. OPERATIONAL HISTORY

Dates of significant mining activity ____________________________

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

Years that Mill Operated ____________________________

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

<table>
<thead>
<tr>
<th>Commodity(s)</th>
<th>MILL PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production (ounces)</td>
<td></td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Opening Number</th>
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<tbody>
<tr>
<td>Type of Opening</td>
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</tr>
<tr>
<td>Ownership</td>
<td></td>
</tr>
<tr>
<td>Opening Length (ft)</td>
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<td>Opening Width (ft)</td>
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<td>Latitude (GPS)</td>
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<td>Longitude (GPS)</td>
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<tr>
<td>Condition</td>
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</tr>
<tr>
<td>Ground water</td>
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<td>Water Sample #</td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
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</tbody>
</table>

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 visually 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>
<thead>
<tr>
<th>TABLE 2 - DUMPS, TAILINGS, AND SPOIL PILES</th>
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<tbody>
<tr>
<td>Waste Number</td>
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<tr>
<td>Waste Type</td>
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<tr>
<td>Ownership</td>
</tr>
<tr>
<td>Area (acres)</td>
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<td>Volume (cu yds)</td>
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<tr>
<td>Size of Material</td>
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<tr>
<td>Wind Erosion</td>
</tr>
<tr>
<td>Vegetation</td>
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<tr>
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<td>Indicators of Metals</td>
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<td>Stability</td>
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<td>Waste Sample #</td>
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<tr>
<td>Soil Sample #</td>
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<td>Photo Number</td>
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</table>

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER= Explain in comments, NO=NO or none
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, 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", BOULDER=>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>
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<tbody>
<tr>
<td>Sample Number</td>
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<td>Sampler (Initials)</td>
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<td>Discharging From</td>
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<tr>
<td>Feature Number</td>
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<tr>
<td>Indicators of Metal Release</td>
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<tr>
<td>Indicators of Sedimentation</td>
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<td>Distance to stream (ft)</td>
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<td>Sample Latitude</td>
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<td>Sample Longitude</td>
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<tr>
<td>Field pH</td>
</tr>
<tr>
<td>Field SC</td>
</tr>
<tr>
<td>Flow (gpm)</td>
</tr>
<tr>
<td>Method of measurement</td>
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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 spoil 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=No, 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=No, SLIGHT=Some sedimentation in channel, banks and channel largely intact, MOD=Moderate sediment deposits in channel, affecting flow patterns, banks largely intact, SIGN=Significant 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

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<table>
<thead>
<tr>
<th>Location relative to mine site/features</th>
<th>Upstream (Background)</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
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<td></td>
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<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

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<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Date of sample</th>
<th>Sampler (Initials)</th>
<th>Sample Type</th>
<th>Waste Type</th>
<th>Feature Number</th>
<th>Sample Latitude</th>
<th>Sample Longitude</th>
<th>Photo Number</th>
</tr>
</thead>
</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>
<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>Sample Latitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Longitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likely Source of Contamination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feature Number</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicators of Contamination</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 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 7 - HAZARDOUS WASTES/MATERIALS

<table>
<thead>
<tr>
<th>Waste Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Containment</td>
<td></td>
</tr>
<tr>
<td>Condition of Containment</td>
<td></td>
</tr>
<tr>
<td>Contents</td>
<td></td>
</tr>
<tr>
<td>Estimated Quantity of Waste</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=No, LID=drum/barrel/vat with lid, A/R=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>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Condition</th>
<th>Photo Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></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/flush 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): 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 numbers 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  WA  1
ORANGENUM  451
MAPLOC  1
DEPOSIT  Eagle Creek Mine
MRDSREC
MILSREF  0160790528
PERIODPROD
ORE
COMMOD  Au
LATITUDE  474325
LONGITUDE  1154916
HARDFILE  N
MLA
NAME  EAGLE CREEK MINE
SEC  33
SUBSEC  NESE
TWN  051 N
RNG  005 E
DDMMSS  474325
DDMMSS  1154904
OPTYP  SURFAC
STATUS  PAST PRO
COMMO1  GOLD
COMMO2
COMMO3
COMMO4
COMMO5
MAPNAME  BURKE
QUAD  WALLACE
POP  1KM
TOE  M
YFC
MPF
SITENAME
DISTRICT
COUNTY
SECQUAD
SECQUADSCCL
UTMnorth
UTMEAST
UTNZONE
COMMODIT
LAT
LON
TOWN
SECTION
RANGE

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Appendix C
Geochemical Data
GEOCHEMICAL DATA

ACCURACY OF GEOCHEMICAL DATA

The following information was received on the subject of the accuracy and the detection limits for the geochemical data presented in this report:

Date: Fri, 24 Oct 1997 10:48:23 PST8PDT
From: Kim Anderson <kanderson@asl.fs.uidaho.edu>
To: Ruth E Vance <rvance@uidaho.edu>
Subject: Re: detection limit accuracy

That is something I put together some years ago for another client. Also Greg Moller [Technical Director, Analytical Sciences Laboratory] had input. Other than that, the refs are included in the discussions I sent [discussion titled “Practical Quantitation Limits”; see next page].

Good Luck
Kim,

Kim A. Anderson, Ph.D.
Asst. Prof. / Food Science and Toxicology Dept.
Chief Chemist / Analytical Sciences Laboratory
University of Idaho
Moscow, Idaho 83844-2201
208-885-7900/FAX 209-885-8937
Practical Quantitation Limits

Sensitivity of an analytical method is often based on its ability to reproducibly detect target analytes above the method noise level. Several similar definitions of this Minimum Detection Level or Limit (MDL) or Limit of Detection (LOD) are currently used. According to the American Chemical Society (ACS) (Principles of Environmental Analysis, p 9):

Limit of detection (LOD) "is defined as the lowest concentration level that can be determined as statistically different from the blank".

Instrument detection limit (IDL) "is the smallest signal above background noise that an instrument can detect reliably and is often equivalent to the LOD".

Method detection limit (MDL) "is the lowest concentration of analyte that can that a method can detect reliably in either a sample or a blank".

ACS recommends the value of LOD to be 3σ for a 99% confidence level, where σ is the standard deviation of the measurement.

Limit of Quantitation (LOQ) "is defined as the level above which quantitative results may be obtained with a specified degree of confidence".

ACS recommends an LOQ of 10σ and this imparts a quantitative measurement uncertainty of +/-30% in the measured value at this 99% confidence level. ACS contends "quantitative interpretation, decision-making and regulatory actions should be limited to data at or above the limit of quantitation". In particular, ACS states: "Analytical chemists must always emphasize to the public that the single most important characteristic of any result obtained from one or more analytical measurements is an adequate statement of its uncertainty level. Lawyers usually attempt to dispense with uncertainty and try to obtain unequivocal statements; therefore, an uncertainty interval must be clearly defined in cases involving litigation and/or enforcement proceedings. Otherwise, a value of 1.001 without a specified uncertainty, for example, may be viewed as legally exceeding a permissible level of 1."

EPA Methods used for regulatory enforcement use the same definition of MDL. "The method detection limit is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero". Since performance of analytical methodology and therefore detection limits vary significantly with non-controllable laboratory to laboratory variables such as the exact type of analytical instrumentation, EPA promulgates the concept of Practical Quantitation Limits (PQL). A PQL is equal to the MDL multiplied by a factor of ten or greater and are published as a general guide to laboratory method performance. The factors can range from ten to ten thousand depending on sample matrix and are intended to allow the laboratory the flexibility to determine the relative performance of an analytical method in a more complex sample matrix. In confirmation of laboratory variability, EPA methods as well as other
published analytical methods often estimate detection limits and quantitation limits using a bench-level expert, performance estimate.

Recognition of the 'average performance' nature of the PQL guidelines, EPA states that PQL's "are the lowest concentrations of analytes in (samples) that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQL's listed are generally stated to one significant figure. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for the individual compounds; PQL's are not a part of the regulation (40 CFR Part 264 Appendix IX, Footnote 6)."
SEE

FOLDER:

Geochem_data

For data
Appendix D
Field Forms for Properties in the Study Area
SEE

FOLDER:

Field_forms

For data
Appendix E
Reports Completed for U.S. Forest Service, Region 1, Field Inspection Program
1997 Reports


1998 Reports


1999 Reports


Kauffman, John, E.H. Bennett, and V.E. Mitchell, 1999, Site inspection report for the abandoned and inactive mines in Idaho on U.S. Forest Service lands (Region 1), Idaho Panhandle National Forest: Volume V (Section A): Coeur d'Alene River drainage surrounding the Coeur d'Alene
mining district (excluding the Prichard Creek and Eagle Creek drainages) [secondary properties]: Idaho Geological Survey unpublished report, 250 p., 1 videotape.

Kauffman, John, E.H. Bennett, and V.E. Mitchell, 1999, Site inspection report for the abandoned and inactive mines in Idaho on U.S. Forest Service lands (Region 1), Idaho Panhandle National Forest: Volume V (Section B): Coeur d'Alene River drainage surrounding the Coeur d'Alene mining district (excluding the Prichard Creek and Eagle Creek drainages) [secondary properties]: Idaho Geological Survey unpublished report, 211 p., 1 videotape.

Kauffman, John, E.H. Bennett, and V.E. Mitchell, 1999, Site inspection report for the abandoned and inactive mines in Idaho on U.S. Forest Service lands (Region 1), Idaho Panhandle National Forest: Volume V (Section C): Coeur d'Alene River drainage surrounding the Coeur d'Alene mining district (excluding the Prichard Creek and Eagle Creek drainages) [secondary properties]: Idaho Geological Survey unpublished report, 225 p., 1 videotape.

Kauffman, John, E.H. Bennett, and V.E. Mitchell, 1999, Site inspection report for the abandoned and inactive mines in Idaho on U.S. Forest Service lands (Region 1), Idaho Panhandle National Forest: Volume V (Section D): Coeur d'Alene River drainage surrounding the Coeur d'Alene mining district (excluding the Prichard Creek and Eagle Creek drainages) [secondary properties]: Idaho Geological Survey unpublished report, 276 p., 1 videotape.


2000 Reports


