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 A: Sandpoint Ranger District, Bonner and Boundary Counties, Idaho

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Field Inspection conducted by John Kauffman
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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; chalcopryte, 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(0H)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, H₃AsO₄. 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 [Cu₂(OH)₂(CO₃)₂] 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 chalcopyrite [CuFeS₂], bornite [Cu₅FeS₄], chalcocite [Cu₂S], and tetrahedrite [Cu₁₂Sb₄S₁₃].
Mercury readily vaporizes under atmospheric conditions and thus is most often found in concentrations well below the 25 µg/L equilibrium concentration. The most stable form of mercury in soil is its elemental form. Mercury is found in low temperature hydrothermal ores as cinnabar [HgS], in epithermal (hot springs) deposits as native mercury, and as native mercury in man-made deposits where mercury was used to process gold ores.

Lead concentrations in natural waters are controlled by the formation of lead carbonate, which has an equilibrium concentration of 50 µg/L when the pH is between 7.5 and 8.5. As with other metals, concentrations in solution increase with decreasing pH. In sulfate soils with a pH of less than 6, the formation of anglesite determines how much lead will remain in solution. The formation of cerussite, a lead carbonate, controls solubility in buffered soils. Lead occurs in the common ore mineral galena [PbS].

Zinc solubility is controlled by the formation of zinc hydroxide and zinc carbonate in natural waters. When the pH is above 8, the equilibrium concentration of zinc in water with a high bicarbonate content is less than 100 µg/L. Franklinite may control solubility at pH less than 5 in water and soils, and its formation is strongly affected by sulfate concentrations. Thus, production of sulfate from 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</td>
</tr>
<tr>
<td></td>
<td>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>
</tr>
<tr>
<td></td>
<td>5. Residences, high public use area, or environmentally sensitive area (as</td>
</tr>
<tr>
<td></td>
<td>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 Cathall (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>Rock Unit</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></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></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>---</td>
<td>0.05</td>
</tr>
<tr>
<td>Titanium (percent)</td>
<td></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></td>
<td>224</td>
<td>386</td>
<td>381</td>
<td>600</td>
<td>360</td>
</tr>
<tr>
<td>Barium (ppm)</td>
<td></td>
<td>343</td>
<td>360</td>
<td>235</td>
<td>543</td>
<td>378</td>
</tr>
<tr>
<td>Beryllium (ppm)</td>
<td></td>
<td>1.3</td>
<td>---</td>
<td>---</td>
<td>0.9</td>
<td>0.89</td>
</tr>
<tr>
<td>Cobalt (ppm)</td>
<td></td>
<td>5</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>3.9</td>
</tr>
<tr>
<td>Chromium (ppm)</td>
<td></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>
<td>---</td>
</tr>
<tr>
<td>Nickel (ppm)</td>
<td></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>
<td>---</td>
</tr>
<tr>
<td>Vanadium (ppm)</td>
<td></td>
<td>54</td>
<td>26</td>
<td>20</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Sulfur (percent)</td>
<td></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></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></td>
<td>22</td>
<td>6.2</td>
<td>8</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Lead (ppm)</td>
<td></td>
<td>34</td>
<td>14</td>
<td>10</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td></td>
<td>60</td>
<td>31</td>
<td>15</td>
<td>20</td>
<td>41</td>
</tr>
<tr>
<td>Silver (ppm)</td>
<td></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></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>
<td>---</td>
</tr>
<tr>
<td>Antimony (ppm)</td>
<td></td>
<td>109</td>
<td>1.1</td>
<td>1.6</td>
<td>2.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

No. of Samples: 727, 402, 455, 839, 998
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 sample 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 of these sites; at one of these three sites, mill tailings were the only potential environmental problem noted. Of the nine sites discussed in this section of the report (Section A of Volume IX), three properties have water discharges that exceed one or more water quality standards and two properties have both water quality concerns and waste rock impinging on an active waterway.

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
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 B, C, or D 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>1AC</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>
</thead>
<tbody>
<tr>
<td>SA-207</td>
<td>Ponderosa Group</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>3AO; 3AC; 1SC; several P</td>
</tr>
<tr>
<td>SA-209</td>
<td>Gabriel Mine</td>
<td>P ?</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SA-211</td>
<td>Homestake Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AO</td>
</tr>
<tr>
<td>SA-223/ SA-224</td>
<td>Lawrence Mine/ Little Senator Prospect</td>
<td>FS</td>
<td>2</td>
<td>2</td>
<td>W, T</td>
<td>26AO; 16AC; 3AG; numerous P and T</td>
</tr>
<tr>
<td>SA-226</td>
<td>Ralph Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC; 1AC?</td>
</tr>
<tr>
<td>SA-229</td>
<td>Weir Prospect</td>
<td>P ?</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>SA-234</td>
<td>Sulfide Mine</td>
<td>P &amp; FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO; 2SC</td>
</tr>
<tr>
<td>SA-244</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td>1</td>
<td>D</td>
<td></td>
<td>1AG</td>
</tr>
<tr>
<td>SA-245</td>
<td>Payrock Sunrise Mine</td>
<td>FS</td>
<td>3</td>
<td>W</td>
<td></td>
<td>5AO; 1SO (water filled)</td>
</tr>
<tr>
<td>SA-246</td>
<td>Unnamed Prospect (part of Payrock)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AG (FS gates)</td>
</tr>
<tr>
<td>SA-259</td>
<td>Hope and Faith Shaft</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td>1SO</td>
</tr>
<tr>
<td>SA-260</td>
<td>Catherine Mine</td>
<td>S</td>
<td>1</td>
<td>1</td>
<td>W, D</td>
<td>3AO; 2AC</td>
</tr>
<tr>
<td>SA-261</td>
<td>Brown Bear Mine</td>
<td>S, FS</td>
<td>3</td>
<td>W</td>
<td></td>
<td>1AG; 3AO; 4AC</td>
</tr>
<tr>
<td>SA-262</td>
<td>Iron Mask Mine</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td>2AO</td>
</tr>
<tr>
<td>SA-264</td>
<td>Stemwinder Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO; 1SO</td>
</tr>
<tr>
<td>SA-266</td>
<td>Black Jack Mine</td>
<td>FS</td>
<td>1</td>
<td>1</td>
<td>W, D</td>
<td>6AC; 1AO; 1SO; 1SC</td>
</tr>
<tr>
<td>SA-267</td>
<td>Talache Mine</td>
<td>P</td>
<td>1</td>
<td>W</td>
<td></td>
<td>1AG</td>
</tr>
<tr>
<td>SA-268</td>
<td>Surprise Mine</td>
<td>P &amp; FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO; 1AC</td>
</tr>
<tr>
<td>SA-269</td>
<td>Blue Bird Mine</td>
<td>FS ?</td>
<td>1</td>
<td>W</td>
<td></td>
<td>2AO; 1AG; 1SC; several P and T</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>D</td>
<td></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>D</td>
<td></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; IT</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; ISO</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>T</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 1/4 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, 1/2 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>
hazards. Of the nine sites discussed in this section of the report (Section A of Volume IX), eight had open adits or shafts, and five properties had multiple openings.

2.2 GEOLOGY

The most recent general reference showing the geology of the Sandpoint district 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 district. 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 Kiilsgaard (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 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
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; pCsr = Middle Proterozoic St. Regis Formation; pCew = Middle Proterozoic Wallace Formation; pCxs = 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, Ksd = Cretaceous granitic rocks; Tsp, Tsq = Tertiary granitic rocks; Tdg = Tertiary granodiorite and dacite porphyry dikes; Qgs = Quaternary glacial deposits; Qal = Quaternary stream alluvium.
<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 Formation</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>Ravalli</td>
<td>Wallace Formation</td>
<td>Upper part 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></td>
<td>Lower part Light-gray more or less dolomitic quartzite interbedded with greenish-gray argillite. Ripple marks, mud cracks abundant.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>St. Regis Formation</td>
<td>Upper part Light greenish-yellow to light green-gray argillite; thinly laminated. Some carbonate-bearing beds.</td>
<td>1,400-2,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower part Gradational from thick-bedded pure quartzite at base to interbedded argillite and impure quartzite at top. Red-purple color characteristic; some green-gray argillite. Some carbonate-bearing beds. Ripple marks, mud cracks, and mud-chip breccia common.</td>
<td></td>
</tr>
<tr>
<td></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 Formation</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></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>
of deposits is in the Prichard Formation, and some of these mines are associated with dioritic or diabasic dikes or 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.

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 millsite.

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, ½ 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>---</td>
<td>---</td>
<td>0.0074</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<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>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>---</td>
</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>---</td>
<td>0.0180</td>
<td>0.0045</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>R8079801</td>
<td>Mosquito Creek, at mouth of canyon below Scotchman Peak</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.0035</td>
</tr>
<tr>
<td>R8089801</td>
<td>Webb Creek</td>
<td>0.018</td>
<td>0.0007</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.0011</td>
</tr>
<tr>
<td>R8199803</td>
<td>East Fork Creek, ¾ mile east of Lightning Creek Road</td>
<td>---</td>
<td>0.0014</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>R8209801</td>
<td>Cascade Creek, just east of Lightning Creek Road</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.0044</td>
<td>---</td>
<td>0.0110</td>
<td>---</td>
<td>---</td>
<td>0.0690</td>
</tr>
<tr>
<td>R10059801</td>
<td>Tributary to Rattle Creek, ¾ mile east of Lightning Creek Road</td>
<td>0.020</td>
<td>0.0500</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.0028</td>
<td>0.0028</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</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>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.050</td>
<td>2.000</td>
<td>0.005</td>
<td>0.100</td>
<td>0.050</td>
<td>0.002</td>
<td>0.100</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Secondary MCL</td>
<td>0.05-0.2</td>
<td>1.0000</td>
<td>0.300</td>
<td>0.05</td>
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<td></td>
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</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.360</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></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.190</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></td>
<td></td>
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</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.015</td>
<td>0.0005</td>
<td>0.0004</td>
<td>0.0020</td>
<td>0.0060</td>
<td>0.0028</td>
<td>0.0015</td>
<td>0.0049</td>
<td>0.0007</td>
<td>0.0005</td>
<td>0.010</td>
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</table>
Table 2.4-2. Total recoverable metals in reference water samples from 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>0.0008</td>
<td>0.0030</td>
<td>0.0030</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.021</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</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>
<td>—</td>
<td>0.1200</td>
<td>—</td>
<td>0.0073</td>
<td>—</td>
<td>—</td>
<td>0.0049</td>
<td>—</td>
</tr>
<tr>
<td>R09099706</td>
<td>North Fork Wellington Creek, in Auxor Basin 1 mile east of Round Top Mountain</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.0020</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>R8079801</td>
<td>Mosquito Creek, at mouth of canyon below Scotchman Peak</td>
<td>—</td>
<td>0.0030</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.0022</td>
<td>—</td>
<td>—</td>
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</tr>
<tr>
<td>R8089801</td>
<td>Webb Creek</td>
<td>—</td>
<td>0.0030</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.0260</td>
<td>—</td>
<td>0.0009</td>
<td>—</td>
<td>—</td>
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<td>—</td>
</tr>
<tr>
<td>R8199803</td>
<td>East Fork Creek, ½ mile east of Lightning Creek</td>
<td>—</td>
<td>0.0040</td>
<td>0.0020</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.0018</td>
<td>—</td>
<td>—</td>
<td>0.0036</td>
<td>—</td>
</tr>
<tr>
<td>R8209801</td>
<td>Cascade Creek, just east of Lightning Creek Road</td>
<td>0.0006</td>
<td>0.0020</td>
<td>0.0030</td>
<td>—</td>
<td>—</td>
<td>0.0860</td>
<td>—</td>
<td>0.0250</td>
<td>—</td>
<td>—</td>
<td>0.0900</td>
<td>—</td>
</tr>
<tr>
<td>R10059801</td>
<td>Tributary to Rattle Creek, ½ mile south of Rattle Creek</td>
<td>—</td>
<td>0.0060</td>
<td>—</td>
<td>0.0110</td>
<td>—</td>
<td>0.0470</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.0058</td>
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</tr>
</tbody>
</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>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.0500</td>
<td>2.0000</td>
<td>0.005</td>
<td>0.100</td>
<td>0.0500</td>
<td>0.002</td>
<td>0.1000</td>
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</tr>
<tr>
<td>Secondary MCL</td>
<td>0.05-0.2</td>
<td>1.000</td>
<td>0.300</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.002</td>
<td>0.02</td>
<td>0.0024</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
<td>5.000</td>
</tr>
<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>—</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>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.0005</td>
<td>0.001</td>
<td>0.002</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 B, C, and D of this report.

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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>
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<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<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>0.027</td>
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<td>K908901</td>
<td>Snowbird Mine (SA-272), adit water</td>
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<td>Snowbird Mine (SA-272), upstream</td>
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<td>0.0363</td>
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<td>0.0150</td>
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<td>K914902</td>
<td>Payrock Sunrise Mine (SA-245), Adit 5, water</td>
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<td>0.1300</td>
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<td>Unnamed Prospect (K914903), adit water</td>
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<td>Catherine Mine (SA-260), Adit 1, water</td>
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<td>0.1600</td>
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<td>0.0038</td>
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<td>K915903</td>
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</table>

**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>
<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>
<td>0.100</td>
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<td>0.300</td>
<td>0.050</td>
<td>0.002</td>
<td>0.100</td>
<td>5.000</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
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<td>Secondary MCL</td>
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<td>0.050</td>
<td>0.002</td>
<td>0.100</td>
<td>5.000</td>
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<td>0.12-0.21</td>
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<tr>
<td>Aquatic Life, Acute</td>
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<td>0.360</td>
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<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>
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Table 2.5-1 (continued). Dissolved metals in water samples from the Sandpoint Ranger District.

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<th>Cd (ppm)</th>
<th>Cr (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>
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<td>0.0007</td>
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<td>Regal Mine (SA-203), upstream</td>
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<td>0.0230</td>
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<td>Goat Mountain Prospect (SA-205), adit water</td>
<td>0.0190</td>
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EXPLANATION

Black space equals no analysis

Below Detection Limit is —

WATER QUALITY STANDARDS

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<th>Al (mg/L)</th>
<th>As (mg/L)</th>
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<th>Cd (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>Primary MCL</td>
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<td>0.002</td>
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<td>Secondary MCL</td>
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<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, Acute</td>
<td>0.750</td>
<td>0.360</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>
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<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.190</td>
<td>0.001-0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
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<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.015</td>
<td>0.0005</td>
<td>0.0020</td>
<td>0.0060</td>
<td>0.0028</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 B, C, and D of this report.

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<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>K0976801</td>
<td>Black Jack Mine (SA-266), Adit 3, water</td>
<td>0.0039</td>
<td>0.120</td>
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<td>0.0045</td>
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<tr>
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<td>0.047</td>
<td>—</td>
<td>—</td>
<td>0.200</td>
<td>—</td>
<td>0.0150</td>
<td>—</td>
<td>—</td>
<td>0.0034</td>
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<td>0.0012</td>
<td>0.410</td>
<td>0.002</td>
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<td>—</td>
<td>0.0064</td>
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<td>0.00066</td>
<td>—</td>
<td>—</td>
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<tr>
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<td>0.033</td>
<td>0.003</td>
<td>—</td>
<td>—</td>
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<td>0.020</td>
<td>0.003</td>
<td>0.0072</td>
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<tr>
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<td>—</td>
<td>0.0068</td>
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<td>Payrock Sunrise Mine (SA-245), Adit 5, water</td>
<td>—</td>
<td>0.110</td>
<td>0.003</td>
<td>—</td>
<td>—</td>
<td>0.260</td>
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<tr>
<td>K0986804</td>
<td>Unnamed Prospect (K0919803), adit water</td>
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<td>0.150</td>
<td>0.004</td>
<td>—</td>
<td>—</td>
<td>0.075</td>
<td>—</td>
<td>0.0130</td>
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<tr>
<td>K0986801</td>
<td>Catherine Mine (SA-269), Adit 1, water</td>
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<td>0.270</td>
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<td>0.0060</td>
<td>—</td>
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<td>0.0098</td>
<td>—</td>
<td>—</td>
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</tr>
<tr>
<td>K0986804</td>
<td>Brown Bear Mine (SA-261), Adit 2, water</td>
<td>—</td>
<td>0.180</td>
<td>0.002</td>
<td>—</td>
<td>—</td>
<td>0.280</td>
<td>—</td>
<td>0.0180</td>
<td>—</td>
<td>—</td>
<td>0.0120</td>
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</tr>
<tr>
<td>K0986805</td>
<td>Brown Bear Mine (SA-261), Adit 8, water</td>
<td>—</td>
<td>0.180</td>
<td>—</td>
<td>—</td>
<td>0.260</td>
<td>—</td>
<td>0.0300</td>
<td>—</td>
<td>—</td>
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<td>0.0076</td>
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<tr>
<td>K0986801</td>
<td>Talahe Mine (SA-267), adit water</td>
<td>0.00210</td>
<td>0.068</td>
<td>0.002</td>
<td>0.0120</td>
<td>—</td>
<td>0.360</td>
<td>—</td>
<td>0.0031</td>
<td>0.00078</td>
<td>—</td>
<td>0.0450</td>
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**EXPLANATION**

Blank space equals no analysis

Below Detection Limit is —

**WATER QUALITY STANDARDS**

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<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>—</td>
<td>0.0500</td>
<td>0.005</td>
<td>0.100</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.050</td>
<td>—</td>
<td>—</td>
<td>0.002</td>
<td>0.10</td>
</tr>
<tr>
<td>Secondary MCL</td>
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<td>0.05-0.2</td>
<td>—</td>
<td>—</td>
<td>1.000</td>
<td>0.300</td>
<td>0.050</td>
<td>0.500</td>
<td>—</td>
<td>—</td>
<td>0.024</td>
<td>1.4-5.00</td>
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<tr>
<td>Aquatic Life, Acute</td>
<td>—</td>
<td>0.750</td>
<td>0.3600</td>
<td>0.04-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.082-0.2</td>
<td>—</td>
<td>0.024</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
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<tr>
<td>Aquatic Life, Chronic</td>
<td>—</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>—</td>
<td>0.00012</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>
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<td>0.001</td>
<td>0.002</td>
<td>0.0047</td>
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<td>0.0049</td>
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<td>0.0005</td>
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<td>0.0028</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>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>
<tr>
<td>K10079802</td>
<td>Unnamed Prospect (K10079801), adit water</td>
<td>0.0008</td>
<td>0.010</td>
<td></td>
<td>0.001</td>
<td>0.006</td>
<td>0.010</td>
<td>0.000</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.010</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>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0050</td>
</tr>
<tr>
<td>R09099702</td>
<td>Auxer Mine (SA-194), dump seep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R09109701</td>
<td>Falls Creek Mine (SA-199), adit water</td>
<td>0.0120</td>
<td>0.058</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0041</td>
<td></td>
<td></td>
<td>0.0470</td>
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<tr>
<td>R09109704</td>
<td>Falls Creek Mine (SA-299), mill tails seep</td>
<td>0.0170</td>
<td>0.054</td>
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<td></td>
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<td></td>
<td>0.0060</td>
<td></td>
<td>0.0470</td>
</tr>
<tr>
<td>R09109705</td>
<td>Falls Creek Mine (SA-299), upstream</td>
<td>0.0007</td>
<td>0.022</td>
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<td>R09109706</td>
<td>Falls Creek Mine (SA-299), downstream</td>
<td>0.0074</td>
<td>0.041</td>
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<td>0.0030</td>
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<td>0.0110</td>
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<tr>
<td>R0879802</td>
<td>Regal Mine (SA-203), upstream</td>
<td></td>
<td>0.004</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>0.019</td>
<td></td>
<td>0.0017</td>
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<tr>
<td>R0879804</td>
<td>Regal Mine (SA-203), adit water</td>
<td>0.0058</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.005</td>
<td></td>
<td>0.0039</td>
<td></td>
<td></td>
<td>0.0031</td>
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<tr>
<td>R0889802</td>
<td>Goat Mountain Prospect (SA-205), adit water</td>
<td>0.0008</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.005</td>
<td></td>
<td>0.0017</td>
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<tr>
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<td>Goat Mountain Prospect (SA-205), dump seep</td>
<td>0.0011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.005</td>
<td></td>
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<td>0.0058</td>
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<tr>
<td>R0889804</td>
<td>Goat Mountain Prospect (SA-205), upstream</td>
<td>0.0007</td>
<td>0.006</td>
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<td>0.0015</td>
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<td>R0889805</td>
<td>Goat Mountain Prospect (SA-205), downstream</td>
<td></td>
<td>0.005</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>0.020</td>
<td>0.0061</td>
<td>0.0024</td>
<td>0.013</td>
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<tr>
<td>R09099801</td>
<td>Lawrence Mine (SA-223), Adit 2, water</td>
<td>0.0015</td>
<td>0.044</td>
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<td></td>
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<td></td>
<td>0.0046</td>
<td>0.016</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>
<td></td>
<td></td>
<td>0.027</td>
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<td>0.0029</td>
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<td>0.0009</td>
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<td>0.0010</td>
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**EXPLANATION**

Blank space equals no analysis

Below Detection Limit is ---

**WATER QUALITY STANDARDS**

<table>
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<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>
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<td>0.0500</td>
<td>2.0000</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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<td></td>
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</tr>
<tr>
<td>Secondary MCL</td>
<td>0.05-0.2</td>
<td>1.000</td>
<td>0.300</td>
<td>0.050</td>
<td>5.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<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>
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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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<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>
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<td>0.0005</td>
<td>0.012</td>
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</tr>
</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.

<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>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>
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<td>19.0</td>
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<td>NA</td>
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<td>28.0</td>
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<td>280,000</td>
<td>43,000</td>
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<td>Catherine Mine (SA-260), Adit 1, dump</td>
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<td>2.00</td>
<td>13.0</td>
<td>29.0</td>
<td>23,000</td>
<td>81</td>
<td>680</td>
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<td>490</td>
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<td>130.0</td>
<td>68.00</td>
<td>44.0</td>
<td>470.0</td>
<td>55,000</td>
<td>10,000</td>
<td>9,400</td>
<td>NA</td>
<td>51.0</td>
<td>9,100.0</td>
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<tr>
<td>R8089806</td>
<td>Goat Mountain Prospect (SA-205), lower dump</td>
<td>NA</td>
<td>80</td>
<td>110.0</td>
<td>1.90</td>
<td>20.0</td>
<td>33.0</td>
<td>30,000</td>
<td>62</td>
<td>470</td>
<td>NA</td>
<td>26.0</td>
<td>99.0</td>
</tr>
<tr>
<td>R8089807</td>
<td>Goat Mountain Prospect (SA-205), upper dump</td>
<td>NA</td>
<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>
</tr>
</tbody>
</table>

Tailings Samples

<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>R09109703</td>
<td>Falls Creek Mine (SA-299), flotation tailings</td>
<td>NA</td>
<td>5,900</td>
<td>29.0</td>
<td>51.0</td>
<td>23.0</td>
<td>300.0</td>
<td>38,000</td>
<td>4,000</td>
<td>4,100</td>
<td>NA</td>
<td>14.0</td>
<td>6,500.0</td>
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<tr>
<td>R8099802</td>
<td>Lawrence Mine (SA-223), flotation tailings</td>
<td>NA</td>
<td>410</td>
<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>
<td>22.0</td>
<td>6,800.0</td>
</tr>
<tr>
<td>R8099803</td>
<td>Lawrence Mine (SA-223), jig tailings</td>
<td>NA</td>
<td>350</td>
<td>170.0</td>
<td>41.00</td>
<td>26.0</td>
<td>51.0</td>
<td>48,000</td>
<td>29,000</td>
<td>7,700</td>
<td>NA</td>
<td>24.0</td>
<td>5,000.0</td>
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<tr>
<td>R8199802</td>
<td>Unnamed Prospect (R8199801), tailings</td>
<td>NA</td>
<td>240</td>
<td>140.0</td>
<td>17.00</td>
<td>140.0</td>
<td>160.0</td>
<td>39,000</td>
<td>8,000</td>
<td>1,700</td>
<td>NA</td>
<td>74.0</td>
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Clark Fork Superfund Background Levels (mg/kg) = ppm

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

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>As (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Pb (ppm)</th>
<th>Hg (ppm)</th>
<th>Se (ppm)</th>
<th>Ag (ppm)</th>
<th>Ba (ppm)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dump Samples</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K9079802</td>
<td>Black Jack Mine (SA-266), Adit 7, dump</td>
<td></td>
<td>0.098</td>
<td>1.100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.900</td>
</tr>
<tr>
<td>K9079804</td>
<td>Anderson Prospect (SA-271), dump</td>
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<td>K9089803</td>
<td>Snowbird Mine (SA-272), dump</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>0.710</td>
</tr>
<tr>
<td>K9089807</td>
<td>Wisconsin Prospect (SA-274), dump</td>
<td></td>
<td>0.053</td>
<td>42.000</td>
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<tr>
<td>K9109804</td>
<td>Unnamed Prospect (SA-244), dump</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>K9159802</td>
<td>Catherine Mine (SA-260), Adit 1, dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.700</td>
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<tr>
<td>K10079803</td>
<td>M B Prospect (SA-279), dump</td>
<td></td>
<td>0.038</td>
<td>1.100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.300</td>
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<tr>
<td>R09099705</td>
<td>Auxer Mine (SA-194), dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.890 8.1</td>
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<tr>
<td>R09109702</td>
<td>Falls Creek Mine (SA-299), dump</td>
<td></td>
<td>0.430</td>
<td>0.170</td>
<td>10.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.910 7.0</td>
</tr>
<tr>
<td>R8089806</td>
<td>Goat Mountain Prospect (SA-205), lower dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>0.910</td>
</tr>
<tr>
<td>R8089807</td>
<td>Goat Mountain Prospect (SA-205), upper dump</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.880</td>
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<tr>
<td></td>
<td>Tailings Samples</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R09109703</td>
<td>Falls Creek Mine (SA-299), flotation tailings</td>
<td></td>
<td>0.044</td>
<td></td>
<td>23.000</td>
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<td></td>
<td></td>
<td></td>
<td>0.100 4.4</td>
</tr>
<tr>
<td>R8099802</td>
<td>Lawrence Mine (SA-223), flotation tailings</td>
<td></td>
<td>0.170</td>
<td>0.078</td>
<td>850.000</td>
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<td></td>
<td></td>
<td>0.100</td>
</tr>
<tr>
<td>R8099803</td>
<td>Lawrence Mine (SA-223), jig tailings</td>
<td></td>
<td>0.280</td>
<td>0.888</td>
<td>580.000</td>
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<td></td>
<td></td>
<td></td>
<td>0.290</td>
</tr>
<tr>
<td>R8199802</td>
<td>Unnamed Prospect (R8199801), tailings</td>
<td></td>
<td>0.250</td>
<td>0.046</td>
<td>180.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.600</td>
</tr>
</tbody>
</table>

EXPLANATION

Blank space equals no analysis

Not Detected is ND

Below Detection Limit is —

<table>
<thead>
<tr>
<th>WATER QUALITY STANDARDS</th>
<th>As (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Se (mg/L)</th>
<th>Ag (mg/L)</th>
<th>Ba (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
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<td>0.005</td>
<td>0.100</td>
<td>0.050</td>
<td>0.002</td>
<td>0.050</td>
<td>2.000</td>
<td></td>
</tr>
<tr>
<td>Secondary MCL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.100</td>
</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.360</td>
<td>0.004 - 0.009</td>
<td>1.7 - 3.1</td>
<td>0.082 - 0.2</td>
<td>0.002</td>
<td>0.0041 - 0.0134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.190</td>
<td>0.001 - 0.002</td>
<td>0.21 - 0.37</td>
<td>0.003 - 0.008</td>
<td>0.000012</td>
<td>0.00012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.49</td>
<td>0.02</td>
<td>0.03</td>
<td>0.500</td>
<td>0.0017</td>
<td>0.650</td>
<td>0.270</td>
<td>0.050</td>
</tr>
</tbody>
</table>
3.0 SANDPOINT DISTRICT MINE DESCRIPTIONS

3.1 TALACHE MINE (Site No. SA-267)

Alternate names—Blacktail Mine; B. R. & B. Mining Co.; B. F. & H.; Keystone; Armstead; Little Joe; Rainbow Tunnel; Silver Butte Mining Co.; Imperial Silver Corp.; F C Goldsilver, Inc.

At various times throughout its history, the Talache Mine has been grouped with nearby mines and claims, either as part of Talache Mines, Inc., holdings or as leased properties. The principal mines commonly grouped with the Talache include: the Black Jack (Dakota; SA-266), Stemwinder (SA-264), Surprise (SA-268), Brown Bear (SA-261), Catherine (SA-260), Wisconsin (Mariposa or Old Mexico; SA 274), and possibly the Blue Bird (B. F. & H.; SA-269) and Iron Mask (SA-262) mines. All of these mines are described separately in this report.

3.1.1 Site Location and Access (Figure 2.1-1)

The Talache Mine is at the town of Talache, about 1 mile west of Lake Pend Oreille, in the SE¼, section 6, T. 55 N., R. 1 W., on the Talache 7.5-minute quadrangle (Figure 3.1-1). Portions of the waste dump extend eastward into section 5. The Talache Mine is on private property owned by Mr. Mark Hardesty and is described here for completeness, since several of the workings mentioned above have been worked in conjunction with the Talache and may be interconnected with it. The tailings impoundments are also on private property, although exact ownership was not determined.

3.1.2 Geologic Features (Figure 2.2-1)

The Talache Mine and the associated properties are situated on the west limb of a north-south-trending syncline of Precambrian Belt Supergroup units. From oldest to youngest, these units include the Revett, St. Regis, and Wallace formations. The attitude of the bedding is about north-south with dips of 30°-45° E. Numerous lamprophyre dikes are reported in the workings (Green, 1974; 1977).

Green (1977, p. 16-17) described the structural features as follows:

The portion of Idaho located about Pend Oreille Lake has been divided into blocks bounded by high angle faults exhibiting major dip-slip displacements. This structural pattern is considered to have been created by uplift and collapse related to a Late Mesozoic intrusive episode in the region. In many instances the block faults have guided the emplacement of the final intrusive phases. One of the block faults, the Mirror Lake fault, strikes N 30° W and follows the Mirror Lake valley along the eastern edge of the property. About 17,000 feet of vertical displacement has taken place along this fault, with the southwestern side moving downward in relation to the northeastern side. Aeromagnetic data indicated a possible intrusive located beneath Pend Oreille Lake a short distance south of the property, at the
intersection of the Mirror Lake and Evans block faults. These data also suggest the presence of a buried intrusive along the Moyle fault, just west of the Mirror Lake fault in the northern part of the property.

The important WNW-trending faults which cut the property, listed from south to north include the Pearl Creek, Deer Creek [now Talache Creek], Big, and Moyle faults. Elements of this system strike approximately N 80° W, dip steeply to the south, and have displacements of as much as 600 feet. Drag folds, as well as structural and stratigraphic offsets, indicate a long history of different movement taking place at different times along these features. The trend, apparent old age, and complex history of movement suggest that these fractures are related to prominent tear faults which cut the region both to the north and south of the Pend Oreille Lake area.

The NE-trending faults are pervasive within the borders of the property. The faults strike about N 65° E, dip to the northwest, and have experienced normal movement which has resulted in apparent left-lateral offsets. Displacements are usually less than 50 feet although in some instances they measure several hundred feet.

Nearly all of the past production has come from a series of semi-aligned veins which have been exposed intermittently along a belt that has a length of about 12,000 feet (Plate 2 [omitted]). The veins have similar characteristics, and cut approximately the same stratigraphic position where they have been exposed in a series of blocks offset by cross fracturing. The vein[s] strike approximately north and dip 30° to 50° to the east. As nearly as can be determined, they parallel the bedding in strike. However, they generally cut bedding with a slightly steeper dip, the angle of divergence ranging from 5° to 15°.

The most significant veins in the area are in a zone on the southwestern side of the Talache fault (Green, 1974). Green (1977, p. 21-23) described the mineral deposits as follows:

Mineralization of economic significance occurs as veins contained in numerous faults and shear zones within this belt. Most of the important veins are found along the Talache fault where it cuts the upper portion of the St. Regis Formation. The veins include the Surprise, Little Joe, Brown Bear, and Catherine (Plate 2 [omitted]). Of these, the most prominent is the Little Joe vein which has been traced for more than 3000 feet along strike in the Talache mine workings. The Brown Bear and Catherine veins, which also occupy the Talache fault but are offset by a cross fault, have been traced for a combined length of 3000 feet along strike.

The veins occur as lenses, pipes, and shoots within the faults, and vary considerably in size, grade, and continuity. The zones of higher grade
mineralization have strike lengths of a few feet to as much as several hundred feet, widths varying to a maximum of six feet, and in some instances have been mined for considerable distances down dip. High grade zones show a definite tendency to rake to the north at angles from 30° to 60°. The best example of this is shown by a longitudinal projection of stopes along the Little Joe vein at the Talache mine (Fig. 3 [omitted]). The Little Joe vein strikes nearly due north and dips east, approximately 10° more steeply than the formation it cuts. The shoot averaged 1.5 feet wide and was mine over a strike length of approximately 1500 feet and for a down-dip distance of 1800 feet.

Several pipe-like bodies of mineralization have been mined in the Brown Bear and Catherine veins. The pipes occur where the discordant, north-striking, east-dipping veins are slightly offset by NE-trending fractures that dip to the north. At these intersections the vein has been drag folded forming a “roll” or pipe-like shoot of mineralization which has a rake to the north. . . .

Banding and other textural features of the productive portions of the veins suggest repeated fracturing and open-space filling by several stages of mineralization. Vein filling consists primarily of tetrahedrite in a gauge [sic] of siderite and quartz. Pyrite, arsenopyrite, chalcopyrite, galena, sphalerite, and specular hematite although of lesser extent, have also been noted to occur in the veins. Silver contributes the primary economic value to the mineralization, although significant values in gold, copper, lead, and zinc are contained in the vein material. . . .

Most of the veins are bounded by gouge material indicating some post-mineral movement. Visual wall rock alteration, although generally not extensive, consists of bleaching, silicification, and iron staining up to ten feet on either side of the vein.

3.1.3 Site History

The Little Joe vein at the Talache Mine was discovered in the late 1880s (Sampson, 1928). By 1905, the B. R. & B. Mining Company owned what was possibly the original prospect of the Talache Mine (Savage, 1967). The vein was opened to a depth of 726 feet and total development was 4,000 feet. According to the Idaho Mine Inspector’s annual report (IMIR) for 1904, the B. R. & B. property had made several shipments of ore that returned from 400 to 1,600 ounces of silver per ton. The B. R. & B. workings included the 1,200-foot Rainbow Tunnel that was driven to intersect the Keystone vein at depth (Green, 1976; 1904 IMIR; Calkins, 1909). The Rainbow Tunnel appears to have been the start of the Talache 1200-level adit (Green, 1976). Also in 1904, the nearby B. F. & H. mine shipped two cars of ore that netted $12,000. Shipments from the B. F. & H. the following year contained 300 to 700 ounces per ton of silver and 10 percent copper (1905 IMIR). This property explored the Little Joe vein on two levels, which apparently became the Talache 400- and 700-level tunnels (Green, 1976).
In 1913, the Little Joe Mining Company owned five full and two fractional claims. Total development was reported as about 5,000 feet, including two long tunnels. Keystone Mines Corporation (incorporated in 1915) began the process of consolidating the mining claims in the Blacktail Mountain area. The company held eleven patented and at least twenty-five unpatented claims, which included the claims of the Little Joe Mining Company and others clearly derived from the B. R. & B. Mining Company’s holdings. Keystone made small shipments of ore in 1915 and 1916. The company forfeited its corporate charter in 1917.

In late 1916, Major Henry H. Armstead “took an option on the Little Joe and other groups of claims, conducted a careful investigation, then purchased the properties” (Humphreys and Leatham, 1936, p. 15). Development continued under Armstead Mines, Inc., from 1917 through 1921. The 1200-foot tunnel (the main Talache Mine adit) was extended to intersect the Little Joe vein, 4,000 feet from the portal, raises were driven to connect upper levels, and a 150-ton concentrator was built (Sampson, 1928; Humphreys and Leatham, 1936). By 1919, the claims listed on the Annual Report to the state mine inspector included, in addition to those previously mentioned, the Black Jack or Dakota mine claims, the Stemwinder claims, and the Mexico and Mariposa claims. These later claims are probably related to the Wisconsin (Old Mexico) Mine of this report (section 3.14). By 1921, development on the Little Joe vein totaled 13,365 feet.

In 1922, the property was sold to A. H. Burroughs, Jr., Armstead’s managing director of the property. Armstead Mines changed its name to Talache Mines, Incorporated, and the mine’s name was changed to “Talache” (Humphreys and Leatham, 1936). The 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, although the company noted in 1924 that the ore produced in the early part of 1923 averaged 10 ounces per ton more silver than the ore processed the previous year when the government was buying silver at a guaranteed price of $1.00 an ounce. Ore shipments were discontinued in mid-1923, but Talache continued development work for the next three years.

All operations were suspended on October 31, 1926. Estimated production was about $2 million of metals, predominantly silver along with some gold, lead, and copper (Sampson, 1928; Humphreys and Leatham, 1936). Green (1977) speculated that production may have ceased because the mineralized zone extended beyond the Talache property at depth.

In 1953, portions of the Talache mine dump were being milled in a small flotation mill constructed below the lowest of the Talache dumps. The operation was being run by Mr. V. Anderson (Nugent, 1953). Nugent (1953, p. 1) noted:

Anderson’s operation, called the “Peak Lode,” is similar to that of Guy Patchen at the Idaho Continental Mine. It is a milling project—not well financed and dependent upon the unpredictable grade and tonnage of the dump rock, the efficiency of the home-made mill, and the skill and ingenuity of Anderson.

Green (1977, p. 8-9) described the mine’s recent history:
Since the closure of the Talache mine [in 1926], production has been limited to small, hand-sorted shipments, taken from a number of different workings. On several occasions in recent years, minor attempts at rehabilitation and exploration have been made, but no production has been realized.

Since the early 1900's considerable exploration and development have also taken place at the Brown Bear and Catherine workings located to the north of the Talache mine.

In 1964, the Silver Butte Mining Co. was formed to explore the Brown Bear and Catherine areas. A public stock offering was held and subsequently approximately 2300 feet of drifting and crosscutting and 2400 feet of diamond drilling were carried out. Two small mineralized areas were encountered in the underground portion of this work, and several small, hand-sorted shipments were made to a smelter.

In 1967, Imperial Silver Corp. was formed to explore the Talache mine area. A number of new claims were staked, but very little exploration over and above that necessary for assessment work was undertaken.

In 1969, both the Silver Butte and Imperial Silver holdings were leased to Cominco American, Inc. Cominco held the properties through 1971 and completed approximately 5000 feet of diamond drilling.

From 1973 through 1975, F C Gold Silver, Inc. leased the two properties, but carried out very little exploration.

In 1976, Imperial Silver exchanged all of its mineral rights for capital shares in Silver Butte Mining Company, thus consolidating the mineral ownership of the district.

The Talache Mine is currently owned by Mr. Mark Hardesty, Talache Road, Sagle, Idaho. No mining activity is in progress. The properties on state land, including the Brown Bear, Catherine and Iron Mask mines, are under lease. However, the lease is about to be dropped, according to one of the lease holders, and much of the equipment is being salvaged.

Wormser (1922) and Northwest Mining Truth (1921) contain additional information about the Talache Mine and mill. Wormser (1922) noted that talache is a Mexican name for a crude type of pick used by a tribe of Mexican Indians engaged in mining silver ores. These Indians later became known as the Talache tribe because of their extensive use of this pick.
3.1.4 Environmental Conditions

3.1.4.1 Site Features

The Talache Mine was visited by John Kauffman on September 16, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 1, index 00:14:23-00:22:07). Documenting photographs are Roll K19, frames 6-14. We wish to thank Mr. Hardesty for granting permission to visit the site.

The Talache Mine consists of extensive workings following several veins under the slope to the west of the Talache Fault, which trends northwest along Mirror Creek. The Talache site also has an extensive waste dump, large footings from a former structure, a flotation mill, and two tailings ponds (Figure 3.1-2). Some of the workings may interconnect with the Black Jack Mine and possibly with other mines in the area. Mr. Hardesty (personal communication, 1998) said that there are over 23 miles of workings in the Talache Mine. The adit (the 1200-level tunnel) is located beneath the road to Talache and has been covered. Access into the adit is by means of a hatch door and ladder that drops into a large culvert under Mr. Hardesty’s driveway. Water from the adit drains through a small culvert under the road and flows in front of Mr. Hardesty’s shop building, then along the Talache road for several hundred feet (Figures 3.1-3 and 3.1-4). The waste dump is extremely large, extending at least 1,000 feet from the adit with a width of 200-300 feet at the widest portions. The face along Mirror Creek is at least 60 feet thick (Figure 3.1-5). Almost all of the dump surface has been modified to some extent, and an undetermined amount of the material has been removed. Much of the dump rock has been used as fill or is being screened to several sizes and used as road metal (Figures 3.1-6, 3.1-7 and 3.1-8).

The 400-level and 700-level tunnels reported by Green (1977, 1977) were driven from Talache Creek (originally Deer Creek). From Green’s map, these workings are among those discussed with the Black Jack Mine (section 3.2).

Several shafts are said to be located on the slope west of the Talache Mine, probably on private land (Mr. Mark Hardesty, personal communication). These were not visited, but Mr. Hardesty reports at least one or two are open. If any are on Forest Service land, they are probably adjacent to Mr. Carver Kerney’s property. These shafts provide air flow through the Talache Mine and, if found, should be closed in such a way as to allow the air flow to continue.

The disturbed area at the Talache Mine exceeds 10 acres.

3.1.4.2 Sample Locations

3.1.4.2.1 Solid Samples

No waste dump sample was collected.
3.1.4.2.2 Water Samples

With Mr. Hardesty’s permission, a water sample (K9169801) was collected from the adit water. The sample was taken west of the shop building where the water flows from under the road.

<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>K9169801</td>
<td>Talache Mine adit</td>
<td>meter not working</td>
<td>50</td>
<td>8.32</td>
<td>5-10</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.1.4.2.3 Analytical Results

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

Sample K9169801 exceeds the Aquatic Life Chronic standard for cadmium and the Secondary MCL standard for iron in the total recoverable metals screen. In the ICP cold vapor test, mercury exceeds the Aquatic Life Chronic standard.

3.1.5 Structures

Mr. Hardesty’s shop building may originally have been one of the support buildings for the Talache Mine. On the flat below and north of the shop building is the flotation mill (Figure 3.1-9). The buildings are in excellent condition, at least as seen from the outside. East of the flotation mill are a series of large concrete pillars (Figure 3.1-10), possibly the remains of a former stamp mill. North of the pillars are two tailings ponds surrounded by a low berm (Figure 3.1-11). The one pictured is open and grass covered; the other is east of the open pond and is tree covered. Neither pond has any standing water.

3.1.6 Safety

There are no safety hazards of concern to the Forest Service at this site, unless one or more of the reported air shafts are on National Forest land. These were not found during visits to other mines in the area near the Talache.
Figure 3.1-1. Location of the Talache Mine, Bonner County, Idaho (U.S. Geological Survey Talache 7.5-minute topographic map).
Figure 3.1-2. Sketch map of the Talache Mine and associated features.
Figure 3.1-3. Looking east along the Talache Road (right edge of picture). Water from the Talache Mine flows behind the boat and dump truck, then under the pickup, and follows the edge of the road for several hundred feet. Mr. Hardesty’s shop is at the upper left (Roll K19, frame #6).
Figure 3.1-4. Looking west at the water flowing from the Talache Mine. The original portal area is covered by the road (just above the boat windshield). Water flows from a culvert under the road and past the shop building. The water stream can be seen just above the pickup tailgate at the left (Roll K19, frame #8).
Figure 3.1-5. Looking northward at the face of the Talache 1200-level waste dump. Mirror Creek is in the gully at the toe of the dump (Roll K19, frame #11).

Figure 3.1-6. Looking west at part of the excavated portion of the waste dump (Roll K19, frame #9).
Figure 3.1-7. Looking southeast at the rock screening plant on the Talache 1200-level waste dump (Roll K19, frame #10).

Figure 3.1-8. Looking north-northeast at the rock screening plant on the Talache 1200-level waste dump (Roll K19, frame #12).
Figure 3.1-9. Looking northeast at the Talache flotation mill. The roof of Mr. Hardesty’s shop building is at the far left (Roll K19, frame #14).

Figure 3.1-10. Large concrete pillars north of the waste dump that may have been footings for a stamp mill (Roll K19, frame #13).
Figure 3.1-11. Looking northeast at one of the flotation tailings impoundments (the grass-covered area at the center of the frame). One of the large concrete footings from the previous figure is at the far right (Roll K19, frame #7).
3.2 BLACK JACK MINE (Site No. SA-266)
Alternate names—Dakota; North Dakota; Silver Butte; Silver Butte-Imperial Silver property; F. C. Goldsilver property; Talache Mine.

Some of the workings described below are actually part of the Talache Mine and are noted as such in the discussion.

3.2.1 Site Location and Access (Figure 2.1-1)

The Black Jack Mine workings are on the slope west of Talache in the SE¼ of the NE¼, section 1, T. 55 N., R. 2 W., on the Sagle 7.5-minute quadrangle and the W½ of the W½, section 6, T. 55 N., R. 1 W., on the Sagle and Talache 7.5-minute quadrangles (Figure 3.2-1). An access road exits off of FS Road 2233 at Talache and climbs steeply up the slope to the private residence and orchards of Mr. Carver Kerney. The road continues through his land and onto Forest Service land to the west. Mr. Kerney was not at home at the time of the visit, and it is not known if the road is privately owned or if it is an open access road to the National Forest land. No portion of the road was posted. The mine workings are all on Forest Service land and most are along old, often overgrown, roads.

3.2.2 Geologic Features (Figure 2.2-1)

The geology of the Black Jack Mine is the same as that of the adjacent Talache Mine, which is discussed in detail in section 3.1.2. In addition, Green (1977, p. 10) noted:

The Dakota [Black Jack] workings follow the Black Jack vein west of where it intersects the Little Joe vein to the north of the Talache mine.

The Black Jack is in rocks of the Wallace Formation (Green, 1976).

3.2.3 Site History

In 1901 and 1902, the Idaho Inspector of Mines noted that the Black Jack was one of several properties in this area that were being developed “with excellent results.” By 1913, the Black Jack was owned by the North Dakota Mining Company (incorporated in 1912). The mine had two tunnels, 650 feet and 1,200 feet long, and a 190-foot shaft. In 1919, the Black Jack was acquired by Armstead Mines, owner of what was to become the Talache Mine. North Dakota Mining forfeited its corporate charter in 1920.

Green (1977, p. 10) reported on the Black Jack (Dakota) Mine as follows:
These workings consist of two levels driven as adits. The upper 100, or Black Jack level, extends as a drift along the vein for 700 feet. Several stopes have been mined above this level. The lower 300, or Protector level, extends as a crosscut for 750 feet, then as a drift along the vein for an additional 800 feet. The two levels are approximately 200 feet apart vertically, are not connected, and only the upper level is now partially accessible.
Green (1977) does not mention the 190-foot shaft.

Additional background information is in the “Site History” section for the Talache Mine (section 3.1.3)

3.2.4 Environmental Conditions

3.2.4.1 Site Features

The Black Jack Mine workings were visited by John Kauffman on September 7, 1998. A video segment describing the workings is on the Sandpoint District Videotape (Tape 1, index 00:22:12-00:45:51). Documenting photographs are Roll K14, frames 1-7 and 13-24.

The workings found at the Black Jack include 7 adits and 2 shafts, as well as several shallow prospect pits. One shaft is open, but the remainder of the workings are caved. The workings are numbered in the order they were found.

Adit 1 is in thick timber at the end of an old access road. The adit, now caved, was driven S. 40° W. into the slope (Figure 3.2-2) and is most likely the upper, or Black Jack, level of Green (1977). Several timbers are standing in the trough of the caved adit (Figure 3.2-3). A dump area on the dump in front of the adit indicates that a minor seep probably flows in the spring. There is also a very minor seep in the swale below the dump. The waste dump, which is about 75 feet long, 40 feet wide, and 40 feet down the face, is covered with numerous deciduous saplings (Figure 3.2-4). A pile of wooden planks, possibly part of a collapsed shed, is on the face of the dump (Figure 3.2-5). The disturbed area covers about 0.75 acre.

Shaft 1 and several shallow prospect pits are southwest of Adit 1 on a bench on the nose of the ridge (Figure 3.2-6). A foot trail passes near the shaft and pits. The shaft is open (Figure 3.2-7), about 8 feet square, and is possibly 75 feet deep. (In 1917, the North Dakota Mining Company’s report to the Idaho Mine Inspector listed a 190-foot shaft.) The waste dump is 20 feet long, 12 feet wide, and 15 feet thick (Figure 3.2-8). Three shallow pits are near the shaft and a fourth pit is several hundred feet to the east. A metal spool with a series of spider-like arms (Figure 3.2-9) is lying on the ground north of the shaft near one of the pits. The disturbed area covers less than 0.5 acre.

Adits 2 and 3 are along the dry drainage east of and below Adit 1 (Figure 3.2-10). Adit 2 is short, possibly a prospect cut into the slope that now is only a trough about 10-15 feet long (Figure 3.2-11). No waste dump remains at Adit 2 (Figure 3.2-12). Adit 3 is 100 feet further down the drainage. It is probably the adit shown near this location on Green’s (1976) dissertation map and may be the Protector tunnel (Green, 1977). The adit is caved, forming a trough at least 100 feet long up the slope (Figure 3.2-13). A shallow pond in front of the adit has a low, man-made dam to contain water seeping from the adit at 1-2 gallons per minute (Figure 3.2-14). PVC pipe 1 inch in diameter (Figure 3.2-15) extends from the pond eastward along the slope an undetermined
distance. The water is probably used for irrigation purposes, possibly by Mr. Kerney, although
the line was not followed to its termination. The Adit 3 waste dump (Figure 3.2-16) extends out
across the dry drainage and is 125 feet long, 30 feet wide, and about 40 feet down the face. A
small portion of the dump face contains oxidized material. Seasonal water in the drainage has
eroded a notch in the face of the dump. A metal device with belt driven paddles is on the dump
(Figure 3.2-17), and a pile of old lumber and a bucket are near the south edge of the dump.

Adits 4, 5, and 6, and Shaft 2 are at the corner of a switchback on the access road. These
workings are several hundred feet above Talache Creek on the north side of the drainage (Figure
3.2-18). The road switches back on top of the Adit 4 waste dump; the other workings are above
the road on a north-northwest trend. According to reports by Green (1974 and 1977), these four
workings are part of the Talache Mine.

Adit 4 is the 400 level of the Talache Mine. The adit is caved and has numerous small trees
growing in the trough of the sloughed adit (Figure 3.2-19). Some old rails are in the trough. The
waste dump is large and consists of several lobes (Figures 3.2-20 and 3.2-21). Overall, the dump
is 125 feet long, about 100 feet wide, and 30-40 feet down the face. The dump appears to have
been modified by bulldozer work.

Adit 5 is just above Adit 4 and offset slightly to the northwest. Nothing remains of the opening,
but a waste dump extends down the slope to the road at Adit 4. The dump is 20 feet long, 15 feet
wide, and 15 feet down the face. The opening may be covered by the waste dump from Shaft 2,
which is about 30 feet above Adit 5. Maps in the Idaho Geological Survey’s mineral property
files suggest that the feature at this site may actually have been a shaft that connected with Adit 4.
This shaft was caved before 1921. Later work on Shaft 2 was probably responsible for burying
the opening under the Shaft 2 dump.

Shaft 2 is caved but has an inverted cone-shaped depression 15-20 feet across and 12-15 feet
depth. A piece of metal, probably part of some type of equipment, is on the dump surface just
west of the shaft. Part of the dump is flat and covered with small trees, but the remainder appears
to have been modified by a bulldozer and is mostly bare. Maps in the Idaho Geological mineral
property files suggest this shaft is the upper end of a series of raises that connected the 400
through 1100 levels of the mine. The surface opening was caved before 1921.

Adit 6 is 50 feet above the shaft and is also caved. The waste dump is 25 feet long, 15 feet wide,
and 15 feet down the face. A shallow trough, probably a minor prospect, is on the slope between
the shaft and Adit 6. The disturbed area at Shaft 2 and Adits 4, 5, and 6 covers about 1 acre.

The dump for Adit 7 is located along the south side of Talache Creek at the end of a brush-
covered spur road off the main access road to the other workings (Figure 3.2-22). This site is the
700 level of the Talache Mine. There is no visible indication of the adit except for the waste
dump. A slump on the hillside gives the impression of having apparently eradicated the portal and
other evidence of the adit; however, maps in the Idaho Geological Survey’s mineral property files
indicate the adit was located across the creek on a slope that is heavily overgrown with brush. The waste dump, measuring 35 feet long, 20 feet wide, and 15 feet thick, extends down to the creek (Figure 3.2-23). Most of the dump consists of unoxidized rock, but a minor portion on the northeast end contains oxidized material. Some planks with corrugated metal sheets nailed to them, identified as a timber shed on Talache Mines' map, are on the face of what appears to be a very small waste dump about 75-100 feet east of the main dump. No evidence of an adit was found at this small mound of rock; it may be natural talus debris or a building pad constructed of dump material. The disturbed area is less than 0.25 acre.

3.2.4.2 Sample Locations

3.2.4.2.1 Solid Samples

Sample K9079802 was collected from the waste dump at Adit 7.

<table>
<thead>
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<th>Sample No.</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K9079802</td>
<td>Black Jack Mine, Adit 7 dump</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.2.4.2.2 Water Samples

Sample K9079801 was collected from the water flowing from caved Adit 3. The sample was taken at the old portal area before the water enters the pond.

<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>
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<tbody>
<tr>
<td>K9079801</td>
<td>Black Jack Mine, Adit 3</td>
<td>315</td>
<td>47</td>
<td>7.6</td>
<td>1-2</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.2.4.2.3 Analytical Results

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

The waste dump sample from Adit 7 (K9079802) exceeds background and environmental levels for arsenic, cadmium, copper, iron, lead, manganese, and zinc in the element screen. In the TCLP for metals screen, significant amounts of cadmium and lead are leaching from the sample.
Water Samples (Tables 2.5-1 and 2.5-2)

The water sample from Adit 3 (K9079801) exceeds the Aquatic Life Chronic standard for mercury in the ICP cold vapor test. The sample does not exceed any standards in either the dissolved or the total recoverable metals screens.

3.2.5 Structures

No structures were found at any of the workings, although some planks and corrugated metal sheets on Adit 1 dump may be the remains of a small shed.

3.2.6 Safety

Open Shaft 1 is a serious hazard to anyone exploring the area. There are no warning signs or fencing around the opening. However, access is relatively limited by the private land east of the workings and by the lack of a road to the shaft site.
Figure 3.2-1. Location of the Black Jack Mine, Bonner County, Idaho (U.S. Geological Survey Sagle and Talache 7.5-minute topographic maps).
Figure 3.2-2. Sketch map of Adit 1 of the Black Jack Mine.
Figure 3.2-3. Looking southwest at the portal timbers (center of picture) of caved Adit 1 of the Black Jack Mine (Roll K14, frame #1).

Figure 3.2-4. Looking northeast over the waste dump for Adit 1, which is covered with numerous deciduous saplings (Roll K14, frame #2).
Figure 3.2-5. Wooden planks lying on the northeast face of the waste dump for Adit 1 (Roll K14, frame #4).
Figure 3.2-6. Sketch map of Shaft 1 of the Black Jack Mine.
Figure 3.2-7. Looking down the opening of Shaft 1 at the Black Jack Mine. The shaft is estimated to be 50-75 feet deep (Roll K14, frame #7).

Figure 3.2-8. Looking south at the brush-covered face of the waste dump for Shaft 1 at the Black Jack Mine (Roll K14, frame #5).
Figure 3.2-7. Looking down the opening of Shaft 1 at the Black Jack Mine. The shaft is estimated to be 50-75 feet deep (Roll K14, frame #7).

Figure 3.2-8. Looking south at the brush-covered face of the waste dump for Shaft 1 at the Black Jack Mine (Roll K14, frame #5).
Figure 3.2-9. Metal spool with spider-like arms lying on the ground near Shaft 1 at the Black Jack Mine (Roll K14, frame #6).
Figure 3.2-10. Sketch map of Adits 2 and 3 of the Black Jack Mine.
Figure 3.2-11. Looking west up the short trough of caved Adit 2 at the Black Jack Mine (Roll K14, frame #13).
Figure 3.2-12. Looking southwest up the dry gully in front of caved Adit 2 at the Black Jack Mine. The backpack (just left of the tree trunks at the upper center of the picture) is to the right of the adit trough (Roll K14, frame #14).
Figure 3.2-13. Looking west at the trough of caved Adit 3 at the Black Jack Mine. The trough extends up the slope for about 100 feet (Roll K14, frame #15).
Figure 3.2-14. Looking east from the mouth of Adit 3. Water flowing from the adit forms a small pool behind a low, man-made dam at the mouth of the adit. A barrel stove has been thrown into the center of the pool. The waste dump extends across the dry drainage (Roll K14, frame #16).
Figure 3.2-15. Looking west across the surface of the waste dump for Adit 3 toward the caved adit. The white PVC pipe originates in the small man-made pool in front of the adit, and the water may be used for irrigation (Roll K14, frame #17).
Figure 3.2-16. Looking southwest at the face of the waste dump for Adit 3 at the Black Jack Mine (Roll K14, frame #19).

Figure 3.2-17. Metal box with belt-driven paddles inside lying on the waste dump of Adit 3 (Roll K14, frame #18).
Figure 3.2-18. Sketch map of Adits 4, 5, and 6, and Shaft 2 of the Black Jack Mine.
Figure 3.2-19. Looking north along the trough of caved Adit 4 of the Black Jack Mine (the 400 level of the Talache Mine). The fir trees are growing on the floor of the trough (Roll K14, frame #20).
Figure 3.2-20. Looking southwest across the top of the waste dump for Adit 4 (Roll K14, frame #22).

Figure 3.2-21. Looking east at several lobes of the waste dump for Adit 4. The backpack is on the surface of the main upper lobe seen in the previous figure (Roll K14, frame #23).
Figure 3.2-22. Sketch map of Adit 7 of the Black Jack Mine (the 700 level of the Talache Mine).
Figure 3.2-23. Looking southeast from the north side of Talache Creek at the face of the waste dump for Adit 7 (Roll K14, frame #24).
3.3 STEMWINDER PROSPECT (Site No. SA-264)

Alternate names—Keystone Mines Corporation; Armstead Mines Incorporated; Talache Mine.

3.3.1 Site Location and Access (Figure 2.1-1)

The Stemwinder Prospect is northwest of the Black Jack workings in the SE¼ of the NE¼, section 1, T. 55 N., R. 2 W., on the Sagle 7.5-minute quadrangle (Figure 3.3-1). No access roads or trails were found near the site. The workings are on a brush- and timber-covered slope about 200 feet in elevation uphill from Adit 1 of the Black Jack Mine. Access to the Black Jack Mine is described in section 3.2.1. The Stemwinder Prospect is on Forest Service land.

3.3.2 Geologic Features (Figure 2.2-1)

The geology of the Stemwinder Prospect is the same as that of the Talache Mine, which is discussed in detail in section 3.1.2. The Stemwinder is in rocks of the Wallace Formation (Green, 1976).

3.3.3 Site History

As early as 1915, the Stemwinder (later also written “Stem Winder”) claim was held by the Keystone Mines Corporation. The property was later owned by Amstead Mines and by Talache Mines. Additional information is in the historical overview of the Talache Mine (section 3.1.3).

3.3.4 Environmental Conditions

3.3.4.1 Site Features

The Stemwinder Prospect was visited by John Kauffman on September 7, 1998. A video segment describing the prospect is on the Sandpoint District Videotape (Tape 1, index 00:45:55-00:51:16). Documenting photographs are Roll K14, frames 8-12.

This prospect consists of an open, inclined shaft and an open adit (Figure 3.3-2). The shaft was driven about N. 30° W. into the hill at a decline angle of 40-45°. The opening is 8 feet square (Figure 3.3-3). The waste dump is 20 feet long, 10 feet wide, and 20 feet down the face (Figure 3.3-4). The adit is 100-200 feet south of the shaft at about the same elevation and was driven S. 70° W. into the slope. The adit is open (Figure 3.3-5), although some sloughed debris is piled on the floor (Figure 3.3-6). The waste dump is 25 feet long, 15 feet wide, and 15 feet down the face. The surface is covered with clumps of brush and a few small trees (Figure 3.3-7). The disturbed area is less than 0.5 acre.
3.3.4.2 Sample Locations

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

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

3.3.5 Structures
   No structures were found at this site.

3.3.6 Safety

The open shaft and adit could easily be entered. Piles of rock debris on the adit floor indicate
unstable conditions. The decline of the shaft is moderately steep but should not pose a hazard as
far as falling into it is concerned. However, it could be entered and does present the same
potential caving and bad air hazards as the open adit.
Figure 3.3-1. Location of the Stemwinder Prospect, Bonner County, Idaho (U.S. Geological Survey Sagle 7.5-minute topographic map).
Figure 3.3-2. Sketch of the Stemwinder Prospect.
Figure 3.3-3. Looking northwest into the opening of the inclined shaft at the Stemwinder Prospect (Roll K14, frame #8).

Figure 3.3-4. Looking northeast down the face of the waste dump for the Stemwinder shaft (Roll K14, frame #9).
Figure 3.3-5. Looking southwest at the open adit of the Stemwinder Prospect (Roll K14, frame #10).

Figure 3.3-6. View inside the Stemwinder adit. Piles of rock can be seen on the adit floor (Roll K14, frame #11).
Figure 3.3-7. Looking southwest at the face of the waste dump for the Stemwinder adit (Roll K14, frame #12).
3.4 SURPRISE MINE (Site No. SA-268)

3.4.1 Site Location and Access (Figure 2.1-1)

The Surprise Mine is on Bimetallic Ridge south of Talache Creek in the N1/2 of the NE1/4, section 12, T. 55 N., R. 2 W., on the Sagle 7.5-minute quadrangle (Figure 3.4-1). The Butler Mountain Road is a jeep trail that follows the slope north of Pearl Creek before switching back to Bimetallic Ridge. The adits are along spur roads off the north side of Bimetallic Ridge, and the three prospect trenches are along the road to Butler Mountain on Bimetallic Ridge. This prospect is on several patented claims surrounded by Forest Service land.

3.4.2 Geologic Features (Figure 2.2-1)

The Surprise workings are in the same geological setting as the Talache Mine. Section 3.1.2 gives a geologic description of the area. The Surprise is in rocks of the St. Regis Formation (Green, 1976).

3.4.3 Site History

Green (1974) included the Surprise claim in a list of patented claims for which Imperial Silver held both surface and mineral rights. From 1973 to 1975, F C Goldsilver, Inc., of Coeur d'Alene, Idaho, leased the holdings of Imperial Silver and Silver Butte Mining Company in the Talache area. In 1976, Imperial Silver exchanged all of its mineral rights for capital shares in Silver Butte Mining Company (Green, 1977).

3.4.4 Environmental Conditions

3.4.4.1 Site Features

The Surprise Mine was visited by John Kauffman on September 7, 1998. A video segment describing the mine is on the Sandpoint District Videotape (Tape 1, index 00:51:19-00:57:49). The date is erroneously stated as September 8 on the video segment. Documenting photographs are Roll K14, frames 25-26, and Roll K15, frames 1-3.

The workings consist of two adits and three trenches along and on the north side of Bimetallic Ridge (Figure 3.4-2). One of the trenches is the prospect marked on the topographic map. This trench is about 50 feet long and only a foot or two deep. Two other trenches are east of this first trench. One is similar in length, and the other is about 100 feet long and very brushy. All three are of minor significance and cover less than 0.25 acre.

Adit 1 is located at the end of a short spur road off the north side of the Butler Mountain Road, not far below the location of the prospect shown on the topographic map. There is a pile of sloughed rock at the portal, but the adit has an opening about 4 feet long and 1.5 feet high (Figure
3.4.3. One old timber and additional caved debris are inside the adit (Figure 3.4-4). The spur road crosses the waste dump in front of the adit and terminates at the west side of the dump. The dump measures 40 feet long, 40 feet wide, and 15 feet thick. Most of the surface is covered with weeds and grass (Figure 3.4-5). A survey marker in the timber off the northeast side of the dump identifies this as the Surprise claim. The disturbed area is less than 0.25 acre.

Adit 2 is located along a steep bulldozer road that exits off the north side of the Butler Mountain road on the nose of Bimetallic Ridge about ¼ mile east of the spur road to Adit 1. The road descends northwest down the slope to the adit, then turns to the northeast and continues down the slope for an undetermined distance. The adit, at an elevation of about 3,500 feet, is caved and forms a trough approximately 25-30 feet up the slope (Figure 3.4-6). The waste dump has an irregular, hummocky surface created by numerous low mounds of waste rock (Figure 3.4-7). It measures 40 feet long, 35 feet wide, and 15 feet thick. The west side of the dump has been modified, possibly during construction of the bulldozer road down the hill. The disturbed area at this adit covers less than 0.5 acre.

The road was followed for several hundred yards below Adit 2. No additional workings were found, although there may be some further down the slope toward Talache Creek.

3.4.4.2 Sample Locations

3.4.4.2.1 Solid Samples
No waste dump samples were collected.

3.4.4.2.2 Water Samples
No water samples were collected.

3.4.5 Structures
No structures were found at this site.

3.4.6 Safety

Open Adit 1 is the only safety hazard found at this site. The adit is near the Butler Mountain Road, a jeep road that receives at least moderate recreational traffic.
Figure 3.4-1. Location of the Surprise Mine, Bonner County, Idaho (U.S. Geological Survey Sagle 7.5-minute topographic map).
Figure 3.4-2. Sketch of the Surprise Mine workings.
Figure 3.4-3. Looking southwest at Adit 1 of the Surprise Mine. The opening is visible at the top of the pile of rock rubble in front of the adit (Roll K14, frame #25).

Figure 3.4-4. View inside Adit 1 at the Surprise Mine. A leaning support post is visible a few feet inside the adit (Roll K14, frame #26).
Figure 3.4-5. Looking westerly across the surface of the waste dump for Adit 1 at the Surprise Mine. The adit is in the upper left corner of the picture (Roll K15, frame #1).

Figure 3.4-6. Looking southwest at caved Adit 2 of the Surprise Mine. The leaning trees at the upper center of the photograph mark the location of the trough of the caved adit (Roll K15, frame #2).
Figure 3.4-7. Looking east across the surface of the waste dump for Adit 2 at the Surprise Mine (Roll K15, frame #3).
3.5 UNNAMED PROSPECT (Site No. K9149803)

This adit may be part of the Catherine Mine (Site No. SA-260).

3.5.1 Site Location and Access (Figure 2.1-1)

This unnamed prospect is about 2 miles north of Talache in the N½ of the SW¼, section 31, T. 56 N., R. 1 W., on the Talache 7.5-minute quadrangle (Figure 3.5-1). The adit is below the road to Talache and just north of the turnoff to Camp Stidwell at the south end of Mirror Lake. The site is difficult to see from the road because of the thick trees. A surveyed National Forest boundary line crosses the waste dump in a north-south direction, with private land to the east and Forest Service land to the west (Figure 3.5-2).

3.5.2 Geologic Features (Figure 2.2-1)

The geology of the area including this site is described in section 3.1.2 (Talache Mine). This prospect is in rocks of the Wallace Formation (Green, 1976).

3.5.3 Site History

No specific information could be found concerning this site, but it was probably included in the holdings of Imperial Silver and/or Silver Butte Mining Company (Green, 1974, 1977).

3.5.4 Environmental Conditions

3.5.4.1 Site Features

This prospect was visited by John Kauffman on September 14, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 1, index 00:57:53-01:05:00). Documenting photographs are Roll K17, frames 11-14.

The adit at this site is caved, and several trees have fallen across the trough formed by the caved adit (Figure 3.5-3). The scarp at the head of the trough extends nearly to the Talache road. A steady stream of water, probably 2-5 gallons per minute, flows from the caved adit, forming a large boggy area on the waste dump. Some of the water flows along the northwest edge of the dump and some flows east across the dump surface. The dump extends about 165 feet along the base of the slope to the northwest of the adit and averages about 30 feet wide for most of that length. Toward the north end, an outhouse was constructed on the dump surface (Figure 3.5-4). Beyond the outhouse, the dump narrows to about 6 feet across. In front of the adit, the dump is roughly 4 feet thick, but it thickens to 12 feet at the north end. A metal National Forest boundary stake has been driven into the dump near its center (Figure 3.5-5). Approximately one half of the dump is on Forest Service land. The disturbed area covers about 0.5 acre.
3.5.4.2 Sample Locations

3.5.4.2.1 Solid Samples

No waste dump samples were collected at this site.

3.5.4.2.2 Water Samples

Sample K9149804 was collected from the adit water about 20 feet in front of the adit.

<table>
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<th>Sample No.</th>
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<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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</thead>
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<td>Site No. K9149803 adit</td>
<td>316</td>
<td>53</td>
<td>8.21</td>
<td>2-5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.5.4.2.3 Analytical Results

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

Sample K9149804 exceeds the Aquatic Life Chronic standard for cadmium in the total recoverable metals screen.

3.5.5 Structures

In addition to the outhouse on the north end of the dump, there is a small storage shed just south of the caved adit. This shed is nearly hidden in a grove of cedar trees (Figure 3.5-6). It is about 6-8 feet by 8-10 feet and sits on a concrete foundation. The south wall is partly collapsed and broken. The interior has been partly filled with rock debris, possibly from material deposited during flash flooding of the small ditch near the shed.

3.5.6 Safety

No safety hazards were found at this site.
Figure 3.5-1. Location of the Unnamed Prospect, Site No. K9149803, Bonner County, Idaho (U.S. Geological Survey Talache 7.5-minute topographic map).
Figure 3.5-2. Sketch of Unnamed Prospect, Site No. K9149803.
Figure 3.5-3. Looking southwest up the trough of the caved adit at Site No. K9149803. Several trees have fallen across the trough. A thick carpet of moss (bottom of picture) is growing on the surface where the water flows from the adit (Roll K17, frame #11).
Figure 3.5-4. Looking northwest at the outhouse near the north end of the waste dump at Site No. K9149803 (Roll K17, frame #14).

Figure 3.5-5. Looking northwest across the surface of the waste dump at Site No. K9149803. A metal National Forest boundary marker is just left of the center of the picture. National Forest land is to the left of the marker and private land is to the right (Roll K17, frame #13).
Figure 3.5-6. Looking west at the old shed south of the adit at Site No. K9149803. The shed is nearly hidden by a thick stand of cedar trees (Roll K17, frame #12).
3.6 CATHARINE MINE (Site No. SA-260)
Alternate name—Silver Butte Mines.

3.6.1 Site Location and Access (Figure 2.1-1)

The Catherine Mine is several miles north of Talache on the slope west of Mirror Lake near the center of the E½ of the E½, Section 36, T. 56 N., R. 2 W., on the Sagle 7.5-minute quadrangle (Figure 3.6-1). A good dirt road, blocked by a locked cable, provides access to the workings from FS Road 2233 (the Talache Road). The workings are on leased state land with Forest Service land to the east and south.

3.6.2 Geologic Features (Figure 2.2-1)

For the general geology of the area, see section 3.1.2 (Talache Mine). Green (1974, p. 9) described the Catherine and other veins as follows:

The mineralization contained in the Little JOe [sic], Brown Bear, and Catherine veins favors a fracture set which strikes north-south and cuts bedding, dipping toward the Talache fault with depth. Reverse movement appears to have opened the steeper portions of these fractures thus making them more favorable for deposition. In addition, mineralization within these veins definitely strengthens where they have been cut and offset by east-west striking crossfaults. There is also a rough correlation between the amount of offset and the degree of mineralization. Movement along these fractures appears to be contemporaneous at least in part with the implanation of the vein filling. Thus areas of continuing permeability have controlled deposition near these intersections.

The Catherine is in rocks of the St. Regis Formation (Green, 1976).

3.6.3 Site History

Little is known about the early history of the Catherine, but the mine probably dates back to the turn of the century. In the 1960s and 1970s, the property was explored in conjunction with other nearby mines, including the Talache Mine. Green (1977, p. 8-9) included the following historical account of Catherine in his report:

Since the early 1900’s considerable exploration and development have also taken place at the Brown Bear and Catherine workings located to the north of the Talache mine. Although no production records are available, incomplete smelter statements indicate that the average grade of the hand-sorted material was high, with some shipments recording as much as 500 ounces of silver to the ton. Small shipments have been made intermittently up to recent years and it is estimated by the owners that total production for the property is approximately $300,000.

In 1964, the Silver Butte Mining Co. was formed to explore the Brown Bear and Catherine areas. A public stock offering was held and subsequently approximately
2300 feet of drifting and crosscutting and 2400 feet of diamond drilling were carried out. Two small mineralized areas were encountered in the underground portion of this work, and several small, hand-sorted shipments were made to a smelter.

In 1967, Imperial Silver Corp. was formed to explore the Talache mine area. A number of new claims were staked, but very little exploration over and above that necessary for assessment work was undertaken.

In 1969, both the Silver Butte and Imperial Silver holdings were leased to Cominco American, Inc. Cominco held the properties through 1971 and completed approximately 5000 feet of diamond drilling.

From 1973 through 1975, F.C. Gold Silver, Inc. leased the two properties, but carried out very little exploration.

In 1976, Imperial Silver exchanged all of its mineral rights for capital shares in Silver Butte Mining Company, thus consolidating the mineral ownership of the district.

Green (1974, p. 5) described the workings as follows:
The Catherine workings consist of the Main Catherine level, the Lower Catherine level, and a number of short adits and small stopes located near the outcrop of the Catherine vein. The Main level is nearly 800 feet long, and for most of its length is a drift on the vein. A number of small stopes have been excavated above this level, and some production is reported to have come from a 30-foot deep inclined winze located at its face. The Lower level is approximately 230 feet vertically below the Main level, and was driven as a crosscut for 800 feet. At a point 590 feet from the portal the Catherine vein was intersected and drifted on for 150 feet to the north and 280 feet to the south. Several small stopes were excavated above this level, but did not connect with the workings above.

All of the properties in section 36, including the Catherine Mine, are currently being leased from the state. One of the lease holders, Mr. Robert Evans, was present the day the property was visited. He stated that as much of the equipment and materials as possible was going to be salvaged, after which the lease would be dropped.

3.6.4 Environmental Conditions

3.6.4.1 Site Features

The Catherine Mine workings were visited by John Kauffman on September 15, 1998. A video segment describing the property is on the Sandpoint District Videotape (tape 1, index 01:05:04-01:25:37). Documenting photographs are Roll K17, frames 15-26, and Roll K18, frame 1.
Five adits and a prospect were found at the Catherine Mine. These workings are part of a group of mines that were formerly leased by Silver Butte Mines. Adit 1, described below, is called the Brown Bear #8 on Plates 3 and 4 of Green's (1974) report on the holdings of F C Goldsilver, Inc. On the same plates, Adit 2 is labeled the "Lower Catherine" and Adit 3 is shown as the "Main Catherine" tunnel, while on Plate 2 of his report, Adit 2 is shown as "Brown Bear #9."

Adits 1 and 2 are at the end of a spur off the main access road that drops into the bottom of the drainage (Figure 3.6-2). Adit 1 is on the south side of the drainage and was the larger of the two sets of workings. Adit 2 is on the north side of the drainage across from the center of the waste dump for Adit 1. Adit 1 is open with a broken, leaning wooden plank door and collapsed portal timbers (Figure 3.6-3) in front of the opening. A scarp and trough on the slope behind the portal indicate the adit may be caved, although the opening at the portal can still be entered. The waste dump extends east from the portal along the south side of the drainage and consists of two or three levels. The upper level is 130 feet long, 30 feet wide at the upper end (tapering to about 10 feet wide at the east end), and about 8 feet thick. The remains of the trestle for the rails protrudes through the dump near the east end (Figure 3.6-4). An outhouse stands over a ditch about 25 feet in front of the adit (Figure 3.6-5), and a core shack is on the widest part of the dump about 50 feet from the portal (Figures 3.6-6 and 3.6-7). The second dump level is covered by the upper level for part of its length, but extends another 70 feet beyond the end of the upper level. The face of this portion is about 15 feet thick. A third level, probably part of the dump for Adit 2, is partially covered by the second level and has been eroded by the drainage (Figure 3.6-8). This lower level is about 6 feet thick and appears to extend about the same distance as the uppermost level. Adit 2 is caved and marked by a trough and scarp on the slope on the north side of the drainage (Figure 3.6-9). The dump for Adit 2 has been modified by some bulldozer work, but appears to have extended across the creek to merge with the lowermost level of the dump for Adit 1. As shown in Figure 3.6-8, the drainage has eroded a notch in this part of the dump. There is a considerable amount of debris around the site, including scrap metal, cans, old shirts, gears, and plastic scattered on the surface of the Adit 1 dump, especially in the vicinity of the core shack. In addition, three large-diameter culverts are lying on the access road just east of Adit 2. The disturbed area covers about 1 acre.

Adit 3 is about ¼ mile southwest of Adits 1 and 2. It is uphill and slightly west of an old house. The adit is on a short spur on the west side of a jeep trail that leads to the Iron Mask Mine (Figure 3.6-10) and is accurately located on the topographic map. From the dump, the adit appears to be caved (Figure 3.6-11), but there is a narrow opening at the top of the sloughed debris at the portal (Figure 3.6-12). The opening is about 2 feet long and 6-8 inches high. Most of the surface of the waste dump is open and grassy, but the west side has some trees and deciduous saplings (Figure 3.6-13). The dump is 65 feet long, 60 feet wide, and ranges from 5 feet thick at the upper west end to about 20 feet thick on the southeast face. There is a substantial amount of junk at the site, particularly around the west side of the dump. The debris includes numerous 30-gallon barrels, two old cars, gas cans, car parts, metal chairs, a sink, old heaters, numerous 5-gallon cans, and a variety of other scrap (Figure 3.6-14). The disturbed area covers several acres, including the site of the old house.
Adits 4 and 5, as well as a small prospect cut, are in a gully on the northwest side of the main access road west of Adits 1 and 2 and north of Adit 3 (Figure 3.6-15). These workings are all relatively minor. Adit 4 is the westernmost of the three and is at the site of the middle of three prospect symbols shown on the topographic map. It consists of an open adit and a small waste dump. The adit is on the north side of the gully, and the dump extends into and across the gully. The dump is 40 feet long, 20 feet wide, and a maximum of 10 feet thick. About 100-150 feet down the gully is a shallow scarp with a small mound of waste rock on the east side of the gully. If this was an adit, it was very short. About 150-200 feet farther down the gully is a probable short, caved adit, designated Adit 5. This site is the lower of the three prospect symbols on the topographic map. At this location, there is a shallow trough on the east side of the gully and a small dump that extends across to the west side. This dump is 20 feet long, 10 feet wide, and about 15 feet on the face. The main access road is about 100 feet down the gully from this dump. The disturbed area at these workings is less than 0.25 acre.

3.6.4.2 Sample Locations

3.6.4.2.1 Solid Samples

Sample K9159802 was collected from the eroded face of the lower level of the waste dump at Adit 1, which probably includes material from Adits 1 and 2.

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<th>Location</th>
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<tbody>
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<td>K9159802</td>
<td>Catherine Mine, Adit 1-2 dump</td>
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</tr>
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3.6.4.2.2 Water Samples

Water sample K9159801 was collected about 20 feet in front of Adit 1.

<table>
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<th>Sample No.</th>
<th>Location</th>
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<th>Temperature (°F)</th>
<th>pH</th>
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<td>45</td>
<td>7.95</td>
<td>1-2</td>
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</tbody>
</table>

3.6.4.2.3 Analytical Results

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

Sample K9159802 exceeds background and environmental levels for arsenic, cadmium, copper, and lead in the element screen.
Water Samples (Tables 2.5-1 and 2.5-2)

Sample K9159801 equals or exceeds the Aquatic Life standards for cadmium in the total recoverable metals screen.

3.6.5 Structures

There are several structures associated with the Catherine Mine. At Adit 1, an outhouse and a core shack are on the waste dump surface. A pile of salvaged rails, a large tank, and an ore mucking car are at the junction of the main access road and the spur road to Adits 1 and 2. Up the drainage to the southwest of Adit 1 and just east of Adit 3 are an old house and several storage facilities along the access road (Figure 3.6-16). The house is relatively modern in construction, but the south side of the roof is gone and the interior is dilapidated. A power line that comes in from the Talache road ends at the building. A transformer is still on a power pole west of the house, and a tall, square, wooden shed is across the road from the house. Two small sheds, also in disrepair, are along the west side of the road several hundred feet north of the house. In addition, several pieces of equipment and old vehicles are at the site. These include a crawler with a loader bucket, an ore mucking car, and an ore car locomotive, all near the house along the road, and an old compressor mounted on a Ford truck and a second vehicle parked in the trees south of the house. One of the lease holders, Mr. Robert Evans, was at the site. He indicated that the lease was being dropped and that he was in the process of salvaging materials from this and the other mines on the leased land (these include the Brown Bear Mine and the Iron Mask Mine). He also indicated that the house and other structures were going to be demolished and burned.

3.6.6 Safety

The opening into Adit 1 appears to be dangerous because of the rotten, collapsed timbers of the portal. However, the adit may be caved a short distance inside. Adit 3 has a small opening that could be enlarged to permit entry. Adit 4 is open but appears relatively stable. At the time of the visit, a locked cable blocked vehicle access to these workings, although all-terrain vehicles and trail bikes could easily pass around or underneath the cable. Presumably when the lease is dropped, the cable will be removed, allowing easy vehicle access into the area. All of section 36 is State land and probably a good hunting area (indications of moose, deer, and elk were noted), so frequent visits to the area can be expected if the road is opened.
Figure 3.6-1. Location of the Catherine Mine, Bonner County, Idaho (U.S. Geological Survey Sagle 7.5-minute topographic map).
Figure 3.6-2. Sketch of Adits 1 and 2 of the Catherine Mine.
Figure 3.6-3. Looking south at the portal of Adit 1 of the Catherine Mine. The portal timbers are leaning or collapsed and in very poor condition. An opening into the adit is to the right of the old wooden door (Roll K17, frame #16).
Figure 3.6-4. Looking southeast at the upper portion of the waste dump for Adit 1. The remains of the wooden trestle protrude through the waste rock (Roll K17, frame 19).

Figure 3.6-5. Looking southwest at the outhouse built over a ditch near Adit 1. The wooden frame in the background (left of the outhouse) may have been a support for a core drill (Roll K17, frame #15).
Figure 3.6-6. Looking northeast at the core shack built on the surface of the waste dump near Adit 1 (Roll K17, frame #17).

Figure 3.6-7. View inside the core shack. Some core is still lying on the bench (Roll K17, frame #18).
Figure 3.6-8. Looking east at the drainage cutting through the waste dumps of Adits 1 and 2. The drainage was nearly dry at the time of the site visit (Roll K17, frame #20).

Figure 3.6-9. Looking north at the scarp and trough on the slope at caved Adit 2 of the Catherine Mine (Roll K17, frame #21).
Figure 3.6-10. Sketch of Adit 3 of the Catherine Mine, showing several buildings associated with the workings.
Figure 3.6-11. Looking northeast at the scarp on the slope above Adit 3. From this viewpoint, the adit appears to be caved (Roll K17, frame #22).
Figure 3.6-12. View of the small opening into Adit 3 of the Catherine Mine (Roll K17, frame #23).

Figure 3.6-13. Looking southeast across the surface of the waste dump for Adit 3. A significant amount of scrap debris and junk is in the brush on the west side of the dump (Roll K17, frame #24).
Figure 3.6-14. Looking west at some of the scrap metal, debris, and junk on the west side of the waste dump for Adit 3 (Roll K17, frame #25).
Figure 3.6-15. Sketch of Adits 4 and 5 of the Catherine Mine.
Figure 3.6-16. Looking south up the main access road to the Catherine Mine (and Brown Bear Mine) workings. From this angle, the house appears to be in reasonably good condition. However, the interior and far side are in total disrepair. Equipment near the house includes a crawler-loader and an ore mucking car (right foreground), and an ore car locomotive (behind the ore mucking car). A power pole and transformer are in the distance on the right side of the access road (Roll K18, frame #1).
3.7 BROWN BEAR MINE (Site No. SA-261)

3.7.1 Site Location and Access (Figure 2.1-1)

The Brown Bear Mine workings are south of the Catherine Mine in the S ½ of the SE ¼, section 36, T. 56 N., R. 2 W., and the north edge of the NE ¼, section 1, T. 55 N., R. 2 W., on the Sagle 7.5-minute quadrangle (Figure 3.7-1). Access is the same as for the Catherine Mine. The road continues past the house at the Catherine Mine and goes past the lowest adit of the Brown Bear (Adit 1). The other workings are along or near old, brush-covered access roads south and southwest of Adit 1. All of the workings in section 36 are on state land and are currently under lease agreement. The workings in section 1 are on Forest Service land.

3.7.2 Geologic Features (Figure 2.2-1)

The general geology of the area is discussed in section 3.1.2 (Talache Mine). Green (1974, p. 9) gave the following description of the Brown Bear and other veins:

The mineralization contained in the Little JOe [sic], Brown Bear, and Catherine veins favors a fracture set which strikes north-south and cuts bedding, dipping toward the Talache fault with depth. Reverse movement appears to have opened the steeper portions of these fractures thus making them more favorable for deposition. In addition, mineralization within these veins definitely strengthens where they have been cut and offset by east-west striking crossfaults. There is also a rough correlation between the amount of offset and the degree of mineralization. Movement along these fractures appears to be contemporaneous at least in part with the implantation of the vein filling. Thus areas of continuing permeability have controlled deposition near these intersections.

The Brown Bear is in rocks of the St. Regis Formation (Green, 1976).

3.7.3 Site History

Little is known about the early history of the Brown Bear, but, as with the Catherine Mine, it probably dates back to the turn of the century. In the 1960s and 1970s, the property was explored in conjunction with other nearby mines, including the Talache Mine. Green (1977, p. 8-9) reported the following historical information about the Brown Bear:

Since the early 1900's considerable exploration and development have also taken place at the Brown Bear and Catherine workings located to the north of the Talache mine. Although no production records are available, incomplete smelter statements indicate that the average grade of the hand-sorted material was high, with some shipments recording as much as 500 ounces of silver to the ton. Small shipments have been made intermittently up to recent years and it is estimated by the owners that total production for the property is approximately $300,000.
In 1964, the Silver Butte Mining Co. was formed to explore the Brown Bear and Catherine areas. A public stock offering was held and subsequently approximately 2300 feet of drifting and crosscutting and 2400 feet of diamond drilling were carried out. Two small mineralized areas were encountered in the underground portion of this work, and several small, hand-sorted shipments were made to a smelter.

In 1967, Imperial Silver Corp. was formed to explore the Talache mine area. A number of new claims were staked, but very little exploration over and above that necessary for assessment work was undertaken.

In 1969, both the Silver Butte and Imperial Silver holdings were leased to Cominco American, Inc. Cominco held the properties through 1971 and completed approximately 5000 feet of diamond drilling.

From 1973 through 1975, F C Gold Silver, Inc. leased the two properties, but carried out very little exploration.

In 1976, Imperial Silver exchanged all of its mineral rights for capital shares in Silver Butte Mining Company, thus consolidating the mineral ownership of the district.

Green (1977, p.10, 13) described the Brown Bear workings as follows:

The Brown Bear workings consist of eight levels driven as adits at various elevations in the vicinity of the Brown Bear vein. The upper four levels are short drifts on the vein which lead to stopes that connect with the No. 5 level below. The No. 5 level was driven as a crosscut for 230 feet, thence as a drift 125 feet to the north and 460 feet to the south. The vein was extensively stope above this level. The No. 6 level was driven as a crosscut for 625 feet, thence as a drift along the vein for at least 765 feet to the south. One stope extends from this level 150 feet vertically to the No. 5 level above. The No. 7 level was driven as a drift for 950 feet along the vein approximately 100 feet vertically below the No. 6 level. Several small stopes were excavated above this adit. The No. 8 level is located approximately 300 feet vertically below the No. 7. This level consists of 1700 feet of crosscutting which failed to intersect the vein.

All of the properties in section 36, including the Brown Bear Mine, are currently being leased from the state. One of the lease holders, Mr. Robert Evans, was present the day the property was visited. He stated that as much of the equipment and materials as possible was going to be salvaged, after which the lease would be dropped.
3.7.4 Environmental Conditions

3.7.4.1 Site Features

The Brown Bear Mine was visited by John Kauffman on September 15, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 1, index 01:25:40-01:43:23). Documenting photographs are Roll K18, frames 2-18 and 20-21.

Eight adits were found at the Brown Bear Mine. Adits 1, 2, 3 and 8 are on state land in section 36; Adits 4-7 are probably in section 1 on Forest Service land, although the exact location of the section line was not determined.

Adit 1 (Brown Bear #7 of Green, 1974), the main opening at the Brown Bear, is less than ¼ mile up the access road from the house at the Catherine Mine (Figure 3.7-2) and is marked by an adit symbol on the topographic map. The adit portal has a wooden frame with a locked door covered with thin sheet aluminum (Figure 3.7-3). Rails extend out from under the door a short distance onto the dump and terminate beside a small metal shed. The waste dump appears to have two lobes, separated by a trough. One lobe, crossed by the access road, has had a large portion of the rock removed for use in road construction (Figures 3.7-4 and 3.7-5). This lobe was probably 60 feet long, 60 feet wide, and 20 feet thick. Across a trough along the northeast end of this part of the dump is a linear ridge in the timber that may be an old part of the dump. This ridge is 80 feet long, 2-4 feet wide on top and 15 feet wide at the base, and about 10-15 feet thick. On the day of the site visit, Mr. Robert Evans (one of the lease holders) was onsite salvaging some materials. He indicated that the lease was going to be dropped after salvaging as much of the material from the property as possible, including the rails inside the adit, the metal siding on the shed, and other miscellaneous items. The adit will then be closed with rock from the waste dump, and the wooden frame of the shed will be burnt. The disturbed area at this adit covers approximately 1 acre.

An old access road, now brushy and eroded in places, extends southward up the drainage west of Adit 1, passes two old, collapsed log cabins in the timber, and then reaches Adit 2 (Figure 3.7-6; probably Brown Bear #6 of Green, 1974). On the topographic map, this adit is marked by the lower of two prospect symbols. Adit 2 is caved, and no evidence of the portal remains. A shallow trough on the slope and a minor trickle of water from the mouth of the trough mark the site of the adit (Figure 3.7-7). The waste dump is relatively large, measuring 50 feet long, 45 feet wide, and 40 feet down the face (Figure 3.7-8). Part of the material on the northeast side of the dump has been bulldozed out, forming a shallow depression. No video was taken at this site. The disturbed area covers less than 0.5 acre.

The brushy old road continues up the hill from Adit 2 and ends at Adit 3 (probably Brown Bear #5 of Green, 1974). This adit is marked by the upper of the two prospect symbols on the topographic map, just north of the line between section 36 and section 1 (Figure 3.7-9). Adit 3 is also caved (Figure 3.7-10) and has a large waste dump (Figure 3.7-11) that measures 75 feet
long, 50 feet wide, and about 70 feet down the face. A shed with a metal roof is on the west side of the dump in front of the adit. Behind the shed is a concrete slab with several large bolts that probably served as a base for equipment. A collapsed frame and old boards around the slab indicate it may have been inside a second structure. Additional piles of old boards between the shed and the adit suggest there may have been a covered pathway from the shed to the adit. As was the case at Adit 2, there is a shallow bulldozer cut on the east edge of the waste dump. Some scrap metal is scattered near the shed, including an engine block. The disturbed area covers about 0.5-0.75 acre.

Although the old access road terminates at Adit 3, four additional adits are on the slope above Adit 3 (Figure 3.7-9). These four adits are probably Green’s (1974, 1977) “upper four levels,” presumably the Brown Bear Nos. 1-4. The adits are probably on Forest Service land. Adit 4 is about 75 feet in elevation above and slightly southwest of Adit 3. The adit is open (Figure 3.7-12) and has a waste dump measuring 45 feet long, 15 feet wide, and 30 feet down the face. A small, collapsed shed is on the west end of the dump. Some stove pipe, an old barrel, and minor amounts of other scrap are scattered on the dump surface. The disturbed area covers less than 0.25 acre.

Adit 5 is uphill about 40-50 feet in elevation from Adit 4 and again is offset slightly to the southwest. This adit is caved (Figure 3.7-13) and has a long, narrow waste dump extending about 60 feet west from the adit along the slope (Figure 3.7-14). The dump surface is about 10 feet across, and the face extends down the slope about 25 feet. Patches of moss cover much of the dump surface and face. The disturbed area covers less than 0.25 acre.

Adit 6 is about 15-20 feet above Adit 5 and offset slightly to the southwest. It is nearly caved (Figure 3.7-15), but has a narrow opening 4 feet wide by 1.5-2 feet high (Figure 3.7-16). The waste dump measures 20 feet long, about 6 feet wide, and 15-20 feet down the face. The toe of the dump just reaches the surface of the waste dump for Adit 5. The disturbed area covers less than 0.1 acre.

Adit 7 is the uppermost of those found in this series of workings. It is about 15-20 feet above and again is offset slightly southwest from Adit 6. There are two short openings along a vein or shear parallel to the bedding (Figure 3.7-17). The lower opening goes in at least 3-5 feet, where it may be caved or terminate. The upper opening is no more than 3 feet long and probably never extended any further. The waste rock forms a small dump 20 feet long, 6 feet wide, and about 15 feet down the slope to the level of Adit 6. The disturbed area is less than 0.1 acre.

Adit 8, which probably is the adit marked as “Silver Butte” on Green’s (1974) Plate 2, is along a small drainage about ¼ mile west of Adits 2-7 at the end of a brushy spur road off the equally brushy access road leading to the Hope and Faith Shaft to the north (Figure 3.7-18). The adit is caved and has a minor seep. The waste dump measures 20 feet long, 12 feet wide, and 8 feet thick. A collapsed shed is on the north end of the dump. The disturbed area is less than 0.1 acre.
3.7.4.2 Sample Locations

3.7.4.2.1 Solid Samples

No waste dump samples were collected at any of these workings.

3.7.4.2.2 Water Samples

Water samples were collected at Adit 1 (sample K9159803), Adit 2 (sample K9159804), and Adit 8 (sample K9159805).

<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>
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<td>320</td>
<td>47</td>
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<tr>
<td>K9159804</td>
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<td>8.42</td>
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<td>K9159805</td>
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<td>72</td>
<td>44</td>
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<td>&lt;1</td>
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3.7.4.2.3 Analytical Results

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

Sample K9159803 exceeds the Secondary MCL standard for iron in the total recoverable metals screen. Sample K9159804 equals the upper limit for the Aquatic Life Chronic standard for cadmium in the total recoverable metals screen. Sample K9159805 does not exceed any water quality standards.

3.7.5 Structures

There are structures at several of the workings. The metal-sided shed at Adit 1 (Figure 3.7-19) is scheduled to be salvaged before the lease is dropped. Two old logs cabins are in the timber east of the old access road between Adit 1 and Adit 2 (Figure 3.7-20). Both of these are about 12 feet by 20 feet, and both are nearly collapsed. A metal-roofed shed is on the dump from Adit 3 (Figure 3.7-21). Behind this shed (toward the viewer in Figure 3.7-21) is a second collapsed structure, and between the collapsed structure and the adit are piles of boards that may have covered a pathway to the adit. There are also small collapsed sheds at Adit 4 (Figure 3.7-22) and Adit 8 (Figure 3.7-23).

3.7.6 Safety

Adit 1 is easily accessible, but it should not be hazard if it is closed in the manner described by the lease holders. The other workings are only accessible on foot and are not likely to be found by
the general public. However, Adit 4 is open and poses the usual hazards if entered. The small opening at Adit 6 could be enlarged to gain entry, although the lack of access makes this possibility remote. The openings at Adit 7 are extremely short and do not pose significant hazards.
Figure 3.7-1. Location of the Brown Bear Mine, Bonner County, Idaho (U.S. Geological Survey Sagle 7.5-minute topographic map).
Figure 3.7-2. Sketch of Adit 1 of the Brown Bear Mine.
Figure 3.7-3. Looking southeast at the aluminum-covered locked door on the framed portal of Adit 1 of the Brown Bear Mine (Roll K18, frame #2).
Figure 3.7-4. Looking north across the modified surface of the waste dump for Adit 1 at the Brown Bear Mine (Roll K18, frame #3).

Figure 3.7-5. Loader in the excavated portion of the waste dump for Adit 1 at the Brown Bear Mine. Much of the excavated material has been used for road construction (Roll K18, frame #4).
Figure 3.7-6. Sketch of Adit 2 of the Brown Bear Mine.
Figure 3.7-7. Looking southeast along the trickle of water flowing from caved Adit 2 at the Brown Bear Mine (Roll K18, frame #7).
Figure 3.7-8. Looking northwest down the face of the waste dump for Adit 2 at the Brown Bear Mine (Roll K18, frame #8).
Figure 3.7-9. Sketch of Adits 3, 4, 5, 6, and 7 at the Brown Bear Mine.
Figure 3.7-10. Looking south up the trough of caved Adit 3 at the Brown Bear Mine (Roll K18, frame #9).
Figure 3.7-11. Looking west across the surface of the waste dump for Adit 3 at the Brown Bear Mine (Roll K18, frame #11).
Figure 3.7-12. Looking south at open Adit 4 at the Brown Bear Mine (Roll K18, frame #12).
Figure 3.7-13. Looking south at caved Adit 5 at the Brown Bear Mine (Roll K18, frame #15).
Figure 3.7-14. Looking west along the moss-covered waste dump of Adit 5 at the Brown Bear Mine (Roll K18, frame #14).
Figure 3.7-15. Looking south at nearly caved Adit 6 at the Brown Bear Mine. A small opening into the adit is just above the center of the picture (Roll K18, frame #16).
Figure 3.7-16. View into the small opening of Adit 6 at the Brown Bear Mine (Roll K18, frame #17).

Figure 3.7-17. Looking south at the two short workings of Adit 7 at the Brown Bear Mine (Roll K18, frame #18).
Figure 3.7-18. Sketch of Adit 8 of the Brown Bear Mine.
Figure 3.7-19. Metal-sided shed at Adit 1 of the Brown Bear Mine. The portal is just off the right edge of the frame (Roll K18, frame #5).

Figure 3.7-20. Looking east at the remains of two large log cabins along the trail between Adit 1 and Adit 2 at the Brown Bear Mine (Roll K18, frame #6).
Figure 3.7-21. Looking northwest at the back side of the metal-roofed shed on the west edge of the waste dump for Adit 3 at the Brown Bear Mine. The collapsed side of a possible second structure and concrete footings are behind the shed in the lower left (Roll K18, frame #10).

Figure 3.7-22. Small collapsed shed at Adit 4 of the Brown Bear Mine, looking west (Roll K18, frame #13).
Figure 3.7-23. Collapsed remains of the small shed at Adit 8 (Roll K18, frame #21).
3.8 HOPE AND FAITH SHAFT (Site No. SA-259)
Alternate name—Erikson Shaft

3.8.1 Site Location and Access (Figure 2.1-1)

The Hope and Faith Shaft is west of the Catherine Mine in the NW¼ of the SE¼, section 36, T. 56 N., R. 2 W., on the Slave 7.5-minute quadrangle (Figure 3.8-1). Access is south from the Catherine Mine toward the Brown Bear Mine Adit 1 to where a brushy access road branches from the main road and follows the drainage. This old road continues up the drainage about ¼ mile where the road splits, with one branch continuing up the drainage to Adit 2 of the Brown Bear Mine and the other turning to the northwest. This northwest branch again splits, one road terminating at Adit 8 of the Brown Bear Mine and the other continuing northwest and terminating at the Hope and Faith Shaft (Figure 3.8-2). Past the main road to Adit 1 of the Brown Bear, access is by foot. The shaft is on state land.

3.8.2 Geologic Features (Figure 2.2-1)

The general geology of the area is discussed in section 3.1.2 (Talache Mine). No detailed information is available for this site, but it appears to be near the contact between the Revett and St. Regis formations and near the Moyle Fault (Green, 1976).

3.8.3 Site History

In a report prepared for the Iron Mask Mining Company, Green (1969) includes this shaft with the Iron Mask Mine workings. Apparently some ore was shipped from this shaft in the early 1900s (Green, 1969). Green (1996, p. 3) reported the following on the workings: “Approximately 1800 feet southeast of No. 2 Adit [of the Iron Mask], a 25-foot inclined shaft was sunk on the Erikson (Hope and Faith) vein.”

3.8.4 Environmental Conditions

3.8.4.1 Site Features

The Hope and Faith Shaft was visited by John Kauffman on September 15, 1998. A video segment describing the shaft is on the Sandpoint District Videotape (Tape 1, index 01:43:27-01:45:38). Documenting photograph is Roll K18, frame 19.

The shaft is inclined about 45° and is open to a depth of at least 20 feet (Figure 3.8-3). Sections of stove pipe are sticking up from the opening and may have been used for ventilation. Some of the timbers are still intact while others are rotten and collapsed. The waste dump is fairly small, only 20 feet long, 10 feet wide, and about 6 feet thick. The disturbed area is less than 0.25 acre.
3.8.4.2 Sample Locations

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

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

3.8.5 Structures
No structures were found at this site.

3.8.6 Safety

This site has no vehicle access and is not likely to be frequently visited, although hunters and hikers may occasionally find the shaft. The open shaft has no fence or other warning signs to indicate its presence. Even though it is inclined, serious injury could result from a fall into the opening, particularly from the north side.
Figure 3.8-1. Location of the Hope and Faith Shaft, Bonner County, Idaho (U.S. Geological Survey Sagle 7.5-minute topographic map).
Figure 3.8-3. View down the inclined opening of the Hope and Faith Shaft. Some of the support timbers are intact but in poor condition. The section of pipe in the lower right part of the photograph may have been used for ventilation (Roll K18, frame #19).
3.9 IRON MASK MINE (Site No. SA-262)

3.9.1 Site Location and Access (Figure 2.1-1)

The Iron Mask Mine is on the northwest side of the ridge west of Mirror Lake, near the center of the NW¼, section 36, T. 56 N., R. 2 W., on the Sagle 7.5-minute quadrangle (Figure 3.9-1). Access from the Talache road at Mirror Lake is via the Catherine Mine road to Adit 3 of the Catherine, then northwest on a jeep trail about ¾ mile. The Iron Mask Mine is on state land.

3.9.2 Geologic Features (Figure 2.2-1)

The general geology of the area is discussed in section 3.1.2 (Talache Mine). The Iron Mask is in rocks of the Revett Formation (Green, 1976).

Waddell and Albee (1958, p. 3-4) described the geology of the Iron Mask property as follows: The property lies at the northern end of Blacktail Mountain on the west side of Pend Oreille Lake (fig. 1 [omitted]). The mountain consists largely of the Blacktail formation which, as defined by Sampson, represents the undifferentiated equivalents of the Revett and St. Regis formations of the Coeur d’Alene District. The lower part of the Blacktail formation is prevailingly quartzite and the upper part is mostly argillite, although the two rock types alternate throughout a large part of the formation.

Adits No. 1 and 2 on the Iron Mask property are in fine-grained, pale-yellowish brown quartzite. Adit No. 3 crosscuts argillite and quartzite then turns southerly and continues in quartzite along the strike of the beds (pl. 1 [omitted]). The beds strike due north to N. 10° W. and observed dips range from 30° to 65° E.

The copper-bearing minerals on the Iron Mask property are found in thin fissure veins parallel to the bedding planes. In some places two or three veins parallel each other; in others they form an echelon pattern. The mineralized parts of the veins thicken and thin both laterally and on dip, ranging in width from a feather edge to 6 inches. The applicant reports a thickness of 12 inches in the winze. This could not be verified at the time of the examination as the winze was filled with water.

The vein filling consists mostly of manganese or hematite as botryoidal fillings in vugs, and limonite with minor amounts of malachite, pyrite, and chalcopyrite. Very little quartz is present in the veins. Silver minerals were not recognized but are present as shown by the assays. Hand samples reportedly taken from the winze show a mineral identified by the U. S. Bureau of Mines Station at Albany, Oregon, as tetrahedrite-tennantite.

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3.9.3 Site History

Waddell and Albee (1958, p. 5-6) reported the following historical information about the Iron Mask Mine:

The original Iron Mask mine claim was staked by Josiah Williams and Robert Rennie on April 2, 1886. They started the upper adit, referred to as the No. 1 level, which was mined at intervals for the next 40 years. This adit is approximately 200 feet long. Later the No. 2 level, approximately 56 feet below the No. 1 level, was driven 300 feet and the two levels were connected by a partly stope raise.

In 1952 George Watts obtained a state mining lease on the property and extended the No. 2 level 120 feet to the south. This work revealed a promising looking ore shoot. In 1957 the Iron Mask Mining Co. was incorporated and the new company began sinking a winze on the ore shoot. At a depth of 50 feet their pumping equipment could not handle the water seepage. Therefore, it was decided to go down the hill and start a new adit, crosscut to the vein, drift 1,500 feet southerly along the vein, and raise on the ore shoot. After crosscutting 230 feet and drifting 50 feet on what was assumed to be the vein, the company began to run out of funds and decided to apply for a DMEA loan to complete the project.

A small but unknown amount of ore was produced by the early operators from the partly stope raise. From the winze, now under water, the present operator made a 993-pound shipment to the Tacoma Smelter on July 1, 1957, for smelter testing. This shipment assayed 0.04 ounce gold, 178.78 ounces of silver, and 2.11 percent copper.

The application was denied on June 27, 1958 on the recommendation of the field team (Idaho Geological Survey’s mineral property files).

Green (1969) outlined an exploration program for the company. In this report, the Hope and Faith (Eriksen) shaft was included as part of the Iron Mask property. During the 1960s and the 1970s, part of the land leased from the state by the Iron Mask Mining Company was subleased to Silver Butte Mining Company (Green, 1974; 1977).

All of the properties in section 36, including the Iron Mask Mine, are currently being leased from the state. One of the lease holders, Mr. Robert Evans (of the Iron Mask Mining Company (?)) was present the day the property was visited. He stated that as much of the equipment and materials as possible would be salvaged, after which the lease was going to be dropped.
3.9.4 Environmental Conditions

3.9.4.1 Site Features

The Iron Mask Mine was visited by John Kauffman on September 15, 1998. A video segment describing the property is on the Sandpoint District Videotape (Tape 1, index 01:45:42-01:51:26). Documenting photographs are Roll K18, frames 22-26.

Two adits were found at the Iron Mask, both high on the northwest-facing slope of the ridge (Figure 3.9-2). A third adit, described in the DMEA report (Waddell and Albee, 1958) and in Green (1969), was not visited. The adits are numbered in the sequence they were found, although Adit 2 appears to be the main entry and is probably the opening marked by an adit symbol on the topographic map.

Adit 1, the upper of the two workings, is at the end of a spur road off the main jeep trail. A gutted travel trailer is parked along the spur road about ¼ mile from the adit. The first 30 feet of the adit are caved into a trough with several collapsed timbers in the debris (Figure 3.9-3). Behind the caved portion, the adit has been reopened (Figure 3.9-4). A 2-inch air line and a 1-inch plastic pipe extend into the adit. The air line is connected to a Chicago-Pneumatic air compressor parked on the access road on top of the waste dump (Figure 3.9-5). Although in relatively good condition, the compressor does not appear to be operational. Four 55-gallon barrels are near the compressor and are filled with liquid, presumably petroleum products. The fuel tank on the compressor is also partially filled with diesel fuel. The waste dump is about 45 feet long, 15 feet wide, and 30 feet down the face. The slope here is fairly steep, so the thickness of the dump probably averages less than 15 feet perpendicular to the slope.

Adit 2 is about 50 feet in elevation below Adit 1. The wood-framed portal had been closed with a sheet of plywood (Figure 3.9-6), but the sheet is loose and could easily be removed. The adit has a strong flow of cool air flowing from the portal, indicating that it is not only open but also connected to the upper adit, or at least to other open workings. This, in turn, indicates that there is a shaft inside the adit connecting the workings. Rails extend out of the adit and turn to the southwest on the surface of the waste dump. Next to the rails is a drag-line muck bucket. The waste dump is about 75 feet long, 15 feet wide, and 30 feet down the face (Figure 3.9-7). About 30 feet past the northeast end of the dump is a shallow cut into the slope that may have been a minor prospect cut. The access road to Adit 2 crosses diagonally northeastward up the slope, around the nose of the ridge, and connects with the spur to Adit 1 in a low saddle. Just west of the saddle is an old junk truck with a compressor mounted on the bed.

The disturbed area at these two workings on a state lease is about 1-2 acres. It is expected that the equipment at the Iron Mask will be salvaged before the lease is dropped, as indicated by one of the lease holders.
3.9.4.2 Sample Locations

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

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

3.9.5 Structures
   No structures were found at this site.

3.9.6 Safety

The open adits are a safety hazard, especially if there is a shaft inside connecting the workings as
is indicated by the flow of cool air from Adit 2. It is not known if the lease holders plan to seal
off these workings before dropping the property.
Figure 3.9-1. Location of the Iron Mask Mine, Bonner County, Idaho (U.S. Geological Survey Sagle 7.5-minute topographic map).
Figure 3.9-2. Sketch of the Iron Mask Mine.
Figure 3.9-3. Looking southwest toward Adit 1 of the Iron Mask Mine. The crisscrossed timbers behind the 55-gallon barrels are in the rubble of the collapsed portal portion of the adit. The present adit opening is behind the brush at the center of the photograph. The barrels are filled with liquid, presumably petroleum products (Roll K18, frame #22).
Figure 3.9-4. View into the opening of Adit 1 at the Iron Mask Mine. The large pipe is an air line from the compressor. The black plastic pipe may have been a water-supply line (Roll K18, frame #23).

Figure 3.9-5. Old compressor parked at the end of the access road on the waste dump for Adit 1 at the Iron Mask Mine, looking northwest. The two 55-gallon barrels seen in Figure 3.9-3 are at the left. Two additional barrels, also filled with liquid, are at the right (Roll K18, frame #24).
Figure 3.9-6. Looking southwest at the framed portal of Adit 2 at the Iron Mask Mine. A sheet of plywood just inside the portal is loose and could easily be removed to gain entry into the adit (Roll K18, frame #25).
Figure 3.9-7. Looking northwest along the surface of the waste dump for Adit 2 at the Iron Mask Mine. The portal is left of the backpack off the edge of the picture. A drag-line muck bucket is to the right of the backpack, and a pile of boards and timbers is on the dump behind the muck bucket (Roll K18, frame #26).
REFERENCES


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

LOCATION AND IDENTIFICATION

ID# ______ Site Name(s) ___________________________
FS Tract # __________________ FS Watershed Code __________________
Forest __________________ District __________________
Location based on: GPS ___ Field Map ___ Existing Info ___ Other ___
Lat _______ Long _______ xutm _______ yutm _______ zutm _______
Quad Name __________________ Principal Meridian __________________
Township _______ Range _______ Section _____ 1/4 _____ 1/4 _____ 1/4
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
PART C
(To be completed for all sites not screened out in Parts A or B)

Investigator ___________________________ Date ___________
Weather ________________________________

1. GENERAL SITE INFORMATION

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

2. OPERATIONAL HISTORY

Dates of significant mining activity ________________________________

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</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

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MILL PRODUCTION

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3. HYDROLOGY

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

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

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

____________________________________________________________

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

____________________________________________________________

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

____________________________________________________________

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

5. SAFETY RISKS

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

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

**TABLE 1 - ADITS, SHAFTS, PITS, AND OTHER OPENINGS**

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<td>Ownership</td>
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<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>Condition</td>
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</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)*

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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 2 - DUMPS, TAILINGS, AND SPOIL PILES**

<table>
<thead>
<tr>
<th>Waste Number</th>
<th>Waste Type</th>
<th>Ownership</th>
<th>Area (acres)</th>
<th>Volume (cu yds)</th>
<th>Size of Material</th>
<th>Wind Erosion</th>
<th>Vegetation</th>
<th>Surface Drainage</th>
<th>Indicators of Metals</th>
<th>Stability</th>
<th>Location with respect to Floodplain</th>
<th>Distance to Stream</th>
<th>Water Sample #</th>
<th>Waste Sample #</th>
<th>Soil Sample #</th>
<th>Photo Number</th>
</tr>
</thead>
</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=gravel and <2", COBBLE=2"-8", BOULD=8"

**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=Breach, NO=No indicators of surface flow observe

**Indicators of Metals** (Enter as many as exist): NO=None, VEG=Absence of or stressed vegetation, STAIN=yellow, orange, or red precipitate, SALT=Salt deposits, SULF=Sulfides present

**Stability:** EMER-imminent mass failure, LIKE=Potential for mass failure, LOW=mass failure unlikely

**Location w/respect to Stream:** IN=In contact with normal stream, NEAR=in riparian zone or floodplain, OUT=Out of floodplain

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8. SAMPLES

Take samples only on National Forest lands.

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

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

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none
Discharging From: ADIT=Adit, SHAFT=Shaft, PIT=Pit/Trench, HOLE=Prospect Hole, WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or 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= None, YEG= Absence of, or stressed vegetation/organisms in and along drainage path, STAIN= yellow, orange, or red precipitate, SALT= Salt deposits, SUU=Sulfides present, TURB= Discolored or turbid discharge
Indicators of Sedimentation (enter as many as exist): NO= None, SLIGHT= Some sedimentation in channel, banks and channel largely intact, MOD= Sediment deposits in channel, affecting flow patterns, banks largely intact, SIGN= Sediment deposits in channel and/or along stream banks extending to nearest stream
Method of Measurement: EST= Estimate, BUCK= Bucket and time, METER= Flow meter
TABLE 4 - WATER SAMPLES FROM STREAM(S)

<table>
<thead>
<tr>
<th>Location relative to mine site/features</th>
<th>Upstream (Background)</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date sample taken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampler (Initials)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stream Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicators of Metal Release</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicators of Sedimentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Latitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Longitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field pH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow (gpm)Method of measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method of measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

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

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

Method of Measurement: EST=Estimate, BUCK=Bucket and time, METER=Flow meter
<table>
<thead>
<tr>
<th>Sample Number</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampler (Initials)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feature Number</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>Photo Number</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

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

**Waste Type:** WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, HIGH=Highwall, PLACER=Placer or hydraulic deposit, POND=Settling pond or lagoon sludge, ORE=Ore Stockpile, HEAP=Heap Leach

**Feature Number:** Corresponding number from Table 2 *(Waste Number)*
<table>
<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
### TABLE 7 - HAZARDOUS WASTES/MATERIALS

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

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

Codes Applicable for all entries: **NA**=Not applicable, **UNK**=Unknown, **OTHER**=Explain in comments, **NO**=NO or none
Type of Containment: **NO**=None, **LID**=drum/barrel/vat with lid, **AIR**=drum/barrel/vat without lid, **CAN**=cans/jars, **LINE**=lined impoundment, **EARTH**=unlined impoundment
Condition of Containment: **GOOD**=Container in good condition, leaks unlikely, **FAIR**=Container has some signs of rust, cracks, damage but looks sound, leaks possible, **POOR**=Container has visible holes, cracks or damage, leaks likely, **BAD**=Pieces of containers on site, could not contain waste
Contents: from label if available, or guess the type of waste, e.g., petroleum product, solvent, processing chemical
Estimated Quantity of Waste: Quantity still contained and quantity released
10. STRUCTURES

For structures on or partially on National forest lands.

<table>
<thead>
<tr>
<th>TABLE 8 - STRUCTURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Number</td>
</tr>
<tr>
<td>Condition</td>
</tr>
<tr>
<td>Photo Number</td>
</tr>
</tbody>
</table>

Comments:

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

11. MISCELLANEOUS

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

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

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

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

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

Claimant(s)
Name:  
Address:  
Telephone Number:  

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

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

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

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

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

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

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

MRDSREC
MILSREF  0160790528
PERIODPROD

ORE  Au
COMMOD

LATITUDE  474325
LONGITUDE  1154916
HARDFILE  N
MLA
NAME  EAGLE CREEK MINE
SEC  33
SUBSEC  NESE
TWN  051 N
RNG  005 E
DDMMSS  474325
DDDDMMSS  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
SECUAD
SECUADSCL
UTMNORTH
UTMEAST
UTMZONE
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 $3\sigma$ for a 99% confidence level, where $\sigma$ 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 $10\sigma$ 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
