Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Clearwater National Forest: Volume I, Section B: Palouse Ranger District, Latah and Clearwater 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 Palouse Ranger District of the St. Joe National Forest, an area that is administered by the Clearwater National Forest. 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. In the summer of 1999, field work shifted to lands administered by the Clearwater and Nez Perce National Forests.

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 (Fe₁₋₀₃S). Other sulfides play a minor role in acid generation. Oxidation of iron sulfides forms sulfuric acid (H₂SO₄), sulfate ions (SO₄²⁻), and reduced iron (Fe²⁺). When sulfide-bearing rock is mined, the sulfide minerals are exposed to atmospheric oxygen and oxygen-bearing water. Consequently, the sulfide minerals are oxidized, and acid mine waters are produced (Trexler and others, 1975; Marvin and others, 1995).

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

Once formed, the acid can dissolve other sulfide minerals to produce high concentrations of copper, lead, zinc, and other metals. Minerals that can contribute heavy metals to acid mine drainage include arsenopyrite, FeAsS; chalcopyrite, CuFeS₂; galena, PbS; tetrahedrite, (CuFe)₁₂Sb₄S₁₃; and sphalerite, (Zn, Fe)S. Aluminum can be leached by the dissolution of aluminosilicates common in soils and waste material found in Idaho. The dissolution of any given metal is controlled by the solubility of that metal (Trexler and others, 1975; Marvin and others, 1995).
1.4.2 Solubility of Selected Metals

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

At a pH above 2.2, ferric hydroxide [Fe(OH)$_3$] produces a brownish orange color in surface waters and forms a precipitate with a similar color on rocks in affected streams. If other metals, such as copper, lead, cadmium, zinc, and aluminum, are present in the source rock, they may also precipitate with or adsorb onto the ferric hydroxide (Stumm and Morgan, 1981). Alunite [KAl$_3$(SO$_4$)$_2$(OH)$_6$] and jarosite [KFe$_3$(SO$_4$)$_2$(OH)$_6$] will precipitate at a pH of less than 4, depending on SO$_4^{2-}$ 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 [MnO$_2$] dissolves and manganite [MnO(OH)] precipitates. Manganese is found in mineralized environments as rhodochrosite [MnCO$_3$] and its weathering products.

**Aluminum** solubility is most often controlled by alunite [KAl$_3$(SO$_4$)$_2$(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, H$_2$AsO$_4$. Arsenic is abundant in metallic mineral deposits as arsenopyrite [FeAsS], enargite [Cu$_3$AsS$_4$], tennantite [Cu$_{12}$As$_4$S$_{13}$], 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 [CdCO$_3$]; when the pH of the soil is below 6, cadmium solubility is controlled by strengite [Cd$_3$(PO$_4$)$_2$]. Octavite is the dominant control on the solubility of cadmium in soils. In water, at low partial pressures of H$_2$S, CdCO$_3$ is easily reduced to CdS.

**Copper** solubility in natural waters is controlled primarily by the amount of carbonate present; malachite [Cu$_2$(OH)$_2$CO$_3$] and azurite [Cu$_2$(OH)$_2$(CO$_3$)$_2$]
form when CO$_3^{2-}$ ions are available in sufficient concentrations. In soil, copper combines readily with iron to form cupric ferrite. Other compounds, such as sulfate and phosphates, may also control copper solubility in soils. Copper is present in many ore minerals, including chalcocite [CuFeS$_2$], bornite [Cu$_2$FeS$_4$], chalcolite [Cu$_2$S], and tetrahedrite [Cu$_{12}$Sb$_4$S$_{13}$].

**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 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 listed in HRS) within 200 feet of the disturbance.</td>
</tr>
<tr>
<td></td>
<td>6. Hazardous wastes/materials (chemical containers, explosives, etc.)</td>
</tr>
<tr>
<td></td>
<td>7. Open adits/shafts, highwalls, or hazardous structures/debris.</td>
</tr>
</tbody>
</table>

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

1.5.3 Field Inspection Procedures

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

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

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

1.5.3.1 Soil, Rock, Stream Sediment, and Mine Waste Sampling Procedures

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

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

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

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

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

1.5.3.2 Water Sampling Procedure

As noted, this project focused on the impacts of mining on surface water, ground water, and soils. The reasoning behind this approach was that a mine disturbance may have high total metal concentrations yet may be releasing few metals into the surface water, ground water, or soil. Conversely, another disturbance could have lower total metal content but be releasing metals in concentrations that adversely impact the environment.
The geologist selected and marked water sample sites based on field parameters (SC, pH, temperature) and observations (such as erosion and staining of soils or stream beds). Sample locations were chosen that would provide the best information on the relative impact of the site to surface water and soils. All sites were accurately located on topographic base maps. Surface water samples were collected at all discharge points at the site, as well as samples from upstream and downstream of the site.

At each water sampling site, the temperature, specific conductivity, and pH were measured. A unique sample number was affixed to the sample bottle. Two 125-ml samples were collected. One sample was left raw and the other was acidified with 0.1N nitric acid. Both samples were stored in a secured ice box. The samples remained under constant refrigeration and security until submitted for analysis.

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

1.5.4 Analytical Methods

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

Water Samples (acidified and unfiltered)—Total Recoverable Metal Screen (EPA Test 200.7). Water Samples (acidified and unfiltered)—Arsenic (EPA Test 200.9), Lead (EPA Test 200.9), and Mercury (EPA Test 245.1). Water Samples (raw and filtered 0.45 micron filter)—Dissolved Metal Screen (EPA Test 200.7). Soil and Waste Material—Element Screen (EPA Test 3050/6010), Leachable Metals [Toxicity Characteristic Leaching Procedure (TCLP) for Metals] Screen (EPA Test 1311/6010).

1.5.5 Standards

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

1.5.5.1 Water-Quality Standards

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

Table 1.5-2. Standards for contaminants in water.

<table>
<thead>
<tr>
<th>Element</th>
<th>Primary MCL (mg/L)</th>
<th>Secondary MCL (mg/L)</th>
<th>Aquatic Life, Acute (mg/L)</th>
<th>Aquatic Life, Chronic (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>---</td>
<td>0.05-0.2</td>
<td>0.75</td>
<td>0.087</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.05</td>
<td>---</td>
<td>0.36</td>
<td>0.19</td>
</tr>
<tr>
<td>Barium</td>
<td>2</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.005</td>
<td>---</td>
<td>0.004/0.009</td>
<td>0.001/0.002</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.1</td>
<td>---</td>
<td>1.7/3.1</td>
<td>0.21/0.37</td>
</tr>
<tr>
<td>Copper</td>
<td>1.3</td>
<td>1</td>
<td>0.018/0.034</td>
<td>0.012/0.021</td>
</tr>
<tr>
<td>Iron</td>
<td>---</td>
<td>0.3</td>
<td>---</td>
<td>1</td>
</tr>
<tr>
<td>Lead</td>
<td>0.015</td>
<td>---</td>
<td>0.082/0.2</td>
<td>0.003/0.008</td>
</tr>
<tr>
<td>Manganese</td>
<td>---</td>
<td>0.05</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.002</td>
<td>---</td>
<td>0.0024</td>
<td>0.000012</td>
</tr>
<tr>
<td>Nickel</td>
<td>0.1</td>
<td>---</td>
<td>1.4/2.5</td>
<td>0.16/0.28</td>
</tr>
<tr>
<td>Zinc</td>
<td>---</td>
<td>5</td>
<td>0.12/0.21</td>
<td>0.11/0.19</td>
</tr>
</tbody>
</table>

1.5.5.2 Soil and Rock Background Standards

It is useful to have some idea about the natural background values of rocks and soils when interpreting geochemical data. Although no whole rock or soil samples were run for this study, an estimate can be made from the analyses presented by Gott and Cathrall (1980). They analyzed both rock samples from the parent formation and soil samples from above the parent material. The median results from these analyses are presented in Tables 1.5-3 and 1.5-4, which show data for the Prichard, Burke, Revett, St. Regis, and Wallace Formations. These samples were analyzed by emission spectrophotometry, a much less accurate technique than we use today. However, due to the large number of analyses, the data are still useful, especially for estimating background values. For example, an average sample of soil above the Wallace Formation might contain 45 ppm (mg/Kg) lead, 115 ppm (mg/Kg) zinc, 29 ppm (mg/Kg) copper, 0.13 ppm (mg/Kg) mercury,
Table 1.5-3. Median values of metals in rock samples from various units of the Belt Supergroup (data from Gott and Cathrall, 1980; ppm = mg/Kg).

<table>
<thead>
<tr>
<th>Element</th>
<th>Prichard Formation</th>
<th>Burke Formation</th>
<th>Revett Formation</th>
<th>St. Regis Formation</th>
<th>Wallace Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron (percent)</td>
<td>3</td>
<td>1.8</td>
<td>1.4</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Magnesium (percent)</td>
<td>0.4</td>
<td>0.1</td>
<td>0.05</td>
<td>0.19</td>
<td>0.48</td>
</tr>
<tr>
<td>Calcium (percent)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Titanium (percent)</td>
<td>0.3</td>
<td>0.19</td>
<td>0.13</td>
<td>0.19</td>
<td>0.21</td>
</tr>
<tr>
<td>Manganese (ppm)</td>
<td>224</td>
<td>386</td>
<td>381</td>
<td>600</td>
<td>360</td>
</tr>
<tr>
<td>Barium (ppm)</td>
<td>343</td>
<td>360</td>
<td>235</td>
<td>543</td>
<td>378</td>
</tr>
<tr>
<td>Beryllium (ppm)</td>
<td>1.3</td>
<td>---</td>
<td>---</td>
<td>0.9</td>
<td>0.89</td>
</tr>
<tr>
<td>Cobalt (ppm)</td>
<td>5</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>3.9</td>
</tr>
<tr>
<td>Chromium (ppm)</td>
<td>40</td>
<td>13</td>
<td>8.3</td>
<td>20</td>
<td>23.8</td>
</tr>
<tr>
<td>Molybdenum (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Nickel (ppm)</td>
<td>10</td>
<td>5.5</td>
<td>4.2</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Strontium (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Vanadium (ppm)</td>
<td>54</td>
<td>26</td>
<td>20</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Sulfur (percent)</td>
<td>.01</td>
<td>0.007</td>
<td>0.006</td>
<td>0.007</td>
<td>0.009</td>
</tr>
<tr>
<td>Mercury (ppm)</td>
<td>.03</td>
<td>---</td>
<td>0.03</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>Copper (ppm)</td>
<td>22</td>
<td>6.2</td>
<td>8</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Lead (ppm)</td>
<td>34</td>
<td>14</td>
<td>10</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td>60</td>
<td>31</td>
<td>15</td>
<td>20</td>
<td>41</td>
</tr>
<tr>
<td>Silver (ppm)</td>
<td>0.4</td>
<td>0.36</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Cadmium (ppm)</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Arsenic (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Antimony (ppm)</td>
<td>109</td>
<td>1.1</td>
<td>1.6</td>
<td>2.2</td>
<td>1.1</td>
</tr>
<tr>
<td>No. of Samples</td>
<td>727</td>
<td>402</td>
<td>455</td>
<td>839</td>
<td>998</td>
</tr>
</tbody>
</table>
Table 1.5-4. Median values of metals in soil samples from various units of the Belt Supergroup (data from Gott and Cathrall, 1980; ppm = mg/Kg).

<table>
<thead>
<tr>
<th>Element</th>
<th>Prichard Formation</th>
<th>Burke Formation</th>
<th>Revett Formation</th>
<th>St. Regis Formation</th>
<th>Wallace Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron (percent)</td>
<td>3.1</td>
<td>3.3</td>
<td>3.8</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Magnesium (percent)</td>
<td>0.61</td>
<td>0.60</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Calcium (percent)</td>
<td>0.57</td>
<td>0.59</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Titanium (percent)</td>
<td>0.56</td>
<td>0.49</td>
<td>0.5</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Manganese (ppm)</td>
<td>1,285</td>
<td>1,373</td>
<td>1,730</td>
<td>1,809</td>
<td>1,377</td>
</tr>
<tr>
<td>Barium (ppm)</td>
<td>647</td>
<td>647</td>
<td>616</td>
<td>684</td>
<td>586</td>
</tr>
<tr>
<td>Beryllium (ppm)</td>
<td>1.4</td>
<td>1.1</td>
<td>1</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Cobalt (ppm)</td>
<td>14</td>
<td>10</td>
<td>8.8</td>
<td>9.5</td>
<td>9.4</td>
</tr>
<tr>
<td>Chromium (ppm)</td>
<td>43</td>
<td>32</td>
<td>34</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>Molybdenum (ppm)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Niobium (ppm)</td>
<td>9</td>
<td>9</td>
<td>---</td>
<td>---</td>
<td>8</td>
</tr>
<tr>
<td>Nickel (ppm)</td>
<td>29</td>
<td>21</td>
<td>20</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>Strontium (ppm)</td>
<td>159</td>
<td>178</td>
<td>157</td>
<td>164</td>
<td>154</td>
</tr>
<tr>
<td>Vanadium (ppm)</td>
<td>98</td>
<td>90</td>
<td>97</td>
<td>90</td>
<td>94</td>
</tr>
<tr>
<td>Mercury (ppm)</td>
<td>0.13</td>
<td>0.09</td>
<td>0.08</td>
<td>0.1</td>
<td>0.13</td>
</tr>
<tr>
<td>Copper (ppm)</td>
<td>21</td>
<td>20</td>
<td>29</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>Lead (ppm)</td>
<td>54</td>
<td>35</td>
<td>41</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td>140</td>
<td>89</td>
<td>77</td>
<td>86</td>
<td>115</td>
</tr>
<tr>
<td>Silver (ppm)</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Cadmium (ppm)</td>
<td>1.3</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Arsenic (ppm)</td>
<td>10</td>
<td>8.6</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Antimony (ppm)</td>
<td>1</td>
<td>1</td>
<td>1.8</td>
<td>1.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Sulfur (percent)</td>
<td>0.029</td>
<td>0.035</td>
<td>0.053</td>
<td>0.049</td>
<td>0.046</td>
</tr>
<tr>
<td>No. of Samples</td>
<td>1,705</td>
<td>573</td>
<td>699</td>
<td>1,586</td>
<td>2,298</td>
</tr>
</tbody>
</table>
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 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 digit for the month; 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., “99,” if the samples was taken in 1999); and 5) two 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 PALOUSE RANGER DISTRICT, LATAH AND CLEARWATER COUNTIES, IDAHO

2.1 INTRODUCTION

This volume of the Clearwater National Forest report describes fifty-one properties in the Palouse Ranger District of the St. Joe National Forest, which is administered by the Clearwater National Forest. Six properties discussed in this volume reported either placer or lode production, even though all the properties examined had lode workings; no property had over 1,000 tons of total lode output, although one property had over 1,000 yards of placer production in addition to a smaller amount of lode production. Systematic records of production from the mica and beryl properties discussed in this section of the report are not available.

The study area covers the Palouse Ranger District, which is in Latah and Clearwater counties (Figure 2.1-1). Most of the mineralized areas in the district are in the drainages of the Palouse and Potlatch rivers, and the northern boundary of the Palouse district is the drainage divide between these rivers and the St. Maries River. The Palouse Ranger District contains numerous enclaves of private land (mostly owned by timber companies but also patented mining claims), state land, and lands administered by other federal agencies. Conversely, irregular tracts of National Forest land occur outside the Forest boundary. 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; from State Highway 6, which heads east from Potlatch and then north at Harvard through the study area; and from State Highway 9, which is southwest of the study area. Most of the secondary drainages, especially those with past mining activity, have dirt roads.

The fifty-one mines and prospects described in this volume are located on eight 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 1,600 feet on Dworshak Reservoir along the eastern boundary to 5,861 feet at Hemlock Butte on the northern border of the study area. The area is heavily forested with dense brush and conifers, and the topography is generally steep.

2.1.1 Summary of the Palouse Study Area

There were fifty-one mining properties (Table 2.1-1) examined in the Palouse Ranger District. Of these mines, thirteen have the potential to have an environmental impact on or near USFS lands. Six of these properties have water discharges that exceed one or more water quality standards, two properties have waste rock impinging on an active drainage, and five properties have both water quality concerns and waste rock impinging on an active waterway. Of the twenty-four sites discussed in this section of the report (Section B of Volume I), four properties have water discharges that exceed one or more water quality standards, one has waste rock impinging on an active waterway, and one has both water quality concerns and waste rock impinging on an active waterway.
Table 2.1-1. Summary of properties visited in the Palouse Ranger District. The properties are arranged according to site number. All sites were visited in 1999, although one was revisited in 2000. Properties shown in gray are discussed in Section A 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; T = timber company; ? where ownership is uncertain

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

**Environmental Concerns:** W = water; D = waste dump. 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 - dump samples that exceed background or environmental standards for one or more elements in the *Element Screen*, and/or dump 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; T = trench(es); C = cut(s); P = prospect pit(s). 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>PL-1</td>
<td>Carrico Mine</td>
<td>FS ?</td>
<td></td>
<td></td>
<td></td>
<td>2SC, 1AC numerous placer cuts, P, T</td>
</tr>
<tr>
<td>PL-2</td>
<td>Milbert Lode Claims (K6079901)</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>P and T, collapsed cabins</td>
</tr>
<tr>
<td>PL-3</td>
<td>Prosperity Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1SC, 2AC, T</td>
</tr>
<tr>
<td>PL-4</td>
<td>Lost Wheelbarrow</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2SC, 1AC, 2T</td>
</tr>
<tr>
<td>PL-7</td>
<td>Reservoir Creek Prospect</td>
<td>FS</td>
<td>1</td>
<td></td>
<td>W</td>
<td>1AC</td>
</tr>
<tr>
<td>PL-9</td>
<td>Black Horse</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2 shallow P</td>
</tr>
<tr>
<td>PL-11</td>
<td>Copper Ridge</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>numerous shallow P and short T</td>
</tr>
<tr>
<td>PL-12</td>
<td>Bishop Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1SC, 1AC, 2 possible short AC</td>
</tr>
<tr>
<td>PL-14</td>
<td>Daisy Mine</td>
<td>P (T) ?</td>
<td></td>
<td></td>
<td></td>
<td>did not find</td>
</tr>
<tr>
<td>PL-15</td>
<td>Gold Bug Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1SC, 1AC</td>
</tr>
<tr>
<td>PL-17</td>
<td>Blackfoot Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>did not find</td>
</tr>
<tr>
<td>PL-18</td>
<td>Last Chance</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1SC, several shallow P</td>
</tr>
<tr>
<td>Site Number</td>
<td>Mine Name</td>
<td>Surface Owner</td>
<td>Water Samples</td>
<td>Solid Samples</td>
<td>Environmental Concerns</td>
<td>Physical Conditions/Comments</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>PL-19</td>
<td>Gold Hill Prospect</td>
<td>P (T) ?</td>
<td>2</td>
<td>1</td>
<td>W, D</td>
<td>2AC, several P</td>
</tr>
<tr>
<td>PL-29</td>
<td>Lodestone (Pewee)</td>
<td>FS</td>
<td>2</td>
<td>1</td>
<td>W, D</td>
<td>2AO, 1AC(?) P, placer workings</td>
</tr>
<tr>
<td>PL-35</td>
<td>Mizpah Mine</td>
<td>P, FS</td>
<td>1</td>
<td>D</td>
<td></td>
<td>2-3AC, 1SC</td>
</tr>
<tr>
<td>PL-36</td>
<td>Copper King Mine</td>
<td>P, FS</td>
<td></td>
<td></td>
<td></td>
<td>3AC</td>
</tr>
<tr>
<td>PL-42</td>
<td>Sunshine Claim</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL-43</td>
<td>Lucky Jim Prospect</td>
<td>FS ?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL-44</td>
<td>Morning Star</td>
<td>FS ?</td>
<td>1</td>
<td></td>
<td>W</td>
<td>2AO, 2P</td>
</tr>
<tr>
<td>PL-45</td>
<td>Lindquist Prospect</td>
<td>FS ?</td>
<td>1</td>
<td></td>
<td>W</td>
<td>1AC, numerous T, P</td>
</tr>
<tr>
<td>PL-46</td>
<td>Muscovite Mine</td>
<td>P (T)</td>
<td>1</td>
<td></td>
<td>W</td>
<td>2AC, 2A covered by pit waste</td>
</tr>
<tr>
<td>PL-47</td>
<td>Luella Mine</td>
<td>S</td>
<td>1</td>
<td>1</td>
<td>W, D</td>
<td>2AO, 2AC</td>
</tr>
<tr>
<td>PL-48</td>
<td>McCormack</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC, numerous T, C</td>
</tr>
<tr>
<td>PL-49</td>
<td>Silver White</td>
<td>S, FS ?</td>
<td>1</td>
<td></td>
<td>W</td>
<td>1AO, 1AC</td>
</tr>
<tr>
<td>PL-50</td>
<td>Last Chance Mine</td>
<td>S ?</td>
<td></td>
<td></td>
<td></td>
<td>1-3AC, T, 1C</td>
</tr>
<tr>
<td>PL-51</td>
<td>Witherow Lease</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL-52</td>
<td>Doerr Mine</td>
<td>P, FS</td>
<td></td>
<td></td>
<td></td>
<td>2AC, 6C, numerous T</td>
</tr>
<tr>
<td>PL-53</td>
<td>Gillis Lease</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL-54</td>
<td>Steelsmith Mine</td>
<td>P, S</td>
<td></td>
<td></td>
<td></td>
<td>1AO, 2AC, several C, T, P</td>
</tr>
<tr>
<td>PL-55</td>
<td>Campbell Lease</td>
<td>S ?</td>
<td></td>
<td></td>
<td></td>
<td>1AO (possible decline)</td>
</tr>
<tr>
<td>PL-56</td>
<td>Maxine No. 2</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td>1C, T</td>
</tr>
<tr>
<td>PL-57</td>
<td>Olson Mine</td>
<td>S ?</td>
<td></td>
<td></td>
<td></td>
<td>1AC, 1C</td>
</tr>
<tr>
<td>PL-58</td>
<td>Little Bear Prospect</td>
<td>S ?</td>
<td></td>
<td></td>
<td></td>
<td>1 minor C, 1T</td>
</tr>
<tr>
<td>PL-59</td>
<td>Hungry Gut/Avon Mica Co.</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td>1AC, T</td>
</tr>
<tr>
<td>PL-60</td>
<td>Carlson Lease</td>
<td>S ?</td>
<td></td>
<td></td>
<td></td>
<td>numerous C and T</td>
</tr>
</tbody>
</table>
Table 2.1-1 (continued). Summary of properties in the Palouse Ranger 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>PL-61</td>
<td>Fitzgerald Prospect</td>
<td>S ?, FS ?</td>
<td></td>
<td></td>
<td></td>
<td>1AC (minor), T</td>
</tr>
<tr>
<td>PL-75</td>
<td>Gold Eagle</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td>did not find</td>
</tr>
<tr>
<td>PL-76</td>
<td>Gold Hunter</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td>shallow P</td>
</tr>
<tr>
<td>PL-77</td>
<td>Silver King</td>
<td>S, (T ?)</td>
<td></td>
<td></td>
<td></td>
<td>1AC (minor)</td>
</tr>
<tr>
<td>PL-80</td>
<td>Ruby Creek Mine</td>
<td>P (T), BLM ?</td>
<td>2</td>
<td>D</td>
<td></td>
<td>2AO, 1SO, minor P and C</td>
</tr>
<tr>
<td>PL-84</td>
<td>Victoria Prospect</td>
<td>P (T) ?</td>
<td></td>
<td></td>
<td></td>
<td>3AC</td>
</tr>
<tr>
<td>SP-378</td>
<td>Mountain Gulch</td>
<td>FS</td>
<td>2</td>
<td>2</td>
<td>W, D</td>
<td>4AO, 1AG, 1AC, 1SO</td>
</tr>
<tr>
<td>SP-390</td>
<td>Baby Grand</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1SC</td>
</tr>
<tr>
<td>SP-394</td>
<td>Hecla Prospect</td>
<td>P, FS</td>
<td>2</td>
<td></td>
<td></td>
<td>1AO, 1AC, 1SC</td>
</tr>
<tr>
<td>K6099901</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1SC</td>
</tr>
<tr>
<td>K6109901</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC with short, small opening, P</td>
</tr>
<tr>
<td>K6179902</td>
<td>Gold Queen Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AG</td>
</tr>
<tr>
<td>K6179903</td>
<td>Skeptical Lode Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>K6299901</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>minor caved A or S (?)</td>
</tr>
<tr>
<td>K6299902</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>K6299903</td>
<td>Pay Back Lode</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>K6299904</td>
<td>Gold Dust Prospect</td>
<td>FS</td>
<td>4</td>
<td>2</td>
<td>W, D</td>
<td>4AC, 2AO, 1AG</td>
</tr>
<tr>
<td>K6309902</td>
<td>King of the Hill</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AC</td>
</tr>
<tr>
<td>K6309903</td>
<td>Past Time Prospect</td>
<td>FS</td>
<td>1</td>
<td>W</td>
<td></td>
<td>2AG, 1AO, 1AC(?)</td>
</tr>
<tr>
<td>K7079901</td>
<td>A-Ree Claims</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>2AC, 2P</td>
</tr>
<tr>
<td>K8319901</td>
<td>Bon Ami Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AC</td>
</tr>
<tr>
<td>no site #</td>
<td>Unnamed Prospect (Livingston and Laney (1920))</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>did not find</td>
</tr>
</tbody>
</table>
Of the fifty-one sites discussed in this volume, sixteen have open adits or shafts. Five of these properties have multiple open workings and three have gated openings. Some of these openings pose safety hazards. Of the twenty-four sites discussed in this section of the report (Section B of Volume I), four have open adits or shafts and three properties have multiple openings.

2.2 GEOLOGY

The most recent general references showing the geology of the Palouse area are Rember and Bennett (1979) and Griggs (1973). The geology and ore deposits of the area are discussed in Hubbard (1957), Faick (1937), Stoll (1950), Anderson (1930), and unpublished reports on individual deposits. Gott and Cathrall (1980) discussed the geochemistry of the Coeur d'Alene district, which is underlain by some of the same rock units as the Palouse area. A brief description of the geologic framework of the area follows.

Most of the mines and prospects in the study area are hosted by metasedimentary rocks of the Belt Supergroup of Precambrian age or their metamorphosed equivalents (Figure 2.2-1). The characteristics of the various units comprising the supergroup are shown in Table 2.2-1. Hobbs and others (1965) described the Belt Supergroup units in the Coeur d'Alene area. Recent work on various units in the Belt Supergroup is summarized in Roberts (1986) and Berg (1993).

Granitic rocks of Cretaceous or early Tertiary age intrude the Belt Supergroup throughout most of the area (Rember and Bennett, 1979; Griggs, 1973). The deposits near Gold Hill are related to the intrusion of the Gold Hill syenite (Hubbard, 1957), and the mica deposits in the Avon district formed in pegmatites associated with Cretaceous granodiorite (Stoll, 1950). Cretaceous granitic rocks form the core of the Palouse Range, and Columbia River Basalt flows are to the southwest of the study area. Quaternary Palouse loess covers both the granites and the Columbia River Basalt in some areas (Rember and Bennett, 1979).

The northern part of the area is broken by northwest-trending faults that parallel the St. Joe and Osburn faults. In places, the prominent northwest-trending fractures are intersected by northeast-trending faults (Griggs, 1973; Rember and Bennett, 1979).

2.3 ECONOMIC GEOLOGY

2.3.1 General Characteristics of the Ore

The mines in the district are hosted by metasedimentary rocks of the Belt Supergroup of Precambrian age (Figure 2.2-1). There are four geographic groups of mines in the area: the Gold Hill area mines; the Avon district mines; the Mizpah Creek mines; and the Ruby Creek area mines. The deposits around Gold Hill are predominately gold-bearing quartz veins with associated placer workings. Tungsten and copper mineralization accompanies some of these deposits (Hubbard, 1957). Sheet mica was produced from pegmatite dikes in the Avon district (Stoll, 1950). Copper mineralization, with associated gold and silver, occurs as replacement veins in shear zones or as
Figure 2.2-1. Geology of the Palouse Ranger District, Idaho (Griggs, 1973; Rember and Bennett, 1979). pCu = Precambrian rocks, undifferentiated; pCp, pCqp, pCps = Middle Proterozoic Prichard Formation; pCrb = Middle Proterozoic Revett and Burke Formations, undivided; pCrvq = Middle Proterozoic Revett Formation; pCvg, pCws, pCw = Middle Proterozoic Wallace Formation; pCsp = Middle Proterozoic Striped Peak Formation; pCl = Middle Proterozoic Libby Formation; pCd = Middle Proterozoic diorite or amphibolite; ag = amphibolite and garnet amphibolite, Ki, Kiq, Kgr, Kht, Kgb, Kis = Cretaceous granitic rocks, TMgz = Cretaceous and Tertiary granitic rocks, Tsy = Tertiary syenite; Ti, Tgd = Tertiary granitic dikes and other small intrusives; Tcr, Tcw, Tcg = Tertiary Columbia River Basalt; Tcl = Tertiary Columbia River Basalt and Latah Formation; QTg = Tertiary and Quaternary gravel deposits;QP = Quaternary Palouse Formation (loess); Qtg = Quaternary terrace gravels; Qal = Quaternary stream alluvium.
Table 2.2-1. Generalized section of the Belt Supergroup (modified from Hobbs and others, 1965, p. 14).

<table>
<thead>
<tr>
<th>Group</th>
<th>Formation</th>
<th>Lithology</th>
<th>Thickness (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missoula</td>
<td>Libby Formation</td>
<td>Laminated black argillite and white siltite, green to gray cherty argillite and siltite, and green to tan silty limestone and dolomite. Mud cracks and ripple marks abundant. Top eroded (Harrison and Jobin, 1963).</td>
<td>1,000+</td>
</tr>
<tr>
<td></td>
<td>Striped Peak</td>
<td>Interbedded quartzite and argillite with some arenaceous dolomitic beds. Purplish gray and pink to greenish gray. Ripple marks, mud cracks common. Top eroded [in Coeur d’Alene area].</td>
<td>1,500+</td>
</tr>
<tr>
<td></td>
<td>Formation Upper</td>
<td>Mostly medium- to greenish-gray finely laminated argillite. Some arenaceous dolomite and impure quartzite, and minor gray dolomite and limestone in the middle part.</td>
<td>4,500-6,500</td>
</tr>
<tr>
<td></td>
<td>Wallace</td>
<td>Upper part</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower part</td>
<td>Light-gray more or less dolomitic quartzite interbedded with greenish-gray argillite. Ripple marks, mud cracks abundant.</td>
<td></td>
</tr>
<tr>
<td>Ravalli</td>
<td>St. Regis</td>
<td>Upper part</td>
<td>1,400-2,000</td>
</tr>
<tr>
<td></td>
<td>Formation Upper</td>
<td>Light greenish-yellow to light green-gray argillite; thinly laminated. Some carbonate-bearing beds.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower part</td>
<td>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</td>
<td>Upper part</td>
<td>12,000+</td>
</tr>
<tr>
<td></td>
<td>Formation Upper</td>
<td>Interbedded medium-gray argillite and quartzose argillite and light-gray impure to pure quartzite. Some mud cracks and ripple marks.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower part</td>
<td>Thin- to thick-bedded, medium gray argillite and quartzose argillite; laminated in part. Pyrite abundant. some discontinuous quartzite zones. Base buried.</td>
<td></td>
</tr>
</tbody>
</table>
disseminated sulfides in the mines near the head of Mizpah Creek (Hubbard, 1957; McNeill, 1971). Zinc and lead occur in replacement veins along fissures in the deposits of the Ruby Creek area (Anderson, 1930).

Production was recorded from six mines in the study area, with placer production recorded for four of these properties. One placer processed over 1,000 yards of ore, but no lode mine produced over 1,000 tons of ore. Base-metal production was reported from one mine discussed in this section of the report (Section B of Volume I). In addition, production was reported from several of the mica and beryl mines in the Avon district. However, systematic records of the output from these properties is not available.

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):

Mizpah Mine — tailings(?)
Muscovite Mine
Carrico Mine
Gold Hill Mine
Mountain Gulch Prospect
Past Time Prospect
Ruby Creek Mine

Reworked piles of strongly oxidized waste rock, much of it fine grained and resembling mill tailings, were found at the Mizpah Mine. However, no mill has been reported at the site.

The Idaho Beryllium and Mica Corporation built a 100-tpd mica-processing mill at the Muscovite Mine in the early 1950s. A decade later, Non-Metallics, Inc., of Moscow added a grinding circuit to reduce scrap mica to 28 mesh for the roofing industry. Most of the waste material from this operation would have been crushed rock.

Carrico Gold Mining Company built a 25 ton-per-day (tpd) oil flotation mill in 1926. This mill probably never operated.

Gold Hill Mining and Milling Company installed a test mill in 1942, but the mine was closed shortly afterwards. The mill never operated.

The remains of a Huntington mill were found at the Mountain Gulch Prospect. No evidence remains to show this crusher was operated.
A similar Huntington mill was found at the Past Time Prospect. Again, no evidence remains to show the mill was operated.

Ruby Creek Mining Company began installing a 150-tpd oil flotation mill at the Ruby Creek Mine, but the mill was not completed when the mine closed in 1930. The mill probably never operated.

2.4 HYDROLOGY AND HYDROGEOLOGY

The study area covers the Forest Service lands in the headwaters of the Palouse and Potlatch rivers, and in the Elk Creek drainage (Figure 2.1-1). The eastern edge of the district is in the drainage of the North Fork of the Clearwater River, and most of the streams in that area flow eastward into Dworshak Reservoir. The smaller streams in the study area are tributaries to one of the four major drainages.

As noted, a number of the mines in the study area are hosted by rocks of the Belt Supergroup, particularly in the upper formations in the supergroup. Some of these rocks contain significant values of base metals. Table 1.5-3 (based on 998 samples taken in the Coeur d’Alene mining district) shows that rocks in the Wallace Formation contain 41 ppm zinc, 23 ppm lead, 2.4 percent iron, 11 ppm copper, and 0.5 ppm cadmium, and soils developed on the Wallace reflect this metal content (Table 1.5-4, based on 2,298 samples) with 115 ppm zinc, 45 ppm lead, 3.7 percent iron, 29 ppm copper, and 0.5 ppm cadmium. 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. Water discharges from the mines in the area reflect the metal content of the underlying rocks.

2.5 SUMMARY OF THE PALOUSE RANGER DISTRICT

2.5.1 Summary of Environmental Observations

Most of the samples from properties with water discharge exceed EPA water standards for one or more elements (Tables 2.5-1 and 2.5-2). Water quality variances include significant amounts of aluminum, iron, manganese, copper, and cadmium at the Gold Hill Mine and Lodestone Prospect; aluminum, iron, copper, and cadmium at the Gold Hill, Gold Dust, and Luella mines, and the Past Time Prospect; aluminum, cadmium, and iron at the Mountain Gulch Prospect; and aluminum, iron, manganese, and copper at the Muscovite Mine and Lindquist Prospect. Aluminum in excess of one or more water quality standards, which occurred at every property sampled, is the most prevalent water quality variance in the Palouse district. At seven out of the eleven properties sampled, cadmium also 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.
Table 2.5-1. Dissolved metals in water samples from the Palouse Ranger District. Numbers in bold-face type exceed one or more water quality standards. Properties shown in gray are discussed in Section A of this report.

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>Location</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>K6099902</td>
<td>Reservoir Creek Prospect (PL-7), adit 1</td>
<td>0.230</td>
<td>0.0084</td>
<td>---</td>
<td>---</td>
<td>0.200</td>
<td>0.0120</td>
<td>---</td>
<td>0.0098</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K6109902</td>
<td>Gold Hill Mine (PL-19), Adit 1</td>
<td>0.280</td>
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<td>0.0037</td>
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<td>0.210</td>
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<td>0.0081</td>
<td>0.0930</td>
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<td>K7139902</td>
<td>Muscovite Mine (PL-46), Adit 2, water</td>
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**EXPLANATION**

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

**WATER QUALITY STANDARDS**

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<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<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>0.003</td>
<td>0.100</td>
<td>0.030</td>
<td>0.050</td>
<td>0.002</td>
<td>0.100</td>
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<tr>
<td>Secondary MCL</td>
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<td>0.018-0.034</td>
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<td>0.082-0.2</td>
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<td>1.4-2.5</td>
<td>0.12-0.21</td>
<td>0.11-0.19</td>
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<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.360</td>
<td>0.001</td>
<td>0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.000012</td>
<td>0.16-0.28</td>
<td>0.11-0.19</td>
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<tr>
<td>Aquatic Life, Chronic</td>
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<td>0.002</td>
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<td>0.0013</td>
<td>0.0005</td>
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Table 2.5-2. Total recoverable metals in water samples from the Palouse Ranger District. Numbers in bold-face type exceed one or more water quality standards. Properties shown in gray are discussed in Section A of this report.

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<th>Ba (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<td>K6099902</td>
<td>Reservoir Creek Prospect (PL-7), adit</td>
<td>0.0012</td>
<td>0.011</td>
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<td>--</td>
<td>--</td>
<td>0.340</td>
<td>--</td>
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<tr>
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<td>0.025</td>
<td>0.005</td>
<td>--</td>
<td>0.015</td>
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<td>0.026</td>
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<tr>
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<td>Gold Hill Mine (PL-19), seen below waste dump</td>
<td>0.0015</td>
<td>0.059</td>
<td>--</td>
<td>0.021</td>
<td>3.900</td>
<td>0.00280</td>
<td>0.3700</td>
<td>--</td>
<td>0.023</td>
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<tr>
<td>K6179901</td>
<td>Lodestone Prospect (PL-29), Adit 1</td>
<td>0.00160</td>
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<td>--</td>
<td>0.029</td>
<td>1.600</td>
<td>--</td>
<td>0.0360</td>
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<tr>
<td>K6299905</td>
<td>Gold Dust Mine (K6299904), Adit 2, water</td>
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<tr>
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<td>0.029</td>
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<td>0.0360</td>
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<tr>
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<td>Gold Dust Mine (K6299904), upstream on Mountain Gulch Creek</td>
<td>0.00074</td>
<td>0.008</td>
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<td>--</td>
<td>0.057</td>
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<td>0.0100</td>
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<tr>
<td>K6299910</td>
<td>Gold Dust Mine (K6299904), downstream on Mountain Gulch Creek</td>
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<td>--</td>
<td>--</td>
<td>0.240</td>
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<td>K6299911</td>
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<tr>
<td>K7089901</td>
<td>Tributary to Schwartz Creek, downstream from Silver White (PL-49) and Last Chance (PL-50) prospects</td>
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<td>0.005</td>
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<td>0.130</td>
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<td>0.0220</td>
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**EXPLANATION**
Blank space equals no analysis
Below Detection Limit is ---

**WATER QUALITY STANDARDS**

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<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
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<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
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<td>Aquatic Life, Acute</td>
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<td>0.0024</td>
<td>1.4-2.5</td>
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Table 2.5-3. Element screen for dump and tailings samples from properties in the Palouse Ranger District. Properties shown in gray are discussed in Section A of this report.

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<th>Cd (ppm)</th>
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<th>Cu (ppm)</th>
<th>Fe (ppm)</th>
<th>Pb (ppm)</th>
<th>Mn (ppm)</th>
<th>Hg (ppm)</th>
<th>Ni (ppm)</th>
<th>Zn (ppm)</th>
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<tr>
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<td>Gold Hill Mine (PL-19), dump for Adits 1 and 2</td>
<td>NA</td>
<td>150</td>
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<td>NA</td>
<td>130</td>
<td>140.00</td>
<td>2.80</td>
<td>25.0</td>
<td>10.0</td>
<td>18,000</td>
<td>44.0</td>
<td>580</td>
<td>NA</td>
<td>21.0</td>
<td>42</td>
</tr>
<tr>
<td>K6299913</td>
<td>Mountain Gulch Prospect (SP-378), Mother Lode Adit No. 3, dump</td>
<td>NA</td>
<td>—</td>
<td>68.00</td>
<td>2.20</td>
<td>12.0</td>
<td>13.0</td>
<td>33,000</td>
<td>33.0</td>
<td>1,500</td>
<td>NA</td>
<td>20.0</td>
<td>18</td>
</tr>
<tr>
<td>K6309901</td>
<td>Mountain Gulch Prospect (SP-378), Mother Lode Extension Adit No. 2, dump</td>
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<td>—</td>
<td>180.00</td>
<td>3.10</td>
<td>18.0</td>
<td>23.0</td>
<td>49,000</td>
<td>46.0</td>
<td>2,400</td>
<td>NA</td>
<td>31.0</td>
<td>24</td>
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<tr>
<td>K7019901</td>
<td>Mizpah Mine (PL-35), shaft dump</td>
<td>NA</td>
<td>200</td>
<td>66.00</td>
<td>8.70</td>
<td>30.0</td>
<td>15,000</td>
<td>130,000</td>
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<td>1,200</td>
<td>NA</td>
<td>370.0</td>
<td>110</td>
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<td>Hecla Prospect (SP-394), Adit 1, dump</td>
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<td>220</td>
<td>240.00</td>
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<td>44.0</td>
<td>450.0</td>
<td>89,000</td>
<td>84.0</td>
<td>1,200</td>
<td>NA</td>
<td>38.0</td>
<td>71</td>
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<td>NA</td>
<td>280</td>
<td>78.00</td>
<td>11.00</td>
<td>35.0</td>
<td>7,700.0</td>
<td>190,000</td>
<td>140.0</td>
<td>7,000</td>
<td>NA</td>
<td>89.0</td>
<td>85</td>
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<td>NA</td>
<td>35.0</td>
<td>35.00</td>
<td>0.63</td>
<td>6.5</td>
<td>18.0</td>
<td>7,900</td>
<td>22.0</td>
<td>480</td>
<td>NA</td>
<td>6.6</td>
<td>20</td>
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<tr>
<td>K7159901</td>
<td>Ruby Creek Mine (PL-80), lower adit, dump</td>
<td>NA</td>
<td>92</td>
<td>73.00</td>
<td>4.10</td>
<td>22.0</td>
<td>42.0</td>
<td>31,000</td>
<td>260.0</td>
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<td>NA</td>
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<tr>
<td>K7159902</td>
<td>Ruby Creek Mine (PL-80), upper adit/shaft, dump</td>
<td>NA</td>
<td>130</td>
<td>120.00</td>
<td>33.00</td>
<td>61.0</td>
<td>360.0</td>
<td>36,000</td>
<td>4,400.0</td>
<td>2,300</td>
<td>NA</td>
<td>26.0</td>
<td>13,000</td>
</tr>
<tr>
<td>K5050002</td>
<td>Lodestone Prospect (PL-29), Adit 2, dump</td>
<td>NA</td>
<td>NA</td>
<td>39.00</td>
<td>3.20</td>
<td>30.0</td>
<td>36.0</td>
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<td>38.0</td>
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Clark Fork Superfund Background Levels (mg/Kg) = ppm

<table>
<thead>
<tr>
<th></th>
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<th>Cd</th>
<th>Pb</th>
</tr>
</thead>
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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</td>
<td>16.5</td>
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<td>11.5</td>
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<td>Soil</td>
<td></td>
<td></td>
<td></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>Phytoxic Concentration</td>
<td>100.0</td>
<td>100.0</td>
<td>1000.0</td>
</tr>
</tbody>
</table>

Explanation:
Below Detection Limit is ---
Not analyzed equals NA
Table 2.5-4  Toxicity Characteristic Leaching Procedure for dump and tailings samples from properties in the Palouse Ranger District.
Properties shown in gray are discussed in Section A of this report.

<table>
<thead>
<tr>
<th>FIELD NO.</th>
<th>REMARKS</th>
<th>As (ppm)</th>
<th>Cd (ppm)</th>
<th>Cr (ppm)</th>
<th>Pb (ppm)</th>
<th>Hg (ppm)</th>
<th>Se (ppm)</th>
<th>Ag (ppm)</th>
<th>Ba (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K6109903</td>
<td>Gold Hill Mine (PL-19), dump for Adit 1 and 2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,200</td>
</tr>
<tr>
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<td>Gold Dust Mine (K6299904), Adit 2, dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,100</td>
</tr>
<tr>
<td>K6299907</td>
<td>Gold Dust Mine (K6299904), Eastern Star adit, dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,400</td>
</tr>
<tr>
<td>K6299913</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,300</td>
</tr>
<tr>
<td>K6309901</td>
<td>Mountain Gulch Prospect (SP-378), Mother Lode Extension Adit No. 2, dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>K7019901</td>
<td>Mizpah Mine (PL-35), shaft dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.660</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.500</td>
</tr>
<tr>
<td>K7069902</td>
<td>Hecla Prospect (SP394), Adit 2, dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.510</td>
</tr>
<tr>
<td>K7079902</td>
<td>Luella Mine (PL-47), Adit 3, dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.014</td>
<td></td>
<td></td>
<td>0.910</td>
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<td>K7159901</td>
<td>Ruby Creek Mine (PL-80), lower adit, dump</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>K7159902</td>
<td>Ruby Creek Mine (PL-80), upper adit/shaft, dump</td>
<td></td>
<td>0.310</td>
<td>0.210</td>
<td>43.000</td>
<td></td>
<td></td>
<td></td>
<td>0.880</td>
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<td>Lodestone Prospect (PL-29), Adit 2, dump</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.530</td>
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</table>

EXPLANATION

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

WATER QUALITY STANDARDS

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<tr>
<th></th>
<th>As (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Se (mg/L)</th>
<th>Ag (mg/L)</th>
<th>Ba (mg/L)</th>
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<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></td>
<td>2.000</td>
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<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></td>
<td>0.0041-0.0134</td>
<td>0.00012</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></td>
<td></td>
<td>0.00012</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>0.01</td>
<td>0.650</td>
<td>0.270</td>
<td>0.050</td>
</tr>
</tbody>
</table>
3.0 MINE DESCRIPTIONS — PALOUSE DISTRICT, CLEARWATER NATIONAL FOREST ADMINISTERED LANDS

3.28 LUELLA MINE (Site No. PL-47)

3.28.1 Site Location and Access (Figure 2.1-1)

The main workings for the Luella Mine are on a southeast-flowing tributary to Schwartz Creek in the SE¼ of the SW¼ of section 21, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle; subsidiary workings are in the SW¼ of the SE¼ of section 21, at the site marked on the topographic map as the “Luella Mine” (Figure 3.28-1). Access is on FS Road 3848, the Mica Mountain Road, up Schwartz Creek about 2 miles. An old access road, which is not shown on the topographic map, branches off the west side of Road 3843 and follows the west side of a gully to the mine. The last 1,000 feet of this access road are overgrown with thickets of small hemlock and fir trees. The workings are on State land, although the drainage below the mine is Forest Service land.

3.28.2 Geologic Features (Figure 2.2-1)

The Luella Mine is in metamorphosed units of the Wallace Formation (Rember and Bennett, 1979). Stoll (1950, p. 33-34) described the geology of the mine as follows:

Medium-grained gray mica gneiss, composed of quartz, muscovite, biotite, and scattered small pink garnets, is the chief country rock. Mica schist is present in the west end of the upper and lower levels, where it is interbedded with gneiss. The schist is similar to the gneiss, but the mica in the schist is coarser and slightly more abundant. East and west of the intensely folded rocks that contain the pegmatites the schist and gneiss trend rather uniformly north-northwest.

More than a dozen small pegmatites, enclosed in mica gneiss and schist, are exposed in the workings. All lie within a block 200 feet square and 175 feet or more deep. Most of the pegmatites are pipelike bodies that show a wide range of direction and dip of plunge. The rest are tabular or lenticular bodies that strike in northerly directions and dip east or west at high angles. The pipelike pegmatites occupy the centers of tight plunging folds in gneiss.

The pegmatites are, chiefly, mixtures of coarse- to medium-grained plagioclase, quartz, schorl [tourmaline], and muscovite. Most are highly feldspathic, but some are locally quartzose. Zoning is evinced by a small quartz core in one pegmatite and by narrow border zones rich in scrap-grade muscovite.

3.28.3 Site History

Stoll (1950, p. 33) provided the following history of the Luella property:
The Luella is an old mine that was worked rather extensively at one time. The Western Mica Co. owned the mine in 1910, and, according to local reports, it was worked to produce scrap mica during and shortly after the First World War. Subsequently the mine lay idle until 1943, when the war demand for domestic muscovite caused renewed interest. In the fall of 1943, E. A. Campbell, of Lewiston, Idaho, obtained a 5-year lease from the State of Idaho and built a camp near the lower portal of the mine. Small-scale mining, both open pit and underground, was carried on by Campbell during parts of 1943 and 1944.

The early production is unknown. During 1943 and 1944 Campbell reportedly produced 17,880 pounds of mine-cobbled mica plus an additional 12,000 pounds of mine scrap.

The Western Mica Company was incorporated in 1905 and forfeited its corporate charter in 1912.

The Mica Processing and Milling Company, Inc. (incorporated in 1947), leased the Luella Mine sometime after the end of World War II. The property had two tunnels, one 260 feet long and the other 150 feet. The total development included an open pit and 3,000 feet of underground workings. The company forfeited its corporate charter in 1950.

3.28.4 Environmental Conditions

3.28.4.1 Site Features

The Luella Mine was visited by John Kauffman on July 7, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 3, index 00:00:40-00:16:38). Documenting photographs are Roll K6, frames 14-25 (frame 22 has no image), and Roll K7, frames 1-3.

Two short, caved adits were found at the location marked as the Luella Mine on the topographic map (Figure 3.28-3), but neither matched the description or the map in Stoll (1950). On the video segment, these are identified as Adits 1 and 2. Adit 1, expressed as a trough about 30 feet long, has a minor, iron-stained seep and a small waste dump measuring 20 feet long, 10 feet wide, and 10 feet thick. The second caved adit is a 20-foot-long trough on the slope north of Adit 1. The disturbed area at these adits is minimal.

The main workings were found about 1,000 feet to the southwest in the next drainage. Two adits, a prospect pit or caved adit, and several collapsed structures at this location match Stoll’s (1950) description of the Luella (Figure 3.28-4). A cut into the slope, or possibly a caved adit (Figure 3.28-5), is 50 feet above the Stoll’s (1950) upper adit (this cut may be the “main pit worked by Campbell” noted by Stoll [1950, p. 33]). Several piles of pegmatite vein fragments are on a flat in front of the cut (Figure 3.28-6). The pegmatite is very coarse grained with large
masses of fractured tourmaline, muscovite books, quartz, and plagioclase (Figure 3.28-7). Material from this cut has been bulldozed out over the slope, forming a “dump” about 100 feet long, 30 feet wide, and 15 feet down the face. The surface is covered with a dense growth of saplings.

Immediately below the cut along the west side of the drainage is Adit 3, Stoll’s (1950) upper adit. The adit was driven westward into the hill. A trough leading to the adit, lined with a rock retaining wall, is filled with several feet of sloughed rock and soil (Figure 3.28-8). Inside, the adit is open and measures 6 feet high and 5-6 feet wide (Figure 3.28-9). The floor is covered with a few inches of water, but none was flowing from the adit. The waste dump is built out across the drainage and measures about 100 feet long, 20-30 feet wide, and 30-40 feet thick. A large collapsed structure is on the north edge of the dump (Figure 3.28-10).

Adit 4, Stoll’s (1950) lower adit, is about 150 feet down the drainage from the upper adit. This adit was also driven west or northwest into the hill at creek level. The adit has a small diagonal opening 3-4 feet long and 2 feet high (Figure 3.28-11). Water can be heard dripping into the adit, and a seep of about 1-2 gallons per minute flows out into the drainage. The waste dump measures 100 feet long, 30 feet wide, and 20-30 feet thick, with several lobes on the south end (Figures 3.28-12 and 3.28-13). Three collapsed structures are at the site, two on the dump and one above the south end of the dump at the end of an overgrown access road (Figures 3.28-14, 3.28-15 and 3.28-16). Scrap metal, a vehicle frame, stove parts, and miscellaneous debris are scattered around the site.

The disturbed area at the main workings covers 1.5-2 acres.

3.28.4.2 Sample Locations

3.28.4.2.1 Solid Samples

Sample K7079902 was collected from the face of the waste dump for Adit 3.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K7079902</td>
<td>Luella Mine, Adit 3 waste dump</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.28.4.2.2 Water Samples

Sample K7079903 was collected from the seep flowing from Adit 4.
<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>K7079903</td>
<td>Luella Mine, Adit 4</td>
<td>50</td>
<td>43</td>
<td>7.2</td>
<td>1-2</td>
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</tr>
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</table>

3.28.4.2.3 Analytical Results

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

All elements except cadmium, which was slightly above background levels, were within the expected background and environmental ranges in the element screen for sample K7079902. In the TCLP for metals test, mercury slightly in excess of the detection level is leaching from the sample.

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

Sample K7079903 from Adit 4 of the Luella Mine exceeds the Secondary MCL for aluminum and equals or exceeds the Aquatic Life Chronic standards for aluminum, cadmium, and copper in the dissolved metals screen. In the total recoverable metals screen, sample K7079903 exceeds the Secondary MCL for iron.

3.28.5 Structures

Four collapsed structures were found at the main workings of the Luella Mine, one on the dump of the upper adit and three at the lower adit. Stove pipe, stove parts, a vehicle frame, assorted metal scrap, and old garbage are scattered around the collapsed structures.

3.28.6 Safety

Both Adit 3 and Adit 4 are open and could be entered, although the workings are accessible only on foot and are not at the location indicated on the topographic map. Casual visitors to the site are unlikely.
Figure 3.28-1. Location of the Luella Mine, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map). The main workings are not at the location marked on the topographic map.
Figure 3.28-3. Sketch of Adits 1 and 2 at the location shown on the topographic map for the Luella Mine.
Figure 3.28-4. Sketch of the main workings of the Luella Mine.
Figure 3.28-5. Prospect cut or caved adit above Adit 3 (the upper adit) at the Luella Mine, looking west (Roll K6, frame #15).

Figure 3.28-6. One of the piles of pegmatite fragments at the cut at the Luella Mine (Roll K6, frame #16).
Figure 3.28-7. Massive tourmaline (dark mineral), quartz, muscovite, and plagioclase in rock fragments from the pegmatite dike at the Luella Mine (Roll K6, frame #17).

Figure 3.28-8. Looking west at Adit 3 (the upper adit) at the Luella Mine. Rock and dirt has sloughed into the entryway to the adit. A rock retaining wall can be seen on the right side of the entryway (Roll K6, frame #18).
Figure 3.28-9. View inside the large, open upper adit at the Luella Mine (Roll K6, frame #19).

Figure 3.28-10. Large collapsed structure on the waste dump for Adit 3 at the Luella Mine (Roll K6, frame #20).
Figure 3.28-11. Opening into Adit 4 (the lower adit) at the Luella Mine. Water is dripping into the adit at the left side of the opening (Roll K6, frame #23).

Figure 3.28-12. Looking southeast across the waste dump for Adit 4 at the Luella Mine. The backpack is on one of the lobes on the south end of the dump. Some metal scrap is near the center of the picture (Roll K7, frame #1).
Figure 3.28-13. Looking northeast at the face of the waste dump for Adit 4 at the Luella Mine (Roll K7, frame #2).

Figure 3.28-14. Collapsed structure #1 at Adit 4 of the Luella Mine (Roll K6, frame #24).
Figure 3.28-15. Collapsed structure #2 at Adit 4 of the Luella Mine (Roll K6, frame #25).
Figure 3.28-16. Collapsed structure #3 at Adit 4 of the Luella Mine (Roll K7, frame #3).
3.29 McCORNACK PROSPECT (Site No. PL-48)

3.29.1 Site Location and Access (Figure 2.1-1)

The McCornack Prospect is on the west side of FS Road 3848 in the NE¼ of the SE¼ of the NW¼ of section 28, T. 41 N., R. 2 W., on the Deary 7.5-minute quadrangle (Figure 3.29-1). The prospect is about 500 feet west of the road on the north side of the first drainage north of the turnoff to FS Road 3272. There are no passable roads to the site. The prospect is on Forest Service land.

3.29.2 Geologic Features (Figure 2.2-1)

A series of sheets, stringers, and plunging lenses of pegmatite, interlayered with bands of mica schist, were exposed in the McCornack tunnel. The muscovite books in the pegmatite were too small and too poor in quality to yield much sheet mica (Stoll, 1950).

3.29.3 Site History

The property was owned by Mrs. Mary F. McCornack of Seattle, Washington in the early 1940s. Workings at that time included a few old pits and a 165-foot tunnel. Over a thousand linear feet of trenches were excavated by the U.S. Bureau of Mines in 1944 (Stoll, 1950).

3.29.4 Environmental Conditions

3.29.4.1 Site Features

The McCornack Prospect was visited by John Kauffman on July 8, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 3, index 00:16:42-00:19:20). Documenting photographs are Roll K7, frames 4-5.

This prospect consists of a series of old bulldozer cuts and a caved adit, reported to be 165 feet long (Figure 3.29-2). The trenches, which were excavated by the U.S. Bureau of Mines in 1944, are now overgrown and the sides have sloughed into the trenches. The caved adit, expressed as a V-shaped trough on the slope (Figure 3.29-3), is on the north side of a dry gully that branches just west of the adit. The waste dump measures 35 feet long, 20 feet wide, and 15 feet thick (Figure 3.29-4). Pegmatite and schist fragments comprise the waste dump material. The disturbed area covers less than 0.25 acre.

3.29.4.2 Sample Locations

3.29.4.2.1 Solid Samples

No solid samples were collected.
3.29.4.2.2 Water Samples
   No water samples were collected.

3.29.5 Structures
   No structures were found.

3.29.6 Safety
   No safety hazards were found.
Figure 3.29-1. Location of the McCornack Prospect, Latah County, Idaho (U.S. Geological Survey Deary 7.5-minute topographic map).
Figure 3.29-2. Sketch of the McCornack Prospect.
Figure 3.29-3. Trough of the caved McCornack adit, looking north (Roll K7, frame #4).

Figure 3.29-4. Looking northeast at the face of the waste dump for the McCornack adit (Roll K7, frame #5).
3.30 SILVER WHITE PROSPECT (Site No. PL-49)
Alternate names—Thatuna Mines Prospect; Maybe Mine.

3.30.1 Site Location and Access (Figure 2.1-1)

The Silver White Prospect is on a west-southwest-flowing tributary of Schwartz Creek, on both sides of the line between sections 21 and 22, near the southern 1/16 corner (1/8 mile north of the corner common to sections 21, 22, 27, and 28), T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.30-1). Access is on FS Road 3848 up Schwartz Creek to the switchback where the road crosses the main creek, then up a brushy road to the east-northeast along the tributary drainage. The upper adit is either on State or Forest Service land, and the lower adit is on Forest Service land.

3.30.2 Geologic Features (Figure 2.2-1)

The Silver White workings exposed several small pegmatite bodies enclosed in mica schist. The pegmatites consist of plagioclase, quartz, muscovite, biotite, and tourmaline. The deposits contained very little sheet mica (Stoll, 1950).

3.30.3 Site History

In the early 1940s, the Silver White property was owned by Thatuna Mines of Lewiston, Idaho (Stoll, 1950). This company was incorporated in 1942 and forfeited its corporate charter in 1961. According to Stoll (1950), a few pounds of sheet mica were produced in 1944 by Jack Wright and Robert Green, who were working for the owners. In 1959, the Silver White was leased from Rauch Lumber Company by Western Mica Corporation (Choate, 1959). Western Mica was incorporated in 1957 and changed its name to Ida-Mica Industrial Minerals, Inc., in 1960.

3.30.4 Environmental Conditions

3.30.4.1 Site Features

The Silver White Prospect was visited by John Kauffman on July 8, 1999. A video segment describing the property is on Clearwater National Forest Videotape (Tape 3, index 00:19:24-00:26:55). Documenting photographs are Roll K7, frames 6-8.

The property consists of two adits, a trench, and a prospect cut (Figure 3.30-2). The caved upper adit, Adit 1, is along the access road about 900 feet east of FS Road 3848. A trough 15 feet long is either a caved section of the tunnel or a trench in front of the adit. The waste dump is about 30 feet long, 15 feet wide, and 20 feet thick.

The lower adit, Adit 2, is down a short, brushy access road east of Adit 1 (Figure 3.30-3). Although Stoll (1950, Figure 18) shows this adit as caved, a small opening appears to go into the
tunnel (Figures 3.30-4 and 3.30-5). The opening is 1½ feet wide and 1 foot high. The adit may be caved further inside. A minor seep drains from the adit, but its volume was too small to sample. The wedge-shaped waste dump, built out into the drainage, is 50 feet long, 30 feet wide, and 15 feet thick at the west end. The creek flows across the dump and forms a grass- and reed-covered bog (Figure 3.30-6).

Above the road that passes Adit 1 is a long, brushy trench with sloughed sides. A cut with a thin waste dump is along the trench about 100 feet east of Adit 1. This prospect cut is shown on Stoll’s (1950) map (Figure 3.30-2).

The disturbed area at the Silver White workings covers less than 1 acre.

3.30.4.2 Sample Locations

3.30.4.2.1 Solid Samples
No solid samples were collected.

3.30.4.2.2 Water Samples

Although no samples were collected at the prospect, sample K7089901 was taken on the east side of FS Road 3848 from the same creek that flows across the dump of Adit 2.

<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>K7089901</td>
<td>downstream, Silver White Prospect</td>
<td>22</td>
<td>49</td>
<td>7.4</td>
<td>1-2 ft. wide, 0.5 ft. deep</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.30.4.2.3 Analytical Results

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

Sample K7089901 equals or exceeds the Secondary MCL and the Aquatic Life Chronic standard for aluminum, both Aquatic Life standards for cadmium, and the Aquatic Life Chronic standard for copper in the dissolved metals screen. In the total recoverable metals screen, sample K7089901 equals or exceeds all standards for cadmium.

3.30.5 Structures
No structures were found.
3.30.6 Safety

Adit 2 has a small opening that may provide an entryway into the adit. The site is accessible only on foot and is not obvious because of thick brush and timber, so visitors are unlikely.
Figure 3.30-1. Location of the Silver White Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.30-2. Map of the Silver White Prospect (Stoll, 1950, Figure 18).
Figure 3.30-3. Sketch of the Silver White Prospect.
Figure 3.30-4. Looking north along the trough in front of Adit 2 at the Silver White Prospect. A small opening into the tunnel is at the center of the picture (Roll K7, frame #7).
Figure 3.30-5. Close-up of the opening into Adit 2 at the Silver White Prospect (Roll K7, frame #8).

Figure 3.30-6. Grass- and reed-covered bog on the waste dump of Adit 2 at the Silver White Prospect (Roll K7, frame #6).
3.31 LAST CHANCE MINE (Site No. PL-50) AND WITHEROW LEASE (Site No. PL-51)
Alternate names—Maybe Mine; Silver White Mine.

3.31.1 Site Location and Access (Figure 2.1-1)

The Last Chance Mine is about 900 feet east of the Silver White Prospect in the SW¼ of the SW¼ of section 22, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.31-1). Access is on FS Road 3848 up Schwartz Creek about 3 miles, to where a jeep road cuts back to the north. This jeep road ends at the Last Chance Mine, although the brushy access road to the Silver White Prospect continues eastward and merges into the jeep road. The Witherow Lease is in the NW¼ of the SW¼ of the SW¼ of section 22. These workings appear to be on patented claims adjacent to Forest Service land on the west and State land on the east. The Last Chance is near the location marked on the topographic map, and the Witherow Lease is north of the mine symbol labeled “Olson Mine” on the topographic map.

3.31.2 Geologic Features (Figure 2.2-1)

At least five pegmatites are exposed on the Last Chance in an area 100 by 200 feet. The country rock is quartz-muscovite-biotite schist, and the pegmatites are parallel to the foliation. Some of the books of rum mica were as much as 16 inches in diameter and 6 inches thick. The Witherow lease is near the east end of the Last Chance claim. Four or five pegmatites are near the Witherow workings, but only one was well exposed in the early 1940s. This pegmatite ranged from a few feet up to about 20 feet thick and was about 70 feet long (Stoll, 1950).

3.31.3 Site History

Stoll (1950, p. 28) reported the following information on the history of the Last Chance:
Old workings existed in 1910. At that time the Last Chance and the nearby Silver White prospect were known as the Maybe mine, or Silver White mine. The Spokane and Eastern Branch of the Seattle First National Bank is one of the trustees of the property. Burton L. Meier, of Deary, obtained a lease in 1944 and started open-pit mining in June in partnership with Don Holtz and J. G. Sullivan. Subsequently, part of the open-pit mining was done by Carl Roseberry, who held a sublease from Meier. In the winter and spring of 1944-45 an old tunnel was partly cleaned out and underground development and mining were carried on. The mine was closed on March 23, 1945.

In 1959, Western Mica Corporation (incorporated in 1957) leased the Last Chance from the Spokane and Eastern Bank. Choate (1959) noted that Western Mica Corporation owned the northern three-fifths of the Last Chance Mine (including the Witherow lease), and that the southern two-fifths of the Last Chance was leased from the Spokane and Eastern Bank (trustees). Western Mica also owned the Muscovite Mine and leased several other properties in the area (Choate, 1959). The company later reported that the Last Chance had been purchased in 1957 at
an RFC (Reconstruction Finance Corporation) foreclosure sale in 1957; presumably, this referred
to the three-fifths of the property owned by the company. Western Mica changed its name to Ida-

began construction of a processing plant that year. However, the company confined its
operations to the Muscovite Mine and apparently did little or no work on the Last Chance.

Stoll (1950, p. 54) noted the following on the history of the Witherow lease:
The mine was worked many years ago as shown by old workings, which include a
caved adit and a small open pit. Trenching by the Bureau of Mines in 1944
revealed other pegmatites close to the open pit. A lease on the small area
including the discoveries and the old workings was obtained by Jack Witherow
who was later joined by several partners. A small open pit was dug in pegmatite in
the fall of 1944, and a stope and short drift were driven in the winter of 1944-45.
As effort was made to reopen the old adit, but the opening caved again and the
project was given up. In February 1945 no more than a couple of hundred pounds
of small-sized sheet mica had been produced.

3.31.4 Environmental Conditions

3.31.4.1 Site Features

The Last Chance Mine and Witherow Lease were visited by John Kauffman on July 8, 1999. A
video segment describing the sites is on Clearwater National Forest Videotape (Tape 3, index
00:27:00-00:35:47). Documenting photographs are Roll K7, frames 9 and 11.

Stoll (1950, Plate 3; Figure 3.31-2) mapped the Last Chance Mine, although very little evidence
of these workings remains at the site. The main adit is expressed as a caved trough extending
about 30 feet north of the access road. The trough is overgrown with thimbleberry bushes,
saplings, and other brush (Figure 3.31-3). A second caved adit to the east is now a minor notch
in the embankment of the access road. The other prospect cuts and pits are similarly overgrown
and difficult to see. The disturbed area is difficult to determine because of the brush, but is
estimated to be no more than 0.5 acre.

The Witherow Lease workings, about 600 feet east of the Last Chance, consist of a large open
cut and a possible caved adit (Figure 3.31-4). The open cut is estimated to be 150 feet long and
60 feet wide with a sloping headwall 20 or 30 feet high. The excavated material has been pushed
out on the slope into an irregular “dump” about 25-30 feet thick. At the base of the dump is an
old log structure, built of large-diameter logs, that may have been an ore bin (Figure 3.31-5).
Further down the brushy slope along an old access road is a possible caved adit and a small waste
dump. This feature is along an east-west State boundary survey line and just west of a small
gully. The disturbed area at the Witherow Lease covers about 1 acre.
3.31.4.2 Sample Locations

3.31.4.2.1 Solid Samples
   No solid samples were collected at this site.

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

3.31.5 Structures

The possible ore bin, constructed of logs 1½-2 feet in diameter, was the only structure found at this site.

3.31.6 Safety
   No safety hazards were found.
Figure 3.31-1. Location of the Last Chance Mine and Witherow Lease Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.31-2. Map of the Last Chance Mine (Stoll, 1950, Plate 3).
Figure 3.31-3. Caved main adit at the Last Chance Mine, looking north (Roll K7, frame #9).
Figure 3.31-4. Sketch of the Witherow Lease workings.
Figure 3.31-5. Ore bin or other structure at the base of the dump of the open cut at the Witherow Lease. The logs are 1½-2 feet in diameter (Roll K7, frame #11).
3.32 CAMPBELL LEASE (Site No. PL-55)
Alternate name—Thatuna Lease 7.

3.32.1 Site Location and Access (Figure 2.1-1)

The Campbell Lease is about 500 feet south of the Last Chance Mine in the SE¼ of the SW¼ of the SW¼ of section 22, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.32-1). Access is on FS Road 3848 up Schwartz Creek to the jeep road to the Last Chance Mine, then on the jeep road approximately ½ mile where an old, brushy spur leads to the prospect (Figure 3.32-2). An opening on the road, just below a State land boundary (probably the section line) that has been recently cleared of brush, is on Forest Service land. Some of the trenches and cuts may be on State land.

3.32.2 Geologic Features (Figure 2.2-1)

Stoll (1950, p. 24) reported:
Five lenses of pegmatite, striking N. 63° W. to N. 80° E. and dipping to the south, are exposed in the workings and the surrounding stripped area. The pegmatite mined in the open pit is about 120 feet in length and 18 feet in maximum thickness. It strikes N. 70° W., about parallel to the enclosing mica schist. The lenticular form is modified by the steeply plunging rolls in both walls. The pegmatite is divided into a mica-rich border zone up to 12 inches in width, and a central core composed of plagioclase, quartz, sparsely scattered small books and flakes of muscovite, and schorl. Within the core, small mica books lie in medium-grained plagioclase-quartz pegmatite and in small segregations of gray quartz. Almost all of the books are less than 4 inches in diameter, and most of them are curved and cracked. The sheets are colorless to pale rum.

3.32.3 Site History

Several pegmatite bodies were uncovered during trenching conducted by the U.S. Bureau of Mines in 1943. The operator of the Luella Mine, E. A. Campbell, leased the property and began open pit mining in August 1944. Operations ceased in November 1944 (Stoll, 1950). The tunnel at the site apparently predated Campbell’s work.

3.32.4 Environmental Conditions

3.32.4.1 Site Features

The Campbell Lease workings were visited by John Kauffman on July 8, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 3, index 00:35:51-00:37:33). Documenting photograph is Roll K7, frame 10.
An open tunnel or decline and several cuts and trenches, similar to what is shown by Stoll (1950; Figure 3.32-3), were found at the site. The opening in the embankment of the brushy access road appears to lead to a decline (Stoll labeled it a tunnel). However, the small opening, only 2 feet wide and 1 foot high (Figure 3.32-4), did not provide a good view into the mine. Approximately 30 feet northeast of the decline is a trench cut into the slope along the road. Several additional prospect cuts are on the slope above the workings to the southeast. The disturbed area covers less than 0.25 acre.

3.32.4.2 Sample Locations

3.32.4.2.1 Solid Samples
   No solid samples were collected.

3.32.4.2.2 Water Samples
   No water samples were collected.

3.32.5 Structures
   No structures were found.

3.32.6 Safety

The small opening could be enlarged to gain entry into the adit or decline. However, the site is relatively obscure because of the thick brush along the old access road.
Figure 3.32-1. Location of the Campbell Lease, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.32-3. Map of the Campbell Lease workings (Stoll, 1950, Figure 11).
Figure 3.32-4. Small opening into the decline at the Campbell Lease (Roll K7, frame #10).
3.33 MAXINE NO. 2 PROSPECT (Site No. PL-56)

3.33.1 Site Location and Access (Figure 2.1-1)

The Maxine No. 2 Prospect is near the corner common to sections 21, 22, 27, and 28, in the NW¼ of the NW¼ of the NW¼ of section 27, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.33-1). Access is on FS Road 3848 up Schwartz Creek to the turnoff to the Last Chance Mine, then northerly about ½ mile. The prospect is along the jeep road to the Last Chance Mine (Figure 3.32-2) and is on State land.

3.33.2 Geologic Features (Figure 2.2-1)

Books of pale rum mica are associated with pods of dark gray quartz in a feldspathic pegmatite (Stoll, 1950).

3.33.3 Site History

Stoll (1950, p. 34) reported the following on the history of the Maxine No. 2:

Pegmatite was found by the Bureau of Mines during construction of a road between the mine access road and the Last Chance, Campbell, and other mines in the near vicinity. The discovery was made on State land leased by Wilbur D. Henry. In October 1944 Lester C. Rowland, of Deary, Idaho, obtained a sublease on the property and started open-pit mining with a small hoist-driven scraper. According to the operator, about 7,000 pounds of crude mica was produced. The operation was closed in November 1944.

3.33.4 Environmental Conditions

3.33.4.1 Site Features

The Maxine No. 2 was visited by John Kauffman on July 8, 1999. No video or photographs were taken at this site.

This minor prospect consists of two trenches on the east side of the access road (Figure 3.33-2). The cuts are relatively shallow and are overgrown with brush and small trees. The disturbed area covers less than 0.5 acre.

3.33.4.2 Sample Locations

3.33.4.2.1 Solid Samples

No solid samples were collected.
3.33.4.2.2 Water Samples
   No water samples were collected.

3.33.5 Structures
   No structures were found.

3.33.6 Safety
   There are no safety hazards at this site.
Figure 3.33-1. Location of the Maxine No. 2 Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.33-2. Map of the Maxine No. 2 Prospect (Stoll, 1950, Figure 15).
3.34 AVON MICA COMPANY MINE (Site No. PL-59)
Alternate name—Hungry Gut Mine; Avon.

3.34.1 Site Location and Access (Figure 2.1-1)

The Avon Mica Company Mine is on FS Road 3848 in the SE¼ of the NE¼ of the NE¼ of
section 28, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.34-1). The
property is about ½ mile south of where FS Road 3848 crosses Schwartz Creek and climbs up the
slope east of the creek. This part of section 28 is State land.

3.34.2 Geologic Features (Figure 2.2-1)

A pegmatite exposed in the open cut was 3 feet thick, with a north-south strike and a dip of 60-
70° E. This pegmatite was composed mainly of weathered plagioclase and quartz, with microcline
and muscovite in small amounts. The light rum-colored mica occurred as books up to 3 inches in
diameter. A possible second pegmatite was exposed in the tunnel. This pegmatite was 1½ to 5
feet thick and was composed of plagioclase, quartz, muscovite, and schorl. The largest block of
mica mined from the tunnel measured 8 by 12 inches and weighed 10 pounds (Stoll, 1950).

3.34.3 Site History

The pegmatite, on State land, was discovered in 1943 during construction of an access road by
the Forest Service. William W. Freebury and E. D. Nieland, of Deary, Idaho, obtained a lease on
the property and formed the Avon Mica Company (Stoll, 1950). Small-scale mining was begun in
late 1943 and continued intermittently in 1944. During part of that time, the property was
operated by Dan J. Carlson, also of Deary.

3.34.4 Environmental Conditions

3.34.4.1 Site Features

The Avon Mica Company Mine was visited by John Kauffman on July 8, 1999. A video segment
describing the property is on Clearwater National Forest Videotape (Tape 3, index 00:37:38-
00:40:03). Documenting photograph is Roll K7, frame 12.

The property consists of a caved adit and several trenches (Figure 3.34-2). The trench on the
north side of the road is overgrown with brush. The trench in the timber on the south side of the
road is covered with pine needles and twigs. The sides of both these trenches have sloughed into
the cuts. The adit has been completely obliterated by the road, which crosses just above the old
portal. A slump on the north embankment of the road may be the result of a collapsed stope or a
caved section of the adit. The waste dump forms a flat pad 10-15 feet below the road (Figure
3.34-3) and measures 75-80 feet long, 20-25 feet wide, and 10-15 feet thick. A few pieces of
scrap metal are scattered around the site. The disturbed area, including the trenches, covers about
1 acre.
3.34.4.2 Sample Locations

3.34.4.2.1 Solid Samples
   No solid samples were collected.

3.34.4.2.2 Water Samples
   No water samples were collected.

3.34.5 Structures
   No structures were found.

3.34.6 Safety
   No safety hazards were found.
Figure 3.34-1. Location of the Avon Mica Company Mine, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.34-2. Map of the Avon Mica Company workings (Stoll, 1950, Figure 10).
Figure 3.34-3. Looking northwest along the top of the waste dump at the Avon Mica Company Mine (Roll K7, frame #12).
3.35 OLSON MINE (Site No. PL-57)
Alternate names—Fitzgerald-Olson Prospect; Scott Rogers Mine.

This site does not correspond to the Olson Mine marked on the topographic map, but does match the location for the Olson Mine described by Stoll (1950).

3.35.1 Site Location and Access (Figure 2.1-1)

The Olson Mine is about 1,000 feet east of the Maxine No. 2 Prospect in the NW¼ of the NE¼ of the NW¼ of section 27, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.35-1). Access is on an old spur road going southeast off the jeep road to the Last Chance Mine (Figure 3.35-2). This part of section 27 is State land, adjacent to Forest Service land to the east.

3.35.2 Geologic Features (Figure 2.2-1)

In the open pit, the deposit consists of an irregular pegmatite body that measures 47 feet long and from less than 1 foot to 15 feet thick. The foliation of the enclosing biotite-muscovite-quartz schist is generally parallel to the contacts with the pegmatite. The pegmatite is a mixture of medium- to coarse-grained white albite and gray quartz with slightly warped books of pale rum-colored mica and corrugated books of colorless to pale brownish green mica (Stoll, 1950).

3.35.3 Site History

Stoll (1950, p. 48) noted:
The Olson mine . . . is said to have been operated about 1905 as the Scott Rogers mine. The old workings include a tunnel, cuts, and a caved shaft, situated on State land leased by George Fitzgerald, of Spokane, Wash. In the summer of 1944 the Bureau of Mines, in cutting exploratory trenches near the old surface workings, uncovered a small mica pegmatite, which was subsequently leased by Albert Olson, of Moscow, Idaho. During October and November 1944 Olson and a helper mined the deposit to a depth of about 20 feet in a small open pit. . . .

In the winter of 1944-45, after cessation of open-pit mining, Burt Clayton, of Deary, Idaho, cleaned out the tunnel and drove three raises to the north in an attempt to intersect the pegmatite exposed in the open pit. Reportedly it was encountered in one of the raises, but caving prevented the recovery of much mica. By February 1945 about a ton of crude mica had been produced from underground.
3.35.4 Environmental Conditions

3.35.4.1 Site Features

The Olson Mine was visited by John Kauffman on July 12, 1999. A video segment describing the property is on Clearwater National Forest Videotape (Tape 3, index 00:40:09-00:45:19). Documenting photograph is Roll K7, frame 13.

Stoll (1950) showed an adit, a long trench, and a caved shaft at the Olson Mine (Figure 3.35-2). The waste dump of the adit is obvious, but no indication of the opening remains. The dump extends out to the northwest, with southwest and northeast lobes (Figures 3.35-3 and 3.35-4). The northeast lobe is the longer of the two, measuring 60 feet long, 8 feet wide, and 10 feet thick. The southwest lobe measures 45 feet long, 9 feet wide, and 15 feet thick. The disturbed area covers less than 0.5 acre.

The pit is about 120 feet southeast of the adit and about 50 feet higher in elevation. The brushy, open cut is approximately 100 feet long, 30 feet across, and 20 feet deep. Material from the pit has been pushed out the northwest end of the cut and piled irregularly on the south side of the pit. The caved shaft noted by Stoll (1950) was not found. The head of the pit may have sloughed back far enough to include the shaft within the area of the pit. The disturbed area covers about 0.75 acre.

3.35.4.2 Sample Locations

3.35.4.2.1 Solid Samples
No solid samples were collected.

3.35.4.2.2 Water Samples
No water samples were collected.

3.35.5 Structures
No structures were found.

3.35.6 Safety
No safety hazards were found.
Figure 3.35-1. Location of the Olson Mine, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.35-2. Map of the Olson Mine (Stoll, 1950, Figure 17).
Figure 3.35-3. Sketch of the site of the Olson adit.
Figure 3.35-4. Looking northwest across the waste dump for the Olson adit. The large trees at the center of the picture are in the notch between the two lobes (Roll K7, frame #13).
3.36 CARLSON LEASE PROSPECT (Site No. PL-60) AND LITTLE BEAR PROSPECT (Site No. PL-58)
Alternate name for the Carlson Lease—Fitzgerald-Carlson Prospect.

The Little Bear is a very minor prospect near the Carlson Lease workings. It is included here because of its proximity to the Carlson and because of its minor significance.

3.36.1 Site Location and Access (Figure 2.1-1)

These prospects are on the east side of the jeep access road to the Last Chance Mine in the NW¼ of the NW¼ of section 27, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.36-1). Access from FS Road 3848 is on the jeep road to the Last Chance. The Carlson workings begin about 100 feet up the slope from the jeep road and continue up the slope for another 250 feet; the Little Bear cuts are next to the road (Figure 3.32-2). Both prospects are on State land.

3.36.2 Geologic Features (Figure 2.2-1)

Trenching by the Bureau of Mines exposed about a dozen small pegmatite bodies, all similar in character to other pegmatites in the area (Stoll, 1950).

3.36.3 Site History

The pegmatites on the Carlson Lease, and probably those on the Little Bear property, were discovered in 1943 during extensive trenching operations by the Bureau of Mines. George Fitzgerald, of Spokane, Washington, held a State lease on the property. Dan J. Carlson and Burt Clayton, both of Deary, Idaho, obtained a sublease on the property and began mining from a small open pit in the fall of 1944 (Stoll, 1950). Little else was probably ever done on the property.

3.36.4 Environmental Conditions

3.36.4.1 Site Features

These prospects were visited by John Kauffman on July 12, 1999. No video or photographs were taken at either property.

The Carlson Lease consists of an open pit (now overgrown with brush and with the sides sloughed into the pit) and numerous trenches and cuts across the strike of pegmatite veins (Figure 3.36-2). The trenches are also overgrown with brush and very little can be seen. The disturbed area covers about 1 acre.

The Little Bear Prospect consists of a short cut along the jeep access road and a long trench that starts along the jeep road north of the cut and ends about 50 feet above the cut, a distance of
about 350 feet. The disturbed area, which is restricted to the brushy trench and short cut, is minimal.

3.36.4.2 Sample Locations

3.36.4.2.1 Solid Samples
   No solid samples were collected.

3.36.4.2.2 Water Samples
   No water samples were collected.

3.36.5 Structures
   No structures were found.

3.36.6 Safety
   No safety hazards were found.
Figure 3.36-1. Location of the Carlson Lease and Little Bear Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.36-2. Map of the open pit at the Carlson Lease (Stoll, 1950, Figure 12).
3.37 FITZGERALD PROSPECT (Site No. PL-61)

3.37.1 Site Location and Access (Figure 2.1-1)

The Fitzgerald Prospect is above FS Road 3848, in the SE¼ of the SW¼ of the NW¼ and the NE¼ of the NW¼ of the SW¼ of section 27, T. 41 N., R. 2 W., on the Deary 7.5-minute quadrangle (Figure 3.37-1). The prospect cuts are along a brushy road that splits from FS Road 3848 and traverses the nose of the ridge (Figure 3.32-2). This part of section 27 is Forest Service land.

3.37.2 Geologic Features (Figure 2.2-1)

A large pegmatite and several small pegmatites occur in the old workings and in the trenches on the property. The large pegmatite strikes N. 5° E. and dips steeply west. It may be 900 feet long and up to 90 feet wide (Stoll, 1950).

3.37.3 Site History

Stoll (1950, p. 27) noted:

[Land leased from the State by George Fitzgerald, of Spokane, Wash., was extensively trenched by the Bureau of Mines in 1943. (See pl. 1 [Figure 3.32-2].) O. H. Gleason and C. Ward, of Lewiston, Idaho, held a sublease on the property at that time.

Stoll (1950) also mentioned “old workings,” but did not elaborate on their history.

3.37.4 Environmental Conditions

3.37.4.1 Site Features

The Fitzgerald Prospect was visited by John Kauffman on July 12, 1999. A video segment describing the property is on Clearwater National Forest Videotape (Tape 3, index 00:45:22-00:47:17). No photographs were taken at this site.

A series of old trenches are cut across the slope along the brushy access road and between the access road and FS Road 3848. According to Stoll (1950, p. 27-28), these trenches were along a north-south-trending pegmatite zone that was exposed in the old workings. The sides of the trenches are sloughed into the cuts, and the trenches are covered with brush. A pit 10 feet across and 5 feet deep remains near the location of the old tunnel reported by Stoll (Figure 3.37-2). The area covered by the trenches encompasses several acres, but the disturbance is minimal.
3.37.4.2 Sample Locations

3.37.4.2.1 Solid Samples
No solid samples were collected.

3.37.4.2.2 Water Samples
No water samples were collected

3.37.5 Structures
No structures were found.

3.37.6 Safety
No safety hazards were found.
Figure 3.37-1. Location of the Fitzgerald Prospect, Latah County, Idaho (U.S. Geological Survey Deary 7.5-minute topographic map).
Figure 3.37-2. Sketch of the Fitzgerald Prospect.
3.38 STEELSMITH PROPERTY (Site No. PL-54)
Alternate names - Levi Anderson Mine; Tonopah; Murphy Lease; McDonnell Lease; Steel
Smith Mica Mine; Olson Vennigerholz; Olsen-Vennigerholz.

3.38.1 Site Location and Access (Figure 2.1-1)

The Steelsmith Property is on the southern end of the ridge separating Schwartz Creek and the
East Fork of Big Bear Creek. The workings are along the center of the south edge of section 22
and the center of the north edge of section 27, T. 41 N., R. 2 W., on the Sand Mountain 7.5-
minute quadrangle (Figure 3.38-1). Most of the workings are west of FS Road 3848 (Figure
3.38-2). Some of the old roads that split from FS Road 3848 provide vehicle access, but other
roads are brushy and can only be traversed on foot. The northern workings in section 22 are on
the boundary of State and Forest Service land, and the remainder, in section 27, are on Forest
Service land.

3.38.2 Geologic Features (Figure 2.2-1)

Country rock consists of interlayered schist and gneiss, with the foliation apparently parallel to the
original bedding. The main pegmatite is a pipe-like body plunging S. 37° W. at an angle of 50°.
The pegmatite is zoned, consisting of a quartz core, a wall zone containing muscovite and beryl,
and a border zone containing abundant black tourmaline and muscovite of scrap quality. Several
other lenses and pods of pegmatite occur on the property (Stoll, 1950).

3.38.3 Site History

Stoll (1950, p. 51) reported:

Part of the Steelsmith property was known formerly as the Levi Anderson mine
and was worked before 1910. The early production is unknown. The owners are
Robert Olson and Herman Krier, of Troy, Idaho. During 1943 and 1944 they
leased the property to Tonopah Mines, Inc., a local organization headed by O. H.
Gleason, of Moscow, Idaho, and R. Williams, of Lewiston, Idaho. A number of
miners obtained subleases to work on various parts of the property.

Concerning the subleases, Stoll (1950, p. 53) noted: “A pegmatite discovered by the Bureau of
Mines was worked on a small scale by J. D. Murphy in the summer of 1944. . . . A pegmatite that
had been worked to a small extent in early days was leased in 1944 by Finley McDonnell.”
McDonnell produced 78.31 pounds of sheet mica in 1944 and 1945 (Stoll, 1950).

3.38.4 Environmental Conditions

3.38.4.1 Site Features

The Steelsmith Property was visited by John Kauffman on July 12, 1999. A video segment
describing the property is on Clearwater National Forest Videotape (Tape 3, index 00:47:20-
01:09:23). Documenting photographs are Roll K7, frames 14-21.
The Steelsmith Property consists of numerous trenches, three adits, two large open cuts, several smaller open cuts, and a 12-foot-deep shaft (Figure 3.38-3). These include a lower adit (Adit 1, not shown on Figure 3.38-3); the McDonnell adit (Adit 2) and open cut; an upper adit (Adit 3); the Murphy Lease open cut; the Tonopah North and South cuts; and the Gleason Dike cut and shaft. Most of the workings were found, although the shallow shaft near the Gleason Dike could not be located and may have been covered.

Adit 1, Stoll’s (1950) lower adit, is below FS Road 3848 and is the northernmost of the workings on the property. It is 50-70 feet down the slope from a State land boundary marker on the edge of the road (Figure 3.38-4). A trough 15-20 feet long leads to a small opening into the adit (Figure 3.38-5). The opening measures 3½ feet wide and 1½ feet high (Figure 3.38-6). Above the opening, a steeply dipping pegmatite is exposed parallel to the bedding of the schist. On the north side of the entrance to the trough is a low rock retaining wall (Figure 3.38-7). An old, brushy road, possibly an access road from the East Fork drainage below, goes down the slope to the north from the top of the waste dump near the retaining wall. The dump measures 45 feet long, 30 feet wide, and 25 feet thick (Figure 3.38-8).

Adit 2, on the McDonnell Lease, is due south of Adit 1 and above FS Road 3848 along the State land boundary. The caved adit is below the access road to the property. The waste dump measures 45 feet long, 30 feet wide, and 15 feet thick. A collapsed shed is on the southeast edge of the dump beside the adit (Figure 3.38-9). Across the access road south of the adit, a long cut 15-20 feet deep and 25 feet across extends southward for at least 100 feet. The cut becomes shallower after about 50 feet.

A small wooden hut with a hinged door is along the road to Adit 3 (Figure 3.38-10). A pit or cut behind the hut may be a caved adit, but no waste dump was found. The hut may have been for storage.

Adit 3, Stoll’s (1950) upper tunnel, is on the southeast side of the property (Figure 3.38-11) at an elevation of about 4,050 feet. The caved adit forms a notch 15 feet up the slope. The waste dump has two coalescing lobes that extend 50 feet from the center of the road to the face (Figure 3.38-12). The dump is about 40 feet wide and 20 feet thick. Above Adit 3 to the west are the cuts on the Gleason Dike. The 12-foot-deep shaft shown on Stoll’s (1950) map (Figure 3.38-3) was not found. The waste piles are overgrown but discernable.

The Tonopah North and South cuts are both deep V-shaped notches, with sloughed sides and overgrown with brush. The excavated material was pushed out the northwest ends into large “dumps.” The Murphy Lease pit is a north-south trending trench, also overgrown by brush and with sloughed sides.

The Steelsmith property encompasses about 20-25 acres, although the total disturbed area is probably less than 5 acres.
3.38.4.2 Sample Locations

3.38.4.2.1 Solid Samples
   No solid samples were collected.

3.38.4.2.2 Water Samples
   No water samples were collected.

3.38.5 Structures

A collapsed shed or small cabin was found at Adit 2. The small wooden hut along the access road to Adit 3, possibly a storage compartment, was the only other structure found. The building shown on Stoll’s (1950) map at Adit 3 no longer exists.

3.38.6 Safety

Adit 1 has a small opening that could easily be enlarged to gain entry. The adit is near FS Road 3848, a road that receives a substantial amount of recreational use. The Tonopah North and South cuts, although deep, have had sufficient material slough into the trenches that they are not a significant hazard.
Figure 3.38-1. Location of the Steelsmith Property, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.38-2. Map showing the location of the access roads and workings at the Steelsmith Property (Stoll, 1950, Plate 1). Only the section of Stoll’s (1950) map surrounding the Steelsmith property is shown in this figure.
Figure 3.38-3. Map of the Steelsmith Property workings (Stoll, 1950, Plate 9). Adit 1, the lower tunnel, is not shown on this map.
Figure 3.38-4. Sketch of Adit 1 (lower tunnel) and Adit 2 (McDonnell Lease adit) at the Steelsmith Property.
Figure 3.38-5. Trough in front of Adit 1 at the Steelsmith Property, looking southwest (Roll K7, frame #14).

Figure 3.38-6. Close-up of the opening into Adit 1 at the Steelsmith Property. The steeply dipping pegmatite, about 1 foot wide, is intruded parallel to the bedding of the schist (Roll K7, frame #17).
Figure 3.38-7. Low rock retaining wall constructed on the west side of the entrance to Adit 1 at the Steelsmith Property (Roll K7, frame #15).

Figure 3.38-8. Looking northwest at the side of the waste dump for Adit 1 at the Steelsmith Property (Roll K7, frame #16).
Figure 3.38-9. Collapsed shed or small cabin at Adit 2 of the Steelsmith Property, looking southeast (Roll K7, frame #19).

Figure 3.38-10. Small wooden structure along the access road to Adit 3 at the Steelsmith Property. A shallow cut is behind the structure. Although it has the appearance of an entrance to an adit, no waste dump is associated with the structure. It may have been a small storage compartment (Roll K7, frame #20).
Figure 3.38-11. Sketch of Adit 3 and nearby features at the Steelsmith Property.
Figure 3.38-12. Looking southeast across the surface of the waste dump for Adit 3 at the Steelsmith Property (Roll K7, frame #21).
3.39 SUNSHINE PROSPECT (Site No. PL-42)

3.39.1 Site Location and Access (Figure 2.1-1)

The Sunshine Prospect is along FS Trail 330 about ¼ mile south of Mica Mountain (misidentified as Mice Mountain on the topographic map), in the NW¼ of the SE¼ of the NE¼ of section 15, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.39-1). Access is on FS Road 3848, which ends in the saddle north of the Muscovite Mine. From the saddle, the prospect is about 1 mile north on Trail 330 by foot or all-terrain vehicle. The prospect is on Forest Service land.

3.39.2 Geologic Features (Figure 2.2-1)

The pegmatite consists of intergrown gray quartz, feldspar, muscovite, and black tourmaline parallel to the foliation of the country rock, which is a fine-grained gray muscovite schist. The central part of the pegmatite is intergrown quartz and feldspar with books of pale-yellow muscovite and a few small tourmaline crystals, whereas the borders are richer in quartz and muscovite and contain large crystals of fractured schorl (Stoll, 1950).

3.39.3 Site History

The property was owned by David Peterson when the property was visited in 1910 (Sterrett, 1913). In 1942, the property was leased by Victory Metals, Inc., of Salt Lake City, Utah (Stoll, 1950).

3.39.4 Environmental Conditions

3.39.4.1 Site Features

The Sunshine Prospect was visited by John Kauffman on July 13, 1999. A video segment describing the property is on Clearwater National Forest Videotape (Tape 3, index 01:00:28-01:15:02). Documenting photographs are Roll K7, frames 22-23.

In the early 1940s, an inaccessible shaft, a pit, and an open cut were at the Sunshine Prospect (Stoll, 1950). A pit, two trenches, and a short prospect were found. The pit may be the caved shaft, although it does not quite match the description given by Stoll (1950).

The pit and two trenches are located about 100 feet northeast of a section marker on a tree along FS Trail 330 (Figure 3.39-2). All three are a few feet from the west side of the trail. The pit is 7 feet in diameter and 8 feet deep, with moderately steep sides. It is difficult to see in the dense brush along the trail (Figure 3.39-3). One trench is north of the pit and one is to the south. Both are extremely brushy and can barely be seen. They are estimated to be 50-75 feet in length and a maximum of 7 feet deep. Pegmatite fragments are scattered nearby along the trail.
South of the pit and trenches and about 50-75 feet east of and below Trail 330 is a short prospect cut along an outcropping of the pegmatite (Figure 3.39-4). No other workings were found.

The disturbed area of these workings covers less than 0.5 acre.

3.39.4.2 Sample Locations

3.39.4.2.1 Solid Samples
   No solid samples were collected.

3.39.4.2.2 Water Samples
   No water samples were collected.

3.39.5 Structures
   No structures were found.

3.39.6 Safety

The pit along Trail 330 is steep-sided and deep enough to be considered a hazard. It is extremely difficult to see in the brush. Trail 330 receives a moderate amount of use by all-terrain-vehicle and mountain-bike enthusiasts, and by hikers and hunters.
Figure 3.39-1. Location of the Sunshine Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.39-2. Sketch of the Sunshine Prospect.
Figure 3.39-3. Pit in the brush along FS Trail 330. This may be the caved shaft noted by Stoll (1950) at the Sunshine Prospect (Roll K7, frame #22).
Figure 3.39-4. Short cut along an outcropping of the pegmatite on the slope east of FS Trail 330 at the Sunshine Prospect. The trail is on the ridge top about where the tree line crosses the top of the picture (Roll K7, frame #23).
3.40 MORNING STAR PROSPECT (Site No. PL-44)

3.40.1 Site Location and Access (Figure 2.1-1)

The Morning Star Prospect is on the steep east-facing slope of the ridge extending south from Mica Mountain in the NW¼ of the SE¼ of section 15, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.40-1). The upper adit is accessible by foot from FS Trail 330 and is about 100 feet down the steep slope from the trail. The lower adit is about 400 feet in elevation below and southeast of the upper tunnel. An old, brushy access road may lead to this site from the trail up the East Fork of Big Bear Creek. The Morning Star workings are on Forest Service land.

3.40.2 Geologic Features (Figure 2.2-1)

A large pegmatite crops out over a length of 1,000 feet along the ridge. The pegmatite, from 10-20 feet thick, is conformable to the foliation of the muscovite schist country rock, which strikes northeast to nearly north-south and dips 65-70° NW. Several smaller pegmatites are roughly parallel to the large one. The pegmatites typically consist of quartz, feldspar, muscovite, garnet, and schorl (Stoll, 1950).

3.40.3 Site History

The Morning Star is one of several properties held around 1910 by Alexander Munro, of Moscow, Idaho. In 1911, a crosscut tunnel had been driven 660 feet under the outcrop, but was about 90 feet short of intersecting the pegmatite (Sterrett, 1913). In 1942, the property was held by Victory Metals, Inc., of Salt Lake City Utah. The lower tunnel was 880 feet long and the upper tunnel was 100 feet long (Stoll, 1950). Forrester (1942, Plate No. 4) showed underground maps of both adits (labeled tunnels “E” and “F”).

3.40.4 Environmental Conditions

3.40.4.1 Site Features

The Morning Star Prospect was visited by John Kauffman on July 13, 1999. A video segment describing the property is on Clearwater National Forest Videotape (Tape 3, index 01:15:07-01:22:56). Documenting photographs are Roll K7, frames 24-25, and Roll K8, frames 1-3.

The two adits and the small open cut reported by Stoll (1950) were found (Figure 3.40-2). Adit 1, the upper adit, is about 100 feet below the ridge crest and 40-50 feet below the small prospect pit on the open, east-facing slope. The adit is open, although it is hidden behind several large trees (Figures 3.40-3 and 3.40-4). According to Stoll (1950), the adit was 100 feet long. There is no waste dump immediately in front of the adit. All the material is about 30 feet down the steep slope from the adit and has been reworked by erosion along a small gully (Figure 3.40-5). The disturbed area is minimal.
Adit 2 is about 400 feet in elevation below and southeast of Adit 1, just inside the brush and timber at the base of the open slope. A thick growth of ferns, weeds, and brush surrounds the entrance to the opening (Figure 3.40-6). A minor seep trickles from the adit. A low mound of rock and soil forms a dam at the entrance, backing up the water to a depth of about 2 feet inside the adit (Figure 3.40-7). The waste dump measures 35 feet from the adit to the face, 30 feet wide, and at least 30 feet thick. It is overgrown with trees and brush. The disturbed area covers less than 0.5 acre.

3.40.4.2 Sample Locations

3.40.4.2.1 Solid Samples

No solid samples were collected.

3.40.4.2.2 Water Samples

Water was collected behind the dam at the portal of Adit 2.

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<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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3.40.4.2.3 Analytical Results

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

Sample K7139901 from Adit 2 of the Morning Star Prospect exceeds the Aquatic Life Chronic standard and is within the range of the Secondary MCL for aluminum in the dissolved metals screen. In the total recoverable metals screen, sample K7139901 is within the range of the Aquatic Life Chronic standard for copper.

3.40.5 Structures

No structures were found.

3.40.6 Safety

Both adits are open, although they are not easy to find. In both, the rock appears very competent, standing open without any support timbers. The floor of Adit 2 is covered with about 2 feet of water, although this water could easily be drained by channeling it through the dam at the entrance.
Figure 3.40-1. Location of the Morning Star Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.40-2. Sketch of the Morning Star Prospect workings.
Figure 3.40-3. Looking north toward Adit 1 at the Morning Star Prospect. The opening is to the left behind the brush and trees (Roll K7, frame #24).
Figure 3.40-4. View inside open Adit 1 at the Morning Star Prospect, looking west (Roll K7, frame #25).
Figure 3.40-5. Looking southeast down the steep slope in front of Adit 1 at the Morning Star Prospect. Irregular piles of waste rock from the adit are in the small gully 30 feet below the adit (around the small trees at the center of the picture). Adit 2 is in the trees at the base of the open slope, just above the center of the frame (Roll K8, frame #1).

Figure 3.40-6. Looking west toward Adit 2 at the Morning Star Prospect. The opening is the small dark area just left of center (Roll K8, frame #2).
Figure 3.40-7. View inside Adit 2 at the Morning Star Prospect. Water covers the floor to a depth of about 2 feet (Roll K8, frame #3).
3.41 MUSCOVITE MINE (Site No. PL-46)

3.41.1 Site Location and Access (Figure 2.1-1)

The Muscovite Mine is about 1¼ miles south of Mica Mountain in the SE¼ of the NW¼, and the SW¼ of the NE¼ of section 22, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.41-1). Access is on FS Road 3848, the Mica Mountain Road. The road terminates in the saddle of the ridge just north of the mine. Several short spur roads provide access to the main pit and to the old buildings and structures. All of the workings are on private land, owned by individuals or by Bennett Tree Farms, Inc., with Forest Service land to the north, east, and south and State land to the west.

3.41.2 Geologic Features (Figure 2.2-1)

Stoll (1950, p. 36-48) described the Muscovite Mine pegmatites and workings in detail. The following description of the geology is summarized from his report.

Three major pegmatite bodies occur at the Muscovite Mine: the East, Central, and West pegmatites. All are concordant with the enclosing quartz-mica schist, which strikes about north-south and dips 50-70° W. The schist is highly altered adjacent to the pegmatites. Where unaltered, the schist is gray, well foliated, and fine to medium grained. Some garnet-rich bands occur locally. Bedding and schistosity are generally parallel, but are locally divergent. The major pegmatites are closely spaced and roughly parallel. The Central pegmatite has fine-grained border zones, wall zones containing sheet muscovite, and a central core of albite and quartz. The East and West pegmatites are complexly interlayered with the schist and consist of a series of closely spaced lenses that contain sheet muscovite and beryl.

3.41.3 Site History

The following of the history of the Muscovite Mine is from Stoll (1950, p. 37) and was drawn in part from previous reports by Sterrett (1913, 1923) and Anderson (1925):

It was first worked in 1888 by Woody and Lamb [(Sterrett, 1923)]. Later it was worked intermittently, first by the Muscovite Mica Co., of Spokane, Wash., and subsequently by Alexander Munro, of Moscow, Idaho and the Producers Mica Co., of Chicago, Ill. During the period 1910-18 several carloads of crude mica are said to have been shipped each year. Between 1918 and 1942 several attempts were made to work the mine, and a few tons of beryl are said to have been produced. According to Anderson [(1925)], 800 tons of crude book mica yielding 5 percent sheets were produced before 1910. In 1918, according to Ray W. Craine, of Avon, about 120 tons were shipped. The total production to 1942 is thus at least 920 tons of crude mica.
The Muscovite Mica Co. was incorporated in 1927. In 1928, the company reopened the old road to the property and built a new road to a proposed tunnel site, which was surveyed during the year. During 1929, 550 feet of work was done on a crosscut that intersected a 6-foot pegmatite 495 feet from the mouth of the tunnel. Muscovite Mica forfeited its corporate charter in 1932.

Thatuna Mines, Inc. (incorporated in 1942), acquired a lease and bond on the Muscovite Mine and on the nearby Atlas, Violet, and Morning Star properties. The mine was sublet to Victory Metals, Inc. (or Victory Mines, Inc.), a Utah corporation. Initial work on the property included rehabilitating the old workings and putting up camp buildings. According to Stoll (1950, p. 37):

In 1942 the mine and adjacent ground were leased by Victory Metals, Inc., later called Victory Mines, Inc. During parts of 1942 and 1943 preliminary work was done under the direction of the resident manager, Mr. Victor A. Christensen, of Salt Lake City, Utah. About October 15, 1943, mining was started on the No. 5 level in stope No. 1 and later in stope No. 2. A development program directed by Mr. Christensen opened mica-rich pegmatite in the north end of the No. 5 level. Stope No. 3 was started on this deposit and mined from April to October 1944. Subsequently, stope No. 2 was again mined. In 1945 the underground operations were carried on by C. J. Montag & Sons, contractors, of Portland, Oreg., who obtained a lease following the withdrawal of Victory Mines, Inc. Stope No. 4 was started in February and mining was in progress in May 1945. Concurrently with underground mining, C. J. Montag & Sons mined the surface showings by open-pit methods. Montag No. 1 pit was stripped and mined from November 1943 to February 1944. Mining in the main pit was started in April and continued until the end of September 1944 (pl. 8, A [omitted]). Following completion of mining in the main pit, part of the crest of the knoll near pit No. 3 was stripped and mined. Surface work was discontinued in December 1944 but resumed intermittently during 1945.

By the middle of 1944, the combined properties had seven tunnels and a total of 3,400 feet of workings. Thatuna apparently lost its lease on the Muscovite Mine soon after that, and the company forfeited its corporate charter in 1961.

The Idaho Beryllium and Mica Corporation was incorporated in 1950. This company purchased the property for $52,000 and in 1952 obtained an RFC (Reconstruction Finance Corporation) mortgage for $125,000 to build a 100-ton mill. The company's September 12, 1952, report to the Idaho Inspector of Mines noted:

Plant is expected to be completed in six weeks and the production of flour mica and roofing mica to begin at that time. Sheet Mica is now being processed at the company warehouse in Deary. Mining of cobbled mica began on April 11, 1952. Thirty-seven women are now employed at the warehouse with an expected total of 75 in the near future.
The mine had one 660-foot tunnel, but the mica was being produced from an open pit. Mica and beryl concentrates were produced from the property in 1953, and the company did 392 feet of drifting. During 1952 and 1953, the company had a Defense Minerals Exploration Administration (DMEA) contract for $28,700 to explore for additional mica reserves; the government participation in this project was 90 percent. Hand-cobbled mica and byproduct beryllium concentrate were also shipped from the Muscovite Mine in 1954. Full-trimmed and hand-cobbled mica were shipped from the property until July 1955, when the mine was closed. Idaho Beryllium and Mica forfeited its corporate charter in 1957.

Western Mica Corporation was incorporated in 1957 and acquired the Muscovite Mine at an RFC sale, apparently a foreclosure sale of Idaho Beryllium's mortgage. Several nearby properties were under lease from the State, from individuals, and from other businesses. The company produced hand-cobbled, full-trimmed, and scrap mica during the year. Ore sales through June 1958 brought in $11,500, and the company shipped mica to the government stockpile during the year. Hand-cobbled ruby muscovite was shipped from the property in 1959.

In 1960, the company changed its name to Ida-Mica Industrial Minerals, Inc. The company carried out some development during the year, but no mica was shipped. In 1961, the property was leased to Non-Metallics, Inc. (incorporated in 1961). Non-Metallics began constructing a dry recovery plant for recovering scrap mica during 1961. Scrap mica was recovered from the mine dumps and tailings at the Muscovite Mine during 1963 and 1964. In 1964, Non-Metallics reported adding a grinding circuit to reduce scrap mica to 28 mesh for the roofing industry, and the company planned to add flotation equipment to recover 1/8 to 100 mesh mica. The operation closed in 1965.

3.41.4 Environmental Conditions

3.41.4.1 Site Features

The Muscovite Mine was visited by John Kauffman on July 13, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 3, index 01:23:00-01:35:52). Documenting photographs are Roll K8, frames 4-13.

A large open pit and several caved adits comprise the main workings at the Muscovite Mine. In addition, there are several long but shallow prospect trenches and numerous pits and cuts in the vicinity. Stoll (1950, Plate 5; Figure 3.41-2) mapped the workings and associated features. Of the underground workings, only the east tunnel and the probable site of the No. 5 level were found.

The east tunnel is located on the east side of FS Road 3848, about 25-30 feet below the road (Figure 3.41-3). A tree along the east edge of the road above the tunnel has a Bennett Tree Farms, Inc., location tag. A trough extends up the slope nearly to the road, and a small slump or pit is on the west embankment of the road on strike with the adit. In the caved debris at the
mouth of the trough are a few old timbers (Figure 3.41-4). The waste dump measures 50 feet long, 30 feet wide, and 30 feet down the face, with a maximum thickness on the slope of 20 feet (Figure 3.41-5).

In the vicinity of the No. 5 adit, an iron-stained flow of water was found, presumably from the caved adit (Figure 3.41-6). However, the portal of the adit could not be found. Several structures near the No. 5 adit, in various stages of disrepair, are described below. The drainage from the adit flows over a long, flat area covered with grass and brush that is probably the waste dump, although no dimensions could be determined with any certainty. The dump most likely has been leveled and reworked for construction of the roads, screening plant, and other structures.

The open pit is much as Stoll (1950) depicted it on his map, although a few trees have begun to take hold and rock debris has sloughed into the pit (Figure 3.41-7). Large volumes of material have been pushed out from the pit and down over the slope to the south and west, forming long, irregular mounds and fingers. The pit and waste piles are scarred with recent tire tracks from trail bikes and all-terrain vehicles.

The disturbed area at the mine covers about 15-20 acres.

3.41.4.2 Sample Locations

3.41.4.2.1 Solid Samples
No solid samples were collected.

3.41.4.2.2 Water Samples
Sample K7139902 was taken from the iron-stained water flowing from the No. 5 adit.

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3.41.4.2.3 Analytical Results

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

Sample K7139902 from the No. 5 adit at the Muscovite Mine equals or exceeds the Secondary MCLs for iron, manganese, and aluminum and exceeds the Aquatic Life Chronic standard for aluminum in the dissolved metals screen. In the total recoverable metals screen, sample
K7139902 exceeds the Secondary MCLs for iron and manganese and is within the range of the Aquatic Life Chronic standard for copper.

3.41.5 Structures

Not all of the buildings shown on Stoll's (1950) map were found, and those that were found (shown in Figure 3.41-8) are in various stages of disrepair. One collapsed building is south of the portal of the No. 5 adit (Figure 3.41-9). A second structure north of the drainage from the adit, possibly an old ore bin, is partially standing (Figure 3.41-10). On the slope immediately northeast of the second structure is a third, which looks like a house or living quarters (Figure 3.41-11). The best preserved structure is the screening plant. Two large metal hoppers, each with a smaller hopper on top, are supported by a steel I-beam framework (Figures 3.41-12 and 3.41-13). Beside the hoppers is a tall wooden building that was a storage bin with loading bays underneath (Figure 3.41-14). Two additional structures, possibly ore bins, were found on an upper spur road about 100 feet up the slope from the access road to the adit. These do not appear to be shown by Stoll (1950). The remainder of the buildings on Stoll's (1950) map were not found.

3.41.6 Safety

No major safety hazards were found, although the pit presents the usual hazards of precipitous sides and falling rocks. The structures that remain standing are in disrepair and could collapse.
Figure 3.41-1. Location of the Muscovite Mine, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.41-3. Sketch of the east adit at the Muscovite Mine.
Figure 3.41-4. Old timbers in the debris at the mouth of the caved east adit at the Muscovite Mine, looking west (Roll K8, frame #4).
Figure 3.41-5. Looking southeast at the side of the waste dump for the east adit at the Muscovite Mine (Roll K8, frame #5).

Figure 3.41-6. Iron-stained water, possibly flowing from the No. 5 adit at the Muscovite Mine (Roll K8, frame #10).
Figure 3.41-7. Open pit at the Muscovite Mine, looking north (Roll K8, frame #6).
Figure 3.41-8. Sketch of the buildings found near the No. 5 adit at the Muscovite Mine.
Figure 3.41-9. Collapsed building south of the No. 5 adit at the Muscovite Mine (Roll K8, frame #7).

Figure 3.41-10. Partially standing structure, possibly an ore bin, north of the No. 5 adit at the Muscovite Mine (Roll K8, frame #8).
Figure 3.41-11. Probable living quarters on the slope above the previous structure, looking northeast (Roll K8, frame #9).
Figure 3.41-12. Large hoppers for the screening plant at the Muscovite Mine, looking northeast (Roll K8, frame #12).
Figure 3.41-13. Another view of the hoppers at the Muscovite Mine, looking southeast. The peak of the roof of the wooden building beside the hoppers can be seen through the trees just left of center of the picture (Roll K8, frame #11).
Figure 3.41-14. Lower part of the wooden building beside the hoppers at the Muscovite Mine. Openings in the floor probably fed mica into the loading bays underneath (Roll K8, frame #13).
3.42 LUCKY JIM PROSPECT (Site No. PL-43)  
Alternate names—J. H. Nesbit Prospect; Olsen.

3.42.1 Site Location and Access (Figure 2.1-1)  
The Lucky Jim Prospect is on the nose of the ridge extending southeast from Mica Mountain, in the SW¼ of the NW¼ of section 14, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.42-1). The workings are just east of FS Trail 330 at an elevation of 4,200-4,250 feet. The property can be reached by foot or all-terrain vehicle on Trail 330 from roads in either the upper Big Sand Creek or the East Fork of Big Bear Creek drainages. The prospect is on Forest Service land.

3.42.2 Geologic Features (Figure 2.2-1)  
Two pegmatite lenses and several smaller parallel bodies occur at the Lucky Jim Prospect. The northern of the two consists of a core of white quartz and a feldspathic wall zone containing scrap mica. The southern pegmatite consists almost entirely of medium-grained plagioclase, muscovite, and quartz. It ranges from less than 1 foot to about 20 feet thick (Stoll, 1950).

3.42.3 Site History  
An early name for the property was the J. H. Nesbit Prospect. Old workings included a tunnel and a caved shaft. In the winter of 1943-1944, Fred Lundsford and Ray Craine, of Avon, produced a few pounds of sheet mica from the tunnel. During the summer of 1944, the Bureau of Mines stripped and trenched the area near the old tunnel and shaft (Stoll, 1950). Hand-cobbled mica was produced from the mine in 1962.

3.42.4 Environmental Conditions  

3.42.4.1 Site Features  
The Lucky Jim Prospect was visited by John Kauffman on July 14, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 3, index 01:35:56-01:45:09). Documenting photographs are Roll K8, frames 14-20.

The prospect consists of several bulldozer cuts, a caved shaft, and a nearly caved adit (Figure 3.42-2). An area about 100 feet long and 100 feet wide has been bulldozed on the ridge top, forming a large flat with a rim of waste rock. Near the south side of the flat area is a pit that may be the caved shaft (Figure 3.42-3). On the slope below the shaft and the flat area is a trench about 150 feet in length (Figure 3.42-4). Soil and forest litter have sloughed into the trench, providing support for small trees and low brush. Below this trench are two short, connecting trenches, and below those is the adit.
The adit has collapsed for the first 30 feet, forming a V-shaped trough (Figure 3.42-5). At the head of the caved zone is a small, triangular opening that appears to continue into the adit (Figure 3.42-6). The opening is 3 feet wide and 1½ feet high. Rails extend from beneath the caved debris to the face of the waste dump (Figure 3.42-7). A pile of twisted cable is near the mouth of the adit. The dump measures 50 feet long, 30 feet wide, and about 10 feet thick. It is overgrown with saplings, small trees, and brush (Figure 3.42-8).

Approximately ¼ mile south of the prospect is an old boiler with two piston drives, probably a steam-driven compressor (Figure 3.42-9). The boiler is 200 feet west of the junction of FS Trail 330 and the trail that comes up the East Fork of Big Bear Creek. A shallow, water-filled pit near the compressor may have been a prospect pit. It is not known if the boiler is related to the Lucky Jim Prospect.

3.42.4.2 Sample Locations

3.42.4.2.1 Solid Samples
No solid samples were collected.

3.42.4.2.2 Water Samples
No water samples were collected.

3.42.5 Structures
No structures were found.

3.42.6 Safety

The small opening at the adit could be enlarged to gain entry. Although the nearby trail receives a moderate amount of recreational use, the adit is not obvious and few individuals are likely to find the site.
Figure 3.42-1. Location of the Lucky Jim Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.42-2. Map of the Lucky Jim Prospect workings (Stoll, 1950, Figure 14).
Figure 3.42-3. Pit of the caved shaft at the Lucky Jim Prospect. The outcrop is a large pegmatite body (Roll K8, frame #14).

Figure 3.42-4. Long bulldozer trench on the slope below the shaft at the Lucky Jim Prospect, looking west (Roll K8, frame #15).
Figure 3.42-5. Looking north up the trough of the caved portion of the adit at the Lucky Jim Prospect (Roll K8, frame #16).

Figure 3.42-6. Close-up of the small opening into the adit at the Lucky Jim Prospect (Roll K8, frame #19).
Figure 3.42-7. Looking southwest at the rails on the waste dump at the Lucky Jim Prospect (Roll K8, frame #17).

Figure 3.42-8. Brushy face of the waste dump at the Lucky Jim Prospect, looking east (Roll K8, frame #18).
Figure 3.42-9. Old compressor ¼ mile south of the Lucky Jim Prospect. Note the piston drive at the base. The trail from the East Fork of Big Bear Creek is at the bottom of the picture. FS Trail 330 is about 200 feet up the trail to the right (Roll K8, frame #20).
3.43 LINDQUIST PROSPECT (Site No. PL-45)
Alternate names—Munro Mill Prospect; Avon Prospect; Monroe Mill Prospect.

3.43.1 Site Location and Access (Figure 2.1-1)

The Lindquist Prospect is near the head of the East Fork of Big Bear Creek in the SE¼ of the SE¼ of section 15, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.43-1). From State Highway 9, the prospect can be reached by following FS Road 3347 about 4 miles east from the highway, then traveling north on FS Road 3803. Road 3803 is washed out about 2 miles from Road 3347 and becomes an all-terrain-vehicle trail. The prospect is about ¾-1 mile north of the washout and is along the creek below the trail. A short, brushy spur road leads from the trail to the workings, which are on Forest Service land.

3.43.2 Geologic Features (Figure 2.2-1)

Several pegmatite lenses and bodies are on the east side of the drainage. The pegmatites contain quartz, feldspar, muscovite, and schorl. The muscovite is typically small and of poor quality. A series of similar pegmatites were exposed in trenches cut by the Bureau of Mines in the 1940s on the west side of the drainage. The pegmatites are roughly parallel to the schistosity of the northerly striking, westerly dipping mica schist (Stoll, 1950).

3.43.3 Site History

The Lindquist was formerly known as the Munro Mill Prospect or the Avon Prospect. It was possibly worked by Alexander Munro in the early 1900s (Stoll, 1950). Stoll (1950, p. 30-31) also reported:

J. H. Nesbit, of Avon, worked the prospect about 1923, but no mica is known to have been produced. The property, including two buildings, was acquired in 1944 by E. R. Lindquist. A little mining and development was done by the owner during the summer and fall of 1944, but only a few pounds of sheet mica were produced. . . .

Numerous bulldozer trenches cut by the Bureau of Mines have exposed several small pegmatites directly above the north end of the tunnel, and several larger pegmatites were partly uncovered on the west side of the valley. In one of the bodies on the west side of the valley Lindquist excavated a small pit, the South cut.

The prospect has probably been idle since the 1940s.
3.43.4 Environmental Conditions

3.43.4.1 Site Features

The Lindquist Prospect was visited by John Kauffman on July 14, 1999. A video segment describing the property is on Clearwater National Forest Videotape (Tape 3, index 01:45:14-01:53:30). Documenting photograph is Roll K8, frame 21.

The property is much as Stoll (1950) described it, consisting of an adit, the north cut and trenches, and the south cut with numerous associated trenches (Figure 3.43-2). The north cut is along a small tributary drainage of the East Fork and is about 75 feet below the East Fork trail. This excavation into a pegmatite outcrop is shallow and the sides have sloughed into the cut (Figure 3.43-3). Not shown on Stoll’s (1950) map (Figure 3.43-2) is a long trench on the slope just above the cut. The disturbed area is minimal.

About 200 feet south of the north cut is the adit, which is along the east side of the East Fork. The adit is completely caved and has a very minor seep of less than 0.1 gallon per minute. The water contains a small amount of iron oxide staining. The waste dump was built out to the south parallel to the creek (dry at the time of the site visit) and measures 70 feet long, 10-12 feet wide, and 8 feet thick. About 100 feet above the adit is another shallow trench, and a small prospect cut is 100 feet north of the adit along the creek. Other trenches are also in the vicinity. The disturbed area is less than 0.5 acre.

The south cut is about 900 feet south of the adit on the west side of the valley, and numerous trenches cut by the U.S. Bureau of Mines are in the same area (Stoll, 1950). Overburden and forest litter have sloughed into all of these trenches and cuts, although some pegmatite dike fragments can be found in and near the cuts. Several of the trenches have excavated pits or deeper cuts, but it could not be determined which of these corresponds to Stoll’s (1950) south cut. The disturbed area, covering several acres, is overgrown and of little significance.

3.43.4.2 Sample Locations

3.43.4.2.1 Solid Samples

No solid samples were collected.

3.43.4.2.2 Water Samples

Sample K7149901 was collected from the minor seep at the Lindquist adit.

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<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>&lt;0.1</td>
<td>Yes</td>
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</table>

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3.43.4.2.3 Analytical Results

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

Sample K7149901 from the seep at the Lindquist adit equals or exceeds the Secondary MCLs for iron and manganese, the Secondary MCL and the Aquatic Life Chronic standard for aluminum, and both Aquatic Life standards for copper. In the total recoverable metals screen, sample K7149901 exceeds the Secondary MCLs for iron and manganese, and is within the range of the Aquatic Life Chronic standard for copper.

3.43.5 Structures

Stoll (1950, Figure 13) showed two buildings on the west side of the East Fork across the creek from the adit. This area is open and grassy with a few old boards and some scrap metal, but neither building is standing.

3.43.6 Safety

No safety hazards were found.
Figure 3.43-1. Location of the Lindquist Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.43-2. Map of the northern workings of the Lindquist Prospect (Stoll, 1950, Figure 13).
Figure 3.43-3. Looking northeast at the pegmatite outcrop above the north cut at the Lindquist Prospect (Roll K8, frame #21).
3.44 DOERR PROSPECT (Site No. PL-52) AND GILLIS LEASE (Site No. PL-53)
Alternate names for the Doerr Prospect—Bentz claim; Doer Mine.

3.44.1 Site Location and Access (Figure 2.1-1)

These adjoining prospects are along a northwest-southeast-trending tributary of the East Fork of Big Bear Creek, in the E½ of the E½ of the SE¼ of section 22, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.44-1). The site marked as the “Doer Mine” on the topographic map is about ¼ mile west of its actual location. Access from State Highway 9 is on FS Road 3347 about 4 miles east to FS Road 3803, then north on Road 3803 about 1 mile. A trail that splits off the west side of Road 3803 leads to the property. An old bulldozer road follows the nose of the ridge from the East Fork to the upper workings. Most of the old cuts appear to be on land owned by Bennett Tree Farms, Inc., although the lower workings, including a caved adit, may be on Forest Service land.

3.44.2 Geologic Features (Figure 2.2-1)

Stoll (1950, p. 27) reported the geology as follows:
A series of pegmatites is exposed over a north-south distance of more than 1,200 feet. Most of the pegmatites, including all the larger ones, are lenses that strike northward and dip westward, parallel to the enclosing schist. A few narrow dikes break across the schistosity.

The country rock is gray to silvery-white medium-grained strongly foliated muscovite-biotite-quartz schist interbedded with thin layers of finer-grained harder mica gneiss. The foliation is parallel to the bedding. The rocks strike nearly due north and dip from 50° W. to vertical, the average dip being about 70° W. Large differences from the average strike and dip were observed locally.

3.44.3 Site History

Stoll (1950, p. 26) reported:
The Doerr property was located in 1914 as the Bentz claim and was worked for 3 years by the Washington Mica Co., of which A. H. Bentz, of Spokane, Wash., was president. During the operation, according to Bentz, several 40-ton carloads of crude mica were mined and hauled by wagons and sleighs to Avon for rail shipment.

Washington Mica was incorporated in 1921. In that year, the mine had two tunnels (but the company reported lengths of 350 feet, 75 feet, and 50 feet) and a 30-foot shaft. George H. Doerr was the secretary and A. H. Bentz was the president. The property was purchased from the State for $1,200. Washington Mica did little work on the property and later listed the workings as one 360-foot tunnel and one 40-foot vertical shaft. The company forfeited its corporate charter in 1927.
Concerning later developments on the property, Stoll (1950, p. 26-27) noted:
In succeeding years, several attempts at operation were made and a little mica is said to have been produced in 1927. Later the Bentz claim was acquired by the present owner, Mrs. Janett Doerr, of Spokane, Wash. In 1943 the Doerr property was leased by Frank Eichelberger, mining engineer of Spokane, and C. J. Montag & Sons, contractors of Portland, Oreg. The land adjoining the Doerr property on the south was leased from the State by Don Gillis of Spokane....

In the fall of 1943 C. J. Montag & Sons, using a power shovel and angledozer, dug six open pits on the crest of the ridge. Cut No. 2, the only one from which appreciable amounts of mica were produced, was excavated on the site of an old raise on the outcrop of the same pegmatite that had been mined from the upper tunnel in the early operation.

The Bureau of Mines made about 2,500 feet of angledozer trenches north of the ridge in 1943. Trenching was also done on the Gillis lease. In 1944, Montag & Sons drove an extension of the old lower tunnel in an unsuccessful effort to intersect the pegmatite exposed in the No. 2 cut (Stoll, 1950).

Judging from the size of the trees and the condition of the pits, little or no work has been done on the property since the 1940s.

3.44.4 Environmental Conditions

3.44.4.1 Site Features

The Doerr Prospect and the Gillis Lease were visited by John Kauffman on July 15, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 4, index 00:00:37-00:08:47). Documenting photographs are Roll K8, frames 22-23.

The prospect consists of numerous bulldozer trenches on the north side of the ridge, six open pits or large cuts on the crest and south flank of the ridge, and three old adits (Figure 3.44-2). All of the adits, driven prior to 1920, are caved or were destroyed by later pit excavations. The lower adit has a minor iron-stained seep (Figure 3.44-3) and a two-lobed waste dump (Figure 3.44-4). The dump is a maximum of 40 feet long, 25 feet wide, and 5-10 feet thick. Debris has sloughed into all of the large open pits, and these cuts are overgrown with small trees and brush. The excavated material from the pits has been pushed out into irregular waste dumps on the slope below the workings. The trenches on the north side of the ridge are also debris filled and overgrown. The disturbed area of the original cuts covers about 6-10 acres.

3.44.4.2 Sample Locations

3.44.4.2.1 Solid Samples

No solid samples were collected.
3.44.4.2.2 Water Samples

Although the lower adit had a minor seep, the volume was extremely small, resulting in a stagnant pool that was too shallow to sample. The seep is well above the intermittent creek in the drainage below the adit.

3.44.5 Structures

A collapsed cabin was found at the site shown as the “Old camp” on Stoll’s (1950, Plate 2) map of the workings (Figure 3.44-2). Old boards, pieces of an old wood stove, and other metal scrap are at the site, which is on a low saddle along the ridge crest. Nothing was found at the site labeled “New camp” on Stoll’s (1950) map (Figure 3.44-2).

3.44.6 Safety

No significant safety hazards were found, although some of the old cuts do have relatively steep headwalls. Few people other than hunters are likely to encounter these workings.
Figure 3.44-1. Location of the Doerr Prospect and Gillis Lease, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map).
Figure 3.44-2. Map of the Doerr Prospect and Gillis Lease workings (Stoll, 1950, Plate 2).
Figure 3.44-3. Iron-stained seep at the lower adit, which is on the Gillis Lease (Roll K8, frame #22).

Figure 3.44-4. Looking southwest across the top of the two-lobed waste dump of the lower adit, which is on the Gillis Lease (Roll K8, frame #23).
3.45 BONAMI PROSPECT (Site No. K8319901)

3.45.1 Site Location and Access (Figure 2.1-1)

The Bonami Prospect is on the ridge north of Bonami Creek in the SE¼ of the SE¼ of the SW¼ of section 5, T. 41 N., R. 2 W., on the Sand Mountain 7.5-minute quadrangle (Figure 3.45-1). A prospect pit on the southern extension of the vein is in the NE¼ of the NE¼ of the NW¼ of section 8. These workings are to the west of the mine adit symbols on the topographic map; nothing was found at either of sites marked by these symbols. Likewise, nothing was found at the site on Little Sand Creek on the Clearwater National Forest map which was labeled the Bonami No. 1. Access is on FS Road 292 along Little Sand Creek to Bonami Creek, then northeast up Bonami Creek about ½ mile to where a logging road cuts back up the slope to the northwest. About ½ mile up the logging road, it switches back to the east. At the switchback, a brushy access road with a narrow, brush-free pathway heads northeast. The adit is on this path about 1,200 feet from the switchback. The Bonami workings are on Forest Service land.

3.45.2 Geologic Features (Figure 2.2-1)

The prospect is in quartzite units of the Striped Peak Formation of the Belt Supergroup (Rember and Bennett, 1979). A heavily oxidized quartz vein, up to about 10 feet wide, trends north-south across the ridge.

3.45.3 Site History

Nothing is known about the history of this site.

3.45.4 Environmental Conditions

3.45.4.1 Site Features

The Bonami Prospect was visited by John Kauffman on August 31, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 4, index 00:08:50-00:14:58). Documenting photographs are Roll K21, frames 9-12.

Only one adit and a shallow prospect pit were found at this site (Figure 3.45-2). The adit is nearly caved (Figure 3.45-3), although there is a small opening that may provide access to the workings (Figure 3.45-4). Mr. Vern Bretz of the Clearwater National Forest noted that the adit had been dynamited by the Forest Service. A piece of white PVC drain pipe was visible inside the adit in the caved rubble. The waste dump is 50 feet long, 25 feet wide, and 25 feet thick (Figure 3.45-5). A dense stand of small trees is growing on the dump. Some old cedar posts are stacked along the access road on the northeast end of the dump (Figure 3.45-6). The disturbed area covers about 0.5 acre.
The vein can be traced from the adit southward across the ridge to the logging road. A shallow pit on the north side of the road was the only other excavation found in the area. The disturbed area at this site is insignificant.

3.45.4.2 Sample Locations

3.45.4.2.1 Solid Samples
   No solid samples were collected.

3.45.4.2.2 Water Samples
   No water samples were collected.

3.45.5 Structures

About 250 feet to the northeast from the adit along the access trail are some old boards, a bed frame, and other scrap metal, probably marking the site of a small cabin.

3.45.6 Safety

Although the adit was dynamited, there appears to be a small opening that could be enlarged to gain entry into the workings. The trail to the adit is not obvious from the logging road, so visitors to the site are unlikely, except for hunters or prospectors.
Figure 3.45-1. Location of the Bonami Prospect, Latah County, Idaho (U.S. Geological Survey Sand Mountain 7.5-minute topographic map). The adit symbols on the topographic map are incorrectly located.
Figure 3.45-2. Sketch of the Bonami Prospect.
Figure 3.45-3. Looking southeast at the dynamited portal of the Bonami adit (Roll K21, frame #9).

Figure 3.45-4. Close-up of the small opening into the Bonami adit (Roll K21, frame #10).
Figure 3.45-5. Side view of the waste dump at the Bonami Prospect, looking northeast (Roll K21, frame #12).

Figure 3.45-6. Pile of old cedar posts along the brushy access road on the northeast side of the Bonami waste dump (Roll K21, frame #11).
3.46 SILVER KING MINE (Site No. PL-77)
Alternate name—Jennifer.

3.46.1 Site Location and Access (Figure 2.1-1)

The Silver King Mine is on Ruby Creek, in the SE¼ of the NE¼ of the SE¼ of section 16, T. 40 N., R. 1 E., on the McGary Butte 7.5-minute quadrangle (Figure 3.46-1). One minor prospect was found at the site marked on the topographic map. The prospect is about 100 feet north of State Highway 8 on the east side of a minor gulley, either on State land or on Bennett Tree Farms, Inc., land.

3.46.2 Geologic Features (Figure 2.2-1)

Country rocks consist of metasedimentary units of the Wallace Formation of the Belt Supergroup (Rember and Bennett, 1979). No information is available on the mineralization at the Silver King.

3.46.3 Site History

Anderson (1930) noted that the Silver King was an old gold property that had not been worked for many years. J. H. McCoy, who operated a placer on Ruby Creek, discovered the Silver King in 1889 and became Idaho’s first millionaire by producing $78 million worth of ore from the mine. The Silver King operated continuously until 1929 when an earthquake altered the stream’s course and flooded the shaft (IGS mineral property files). The amount of ore reportedly taken from the mine seems unlikely, considering the lack of other profitable operations in the area.

3.46.4 Environmental Conditions

3.46.4.1 Site Features

The Silver King Mine was visited by John Kauffman on July 15, 1999. No video or photographs were taken at this site.

Only a very minor cut or caved adit and a small waste dump were found about 150 feet north of Highway 8 (Figure 3.46-2). This prospect is very close to where the mine symbol is shown on the topographic map. The waste dump measures 15 feet long, 10 feet wide, and 6 feet thick. If other workings are in the area, they were not found. This includes the shaft, noted in the “Site History” section above, which was obviously somewhere near the creek. Any additional workings may have been destroyed by construction of the highway. The disturbed area is insignificant.

Shallow prospect pits on the top and north flank of the ridge located to the north of this site may be associated with the Silver King, or with either the Gold Hunter (PL-76) or Gold Eagle (PL-75) prospects. No additional workings were found in the vicinity of those prospects.
3.46.4.2 Sample Locations

3.46.4.2.1 Solid Samples
   No solid samples were collected.

3.46.4.2.2 Water Samples
   No water samples were collected.

3.46.5 Structures
   No structures were found.

3.46.6 Safety
   No safety hazards were found.
Figure 3.46-1. Location of the Silver King Mine, Latah County, Idaho (U.S. Geological Survey McGary Butte 7.5-minute topographic map).
Figure 3.46-2. Sketch of the minor prospect at the Silver King Mine.
3.47 RUBY CREEK MINE (Site No. PL-80)
Alternate name—South Bell Group.

3.47.1 Site Location and Access (Figure 2.1-1)

The Ruby Creek Mine is approximately 1 mile up the north branch of Ruby Creek in the NE¼ and NW¼ of the NE¼ of the SE¼ of section 14, T. 40 N., R. 1 E., on the McGary Butte 7.5-minute quadrangle (Figure 3.47-1). Access from State Highway 8 is north about ¾ mile on a gated access road, then another ¼ mile to the property on a slash-covered road along the bottom edge of a recent clear-cut. The workings are on BLM land, according to the Forest Service map of the Clearwater National Forest.

3.47.2 Geologic Features (Figure 2.2-1)

The Ruby Creek Mine is in rocks of the Wallace Formation (Rember and Bennett, 1979). The country rock near the mine is mostly quartzite. Granitic intrusions related to the Idaho batholith and a number of diorite dikes occur in the vicinity. Mineralization consists of fissure fillings, with the vein striking about N. 40° W. and dipping 70-75° NE. Mineralogy of the veins consists of sulfides in a carbonate and quartz gangue. Sphalerite is the main ore mineral, with subordinate amounts of galena, chalcopryite, tetrahedrite, and pyrite. Gangue minerals include quartz, siderite, and calcite (Miller, 1936).

3.47.3 Site History

The following information on the Ruby Creek district is from Miller (1936, p. 3):

Mining began in the Ruby Creek district in 1885, when J. H. McCoy operated a placer. Considerable interest was manifested in the district, then without roads, during the next four or five years. A little gold was taken from the gravels at the lower end of Ruby Creek. So far as was learned, however, the only placer operated at a profit was that of Henry Ables on Placer Creek, which enters Ruby Creek from the south near the western edge of the district.

The Ruby Creek Mining Company was incorporated in 1925. According to the company, the mine buildings had been constructed in 1916. By 1926, the property had one 30-foot tunnel and one 171-foot shaft. By 1928, the mine had 901 feet of development, including a 665-foot tunnel and two intermediate levels driven from the 171-foot shaft. In 1930, two additional tunnels (100 feet and 190 feet) were started, bringing the total on the property up to three. In addition, a 150-tpd oil flotation mill was under construction. By the middle of 1931, the property had five tunnels. The mill was still incomplete, with the flotation cells waiting to be installed. Miller (1936) reported the mine ceased operations in 1930, so it appears the mill was never operated. Ruby Creek Mining forfeited its corporate charter in 1932. The property was apparently restaked, probably in the 1950s, as the South Bell Group (IGS mineral property files).
3.47.4 Environmental Conditions

3.47.4.1 Site Features

The Ruby Creek Mine was visited by John Kauffman on July 15, 1999. A video segment describing the property is on Clearwater National Forest Videotape (Tape 4, index 00:15:02-00:25:23). Documenting photographs are Roll K8, frames 24-25, and Roll K9, frames 1-5.

The workings consist of two adits and a shaft on the north side of the creek (Figures 3.47-2 and 3.47-3). Adit 1, the lower tunnel, is described by Anderson (1930) as a 670-foot crosscut that never reached the vein. A damp area in front of the adit indicates a minor seep. The hill has slumped over the portal (Figure 3.47-4), but a small opening at the top of the slump goes into the adit (Figure 3.47-5). The waste dump is 90 feet long, 50 feet wide, and 15-20 feet thick, extending down to the creek. The disturbed area covers about 0.5 acre.

The access road to the upper adit and the shaft crosses above Adit 1 and continues eastward along the slope about ¼ mile to the workings. The shaft is at the end of the road beside a low waterfall on the creek, and the adit is 15 feet above and 20 feet west of the shaft (Figure 3.47-6). The shaft, reported by Anderson (1930) to be 170 feet deep, is filled with water and covered with old planks, although the wood has rotted and the planks are beginning to collapse (Figure 3.47-7). A short prospect cut into the outcrop adjacent to the shaft had been covered with boards, but some have fallen or broken off. The upper adit, Adit 2, is also nearly caved, but again it has a small, narrow opening (Figure 3.47-8). Only one waste dump is present at these workings, indicating either the dumps are combined or the adit is very short. The dump is 60 feet long, 35-40 feet wide, and 5-20 feet thick (Figure 3.47-9). The creek has been diverted into a ditch at the head of the dump, and the water flows along the dump’s south edge. Old timbers on a small flat area across the creek may have been a hoist base. A piece of equipment in the bushes near the base may have been used to muck out the shaft (Figure 3.47-10). The disturbed area covers less than 0.5 acre.

No remnants of the mill shown on Miller’s (1936) map were found.

3.47.4.2 Sample Locations

3.47.4.2.1 Solid Samples

Samples were collected from the face of both waste dumps. Sample K7159901 was taken from the waste dump for Adit 1, and K7159902 was taken at the waste dump for the shaft and Adit 2.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K7159901</td>
<td>Ruby Creek Mine, Adit 1 dump</td>
<td>Yes</td>
</tr>
<tr>
<td>K7159902</td>
<td>Ruby Creek Mine, Shaft/Adit 2 dump</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3.47.4.2.2 Water Samples

No water samples were collected.

3.47.4.2.3 Analytical Results

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

Sample K7159901 from the lower adit waste dump has elevated levels of arsenic, cadmium, copper, manganese, lead, and zinc in the element screen. All the elements of concern were below detection limits in the TCLP for metals screen. Sample K7159902 from the upper adit/shaft waste dump has elevated levels of arsenic, cadmium, chromium, copper, manganese, lead, and zinc in the element screen. In the TCLP for metals screen, 310 ppb (0.310 ppm) cadmium, 210 ppb (0.210 ppm) chromium, and 43,000 ppb (43 ppm) lead were leaching from the sample.

3.47.5 Structures

- Only the footings of what may have been the shaft hoist were found. Anderson (1930) and Miller (1936) reported the construction of a mill at the mine, but no remnants of it were found.

3.47.6 Safety

The openings at both adits could easily be enlarged to gain entry into the workings. The shaft is particularly hazardous because of the rotten planks covering the water-filled opening. Several signs warning of “open shafts” are posted along the access road. Because of the number of these signs and their locations, other open shafts may be in the area, although no others were found.
Figure 3.47-1. Location of the Ruby Creek Mine, Clearwater County, Idaho (U.S. Geological Survey McGary Butte 7.5-minute topographic map).
Figure 3.47-2. Sketch of the Ruby Creek Mine workings.
MAP OF THE MAIN WORKINGS OF THE

RUBY CREEK MINE

SHOWING GEOLOGICAL RELATIONS

Scale 1 Inch = 100 Feet

Contour Interval 25 Feet
Datum mean sea level

Surveyed in 1936 by J.B. Miller

Figure 3.47-3. Map of the Ruby Creek Mine (Miller, 1936, Plate 5).
Figure 3.47-4. Looking north at the slump over the portal of Adit 1 at the Ruby Creek Mine (Roll K8, frame #24).
Figure 3.47-5. Small, narrow opening into Adit 1 at the Ruby Creek Mine (Roll K8, frame #25).

Figure 3.47-6. Looking north toward the shaft and Adit 2 at the Ruby Creek Mine. The shaft and a short prospect cut into the rock adjacent to the shaft are at the lower right, covered with old boards. The adit is at the base of the scarp at the upper left (Roll K9, frame #1).
Figure 3.47-7. Old planks covering the shaft (lower right) and the short prospect cut (just above center) at the Ruby Creek Mine (Roll K9, frame #2).
Figure 3.47-8. Small opening into Adit 2 at the Ruby Creek Mine (Roll K9, frame #3).

Figure 3.47-9. Looking west across the waste dump for Adit 2 and the shaft at the Ruby Creek Mine (Roll K9, frame #4).
Figure 3.47-10. Old piece of equipment in the brush across the creek from the shaft at the Ruby Creek Mine (Roll K9, frame #5).
3.48 VICTORIA PROSPECT (Site No. PL-84)
Alternate name—Neva Prospect; Brady Claims; George Brady Property.

3.48.1 Site Location and Access (Figure 2.1-1)

The Victoria Prospect is on upper Ruby Creek about ¼ mile north of State Highway 8, in the SW¼ of the SE¼ of the SW¼ of section 14 and in the NW¼ of the NE¼ of the NW¼ of section 23, T. 40 N., R. 1 E., on the McGary Butte 7.5-minute quadrangle (Figure 3.48-1). An adit symbol labeled “Mine Tunnel” on the topographic map is about where the northernmost of the three workings was found. The workings are along the west embankment of the road or slightly above the road in the timber, between ¼ and ½ mile from the highway. Access from Highway 8 is on a gated jeep road along the west side of the creek. This is the same access road as for the Ruby Creek Mine. According to the Clearwater National Forest map, the workings are on both BLM and Potlatch Corporation land.

3.48.2 Geologic Features (Figure 2.2-1)

Miller (1936, p. 21) described the Victoria lode as follows:
Wall rock is in part quartzite and gneiss, but a small granitic body of unknown shape and size occurs on the north side of the vein. The vein strikes about N. 85° W. and dips 65° N.E. The outcrop of the vein may be observed in an open pit in the hillside above the shaft. Limonite and manganese stains indicate several narrow stringers of ore in a zone two or three feet wide. From specimens observed, all taken from the dump, the sulphides in places form a band at least four or five inches thick.

Sphalerite was the most abundant ore mineral, but almost as much chalcopyrite was present (Miller, 1936). The mine is in rocks of the Wallace Formation (Rember and Bennett, 1979).

3.48.3 Site History

The Neva Copper Company was incorporated in 1924. By 1930, the property, consisting of five claims, had three tunnels (325 feet, 20 feet, and 12 feet) and three shafts (75 feet, 70 feet, and 55 feet). Neva Copper forfeited its corporate charter in 1929.

Miller (1936) reported that the property was prospected by the Goldendale Mining Company in 1935. Goldendale was incorporated in May 1931 and forfeited its corporate charter in 1936. No records concerning the extent of their work on the property were found.
3.48.4 Environmental Conditions

3.48.4.1 Site Features

The Victoria Prospect was visited by John Kauffman on July 15, 1999. A video segment describing the site is on Clearwater National Forest Videotape (Tape 4, index 00:25:26-00:30:55). Documenting photograph is Roll K9, frame 6.

Three caved prospects were found at this site, one of which may be the inclined shaft reported by Anderson (1930) and Miller (1936) (Figure 3.48-2). The northernmost, Working #1, is where the adit symbol is shown on the topographic map. This prospect may be the caved, inclined shaft. A U-shaped scarp in the road embankment (Figure 3.48-3) and a very minor amount of waste rock on the east edge of the road are the only evidence for the working. The small dump is 15 feet long, 6 feet wide, and 5 feet thick.

Working #2 is about 75-90 feet south of Working #1 and is also expressed as a shallow scarp on the west embankment of the road. A smaller pile of waste rock, measuring 8 feet long, 4 feet wide, and 4 feet thick, is again on the east side of the road.

Working #3 is about 540 feet south of Working #2. It is just inside the timber on the north edge of a clear-cut and is about 30 feet west of the road. The dump for this caved working is 20 feet long, 12 feet wide at the portal and 2 feet wide at the end, and about 5 feet thick. The toe extends nearly to the road.

The total disturbed area at these workings is minimal.

3.48.4.2 Sample Locations

3.48.4.2.1 Solid Samples

No solid samples were collected.

3.48.4.2.2 Water Samples

No water samples were collected.

3.48.5 Structures

No structures were found that appear to be associated with the prospects. Several recent wooden shelters and a minor amount of garbage are on the east side of the access road across from Working #3.

3.48.6 Safety

No safety hazards were found.
Figure 3.48-1. Location of the Victoria Prospect, Clearwater County, Idaho (U.S. Geological Survey McGary Butte 7.5-minute topographic map).
Figure 3.48-2. Sketch of the Victoria Prospect workings.
Figure 3.48-3. Scarp of caved Working #1 along the west embankment of the access road at the Victoria Prospect (Roll K9, frame #6).
REFERENCES


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

LOCATION AND IDENTIFICATION

ID# __________________ Site Name(s) ________________________________
FS Tract # __________________ FS Watershed Code __________________
Forest __________________ District ___________________________
Location based on: GPS ______ Field Map ______ Existing Info ______ Other ______
Lat _______ Long _______ xutm _______ yutm _______ zutm _______
Quad Name ______________________________ Principal Meridian ___________
Township _____________ Range ___________ Section ____ 1/4 _____ 1/4 _____ 1/4
State ______ County _______________ Mining District __________________

Ownership of all disturbances:

_____ National Forest (NF)
_____ Mixed private and National Forest (or unknown)
_____ Private.

If private only, impacts from the site on National Forest Resources are

_____ Visually apparent _____ Likely to be significant _____ Unlikely or minimal

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

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

SCREENING CRITERIA

Yes No

_____ 1. Mill site or Tailings present

_____ 2. Adits with discharge or evidence of a discharge

_____ 3. Evidence of or strong likelihood for metal leaching, or AMD (water stains,
stressed or lack of vegetation, waste below water table, etc.)

_____ 4. Mine waste in floodplain or shows signs of water erosion

_____ 5. Residences, high public use area, or environmentally sensitive area (as listed in
HRS) within 200 feet of disturbance

_____ 6. Hazardous wastes/materials (chemical containers, explosives, etc)

_____ 7. Open adits/shafts, highwalls, or hazardous structures/debris

_____ 8. Site visit (If yes, take picture of site), Film number(s)

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

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

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

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

Investigator ___________________________ Date ___________
Weather ______________________________

1. GENERAL SITE INFORMATION

Take panoramic picture(s) of site, Film Number(s) ______________________
Size of disturbed area(s) ______ acres Average Elevation _______ feet
Access: ___ No trail ___ Trail ___ 4wd only ___ Improved road
___ Paved road
Name of nearest town (by road): __________________________
Site/Local Terrain: ___ Rolling or flat ___ Foothills ___ Mesa ___ Mountains
___ Steep/narrow canyon
Local undisturbed vegetation (Check all that apply): ___ Barren or sparsely vegetated
___ weeds/grasses ___ Brush ___ Riparian/marsh
___ Deciduous trees ___ Pine/spruce/fir
Nearest wetland/bog: ___ On site, ___ 0-200 feet, ___ 200 feet-2 miles, ___ > 2 miles
Acid Producers or Indicator Minerals: ___ Arsenopyrite, ___ 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 ___________________________

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

<table>
<thead>
<tr>
<th>Years that Mill Operated</th>
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</thead>
<tbody>
<tr>
<td>_____ Amalgamation, _____ Arrastre, _____ CIP (Carbon-in-Pulp), _____ Crusher only, _____ Cyanidation, _____ Flotation, _____ Gravity, _____ Heap Leach, _____ Jig Plant, _____ Leach, _____ Retort, _____ Stamp, _____ No Mill, _____ Unknown</td>
</tr>
</tbody>
</table>

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

MILL PRODUCTION

<table>
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<th>Commodity(s)</th>
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</table>

<table>
<thead>
<tr>
<th>Production (ounces)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
3. HYDROLOGY

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

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

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

________________________________________________________________________

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

________________________________________________________________________

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

________________________________________________________________________

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

5. SAFETY RISKS

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

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

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

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

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

**Type of opening:** ADIT=Adit, SHAFT=Shaft, Pit=Open Pit/Trench, HOLE=Prospect Hole, WELL=Well

**Ownership:** NF=National Forest, MIX=National Forest and Private (Also, for unknown), PRV=Private

**Condition (Enter all that apply):** INTACT=Intact, PART=Partially collapsed or filled, COLP=Filled or collapsed, SEAL=Adit plug, GATE=Gated barrier,

**Ground water (Water or evidence of water discharging from opening):** NO= No water or indicators of water, FLOW=Water flowing, INTER=Indicators of intermittent flow, STAND= Standing water only (In this case, enter an estimate of depth below grade)
7. MINE/MILL WASTE

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

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

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<thead>
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<th>Waste Number</th>
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<tbody>
<tr>
<td>Waste Type</td>
<td></td>
</tr>
<tr>
<td>Ownership</td>
<td></td>
</tr>
<tr>
<td>Area (acres)</td>
<td></td>
</tr>
<tr>
<td>Volume (cu yds)</td>
<td></td>
</tr>
<tr>
<td>Size of Material</td>
<td></td>
</tr>
<tr>
<td>Wind Erosion</td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td></td>
</tr>
<tr>
<td>Surface Drainage</td>
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<td>Indicators of Metals</td>
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</tr>
<tr>
<td>Stability</td>
<td></td>
</tr>
<tr>
<td>Location with respect to Floodplain</td>
<td></td>
</tr>
<tr>
<td>Distance to Stream</td>
<td></td>
</tr>
<tr>
<td>Water Sample #</td>
<td></td>
</tr>
<tr>
<td>Waste Sample #</td>
<td></td>
</tr>
<tr>
<td>Soil Sample #</td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
<td></td>
</tr>
</tbody>
</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, COBBLE=Cobble, BOULD=Boulder  
**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 if any fines, or fines that are not year-round or well cemented.  
**Vegetation** *(density on waste):* DENSE=Ground cover > 75%, MOD=Ground cover 25% - 75%, SPARSE=Ground cover < 25%, BARREN=Barren  
**Surface Drainage** *(Include all that apply):* RILL=Surface flow channels mostly < 1’ deep, GULLY=Flow channels >1’ deep, SEEP=Intermittent or continuous discharge from waste deposit, POND=Seasonal or permanent ponds on feature, BREACH=Breached, NO=No indicators of surface flow observe  
**Indicators of Metals** *(Enter as many as exist):* NO= None, VEG=Absence of or stressed vegetation, STAIN=yellow, orange, or red precipitate, SALT=Salt deposits, SULF=Sulfides present  
**Stability:** EMER-imminent mass failure, LIKE=Potential for mass failure, LOW=mass failure unlikely  
**Location with 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 3 - WATER SAMPLES FROM MINE SITE DISCHARGES

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Date sample taken</th>
<th>Sampler (Initials)</th>
<th>Discharging From</th>
<th>Feature Number</th>
<th>Indicators of Metal Release</th>
<th>Indicators of Sedimentation</th>
<th>Distance to stream (ft)</th>
<th>Sample Latitude</th>
<th>Sample Longitude</th>
<th>Field pH</th>
<th>Field SC</th>
<th>Flow (gpm)</th>
<th>Method of measurement</th>
<th>Photo Number</th>
</tr>
</thead>
</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>
<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>
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<tr>
<td>Date sample taken</td>
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<td></td>
</tr>
<tr>
<td>Photo Number</td>
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</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 ½ 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>Date of sample</th>
<th>Sampler (Initials)</th>
<th>Sample Type</th>
<th>Waste Type</th>
<th>Feature Number</th>
<th>Sample Latitude</th>
<th>Sample Longitude</th>
<th>Photo Number</th>
</tr>
</thead>
</table>

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

**Codes Applicable for all entries:** NA=Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none  
**Sample Type:** SING=Single sample, COMP=Composite sample (enter length)  
**Waste Type:** WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, HIGH=Highwall, PLACER=Placer or hydraulic deposit, POND=Settling pond or lagoon sludge, ORE=Ore Stockpile, HEAP=Heap Leach  
**Feature Number:** Corresponding number from Table 2 (Waste Number)
<table>
<thead>
<tr>
<th>Sample Number</th>
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<tbody>
<tr>
<td>Date of sample</td>
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<tr>
<td>Sampler (Initials)</td>
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<tr>
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<tr>
<td>Likely Source of Contamination</td>
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<td>Feature Number</td>
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<td></td>
<td></td>
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<tr>
<td>Indicators of Contamination</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Photo Number</td>
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</tbody>
</table>

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

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

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

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

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

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

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

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

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

For structures on or partially on National forest lands.

TABLE 8 - STRUCTURES

<table>
<thead>
<tr>
<th>Type</th>
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<table>
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<th>Condition</th>
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</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 numbers throughout this form when referring to a particular feature (Tables 1 and 2). Sketch the drainage routes off the site into the nearest stream.
13. RECORDED INFORMATION

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

Claimant(s)
Name: ____________________________
Address: _________________________
Telephone Number: ________________________

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

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

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

________________________

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

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

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

________________________
Appendix B
Database Fields
NEWLOC       WA  1
ORANGENUM    451
MAPLOC       1
DEPOSIT      Eagle Creek Mine
MRDSREC      
MILSREF      0160790528
PERIODPROD   
ORE          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       
SECUADSCSL   
UTMNORTH     
UTMEAST      
UTMZONE      
COMMODIT     
LAT          
LON          
TOWN         
SECTION     
RANGE       

200
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


Appendix F
Minor Prospects and Prospects Not Found
MINOR PROSPECTS AND PROSPECTS NOT FOUND

Minor Prospects

Unnamed Prospect(?) (Site No. K6299901)
Records at the Palouse District office of the Forest Service show an old opening, possibly a shaft, at this location, which is about ½ mile up Moscow Gulch where the gulch branches. This is in the S½ of the SW¼ of the NW¼ of section 1, T. 42 N., R. 2 W., on the Emida 7.5-minute quadrangle. A shallow pit was found on the south side of the drainage, but it could be merely a slump.

Daisy Mine (Site No. PL-14)
Two unsuccessful attempts were made to find this property, the only mine with reported production from the Gold Hill area. Several prospect pits were found in the vicinity of where Faick (1937) showed the mine. Logging in the area may have destroyed the site, although much of the area that was not logged is heavily forested and the mine could easily have been overlooked.

Gold Eagle and Gold Hunter Prospects (Site Nos. PL-75 and PL-76)
These prospects are reported to be about 1 mile west of the Ruby Creek Mine, presumably along a tributary to Ruby Creek in the E½ of section 16, and the W½ of section 15, T. 40 N., R. 1 E., on the McGary Butte 7.5-minute quadrangle. Several shallow prospect pits were found on the north-facing slope and on the top of the ridge north of State Highway 8, but no workings were found. Hubbard (1957, p. 15) reported a stamp mill at the Gold Eagle property and noted that “underground workings appear to be extensive.” These were not found.

Properties not found

Blackfoot Prospect (Site No. PL-17)
Faick (1937, p. 48) reported “a two-compartment vertical shaft about 180 feet deep ... so badly caved and filled that it is inaccessible.” Aside from stating it is on the north side of Jerome Creek in section 28 (T. 42 N., R. 3 W., Harvard 7.5-minute quadrangle), Faick gave no detailed location and did not mark the site on his map. Several old logging roads were checked in the northwest corner of section 28, but no workings were found. This area, on Forest Service land, was logged 15-20 years ago and now has a dense stand of lodgepole and white pine, mixed with a few ponderosa pines. The remainder of the section is private land and was not checked.

Unnamed Prospect (no site number)
This prospect is shown by Livingston and Laney (1920, Map No. 10) as an adit at the end of a trail north and east of the Mizpah Mine. This should be in the SE¼ of section 5 or the NE¼ of section 8, T. 42 N., R. 1 W., on the Fernwood 7.5-minute quadrangle. A foot trail was found in the area, but no workings were noted above or below the approximate elevation shown for the adit.
Appendix G
GPS Readings for Properties in the Palouse, Pierce, North Fork, Lochsa and Powell Ranger Districts of the Clearwater National Forest

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Site Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>K6079901</td>
<td>Milbert Quartz Lode</td>
<td>46° 59.91'</td>
<td>116° 48.34'</td>
<td></td>
</tr>
<tr>
<td>PL-1</td>
<td>Carrico Mine, shaft 1</td>
<td>46° 59.752'</td>
<td>116° 48.435'</td>
<td></td>
</tr>
<tr>
<td>PL-1</td>
<td>Carrico Mine, shaft 2</td>
<td>46° 59.695'</td>
<td>116° 48.465'</td>
<td></td>
</tr>
<tr>
<td>PL-1</td>
<td>Carrico Mine, adit</td>
<td>46° 59.527'</td>
<td>116° 48.480'</td>
<td></td>
</tr>
<tr>
<td>PL-4</td>
<td>Lost Wheelbarrow Mine, shaft 1</td>
<td>46° 59.817'</td>
<td>116° 47.180'</td>
<td></td>
</tr>
<tr>
<td>PL-4</td>
<td>Lost Wheelbarrow Mine, shaft 2</td>
<td>46° 59.827'</td>
<td>116° 47.052'</td>
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<tr>
<td>PL-3</td>
<td>Prosperity Group</td>
<td>46° 59.94'</td>
<td>116° 48.135'</td>
<td>at east end of upper trench</td>
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<tr>
<td>K6099901</td>
<td>Unnamed Prospect</td>
<td>46° 59.837'</td>
<td>116° 48.215'</td>
<td>on west rim of caved shaft</td>
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<td>PL-7</td>
<td>Reservoir Creek</td>
<td>46° 59.075'</td>
<td>116° 48.472'</td>
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<tr>
<td>K6109901</td>
<td>Unnamed Prospect</td>
<td>46° 58.95'</td>
<td>116° 46.96'</td>
<td>may be questionable readings</td>
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<tr>
<td>PL-9</td>
<td>Black Horse Prospect</td>
<td>46° 57.973'</td>
<td>116° 45.362'</td>
<td>shallow pits</td>
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<tr>
<td>PL-11</td>
<td>Copper Ridge Prospect</td>
<td>46° 58.625'</td>
<td>116° 45.534'</td>
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<tr>
<td>PL-18</td>
<td>Last Chance Prospect</td>
<td>46° 57.332'</td>
<td>116° 44.301'</td>
<td>20 ft. east of collapsed cabin along trail</td>
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<tr>
<td>PL-29</td>
<td>Lodestone Prospect</td>
<td>46° 58.73'</td>
<td>116° 34.84'</td>
<td>@ concrete slab 50-75 ft. south of adit</td>
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<tr>
<td>K6179902</td>
<td>Gold Queen Prospect</td>
<td>46° 59.340'</td>
<td>116° 33.070'</td>
<td></td>
</tr>
<tr>
<td>SP-394</td>
<td>Hecla Prospect, adit 1</td>
<td>46° 00.206'</td>
<td>116° 30.334'</td>
<td></td>
</tr>
<tr>
<td>PL-51</td>
<td>Last Chance-Witherow Lease</td>
<td>46° 52.741'</td>
<td>116° 34.748'</td>
<td>@ large open cut</td>
</tr>
<tr>
<td>PL-55</td>
<td>Campbell Lease</td>
<td>46° 52.703'</td>
<td>116° 34.95'</td>
<td>20 ft. south and 100 ft. east of opening</td>
</tr>
<tr>
<td>PL-44</td>
<td>Morning Star Prospect, adit 1</td>
<td>46° 53.89'</td>
<td>116° 34.440'</td>
<td></td>
</tr>
<tr>
<td>PL-46</td>
<td>Muscovite Mine, adit 2</td>
<td>46° 53.18'</td>
<td>116° 34.65'</td>
<td>probably No. 5 level of Stoll's report</td>
</tr>
<tr>
<td>PL-43</td>
<td>Lucky Jim Prospect</td>
<td>46° 54.04'</td>
<td>116° 33.735'</td>
<td>@ shaft location, 150 ft. north of adit</td>
</tr>
<tr>
<td>K8319901</td>
<td>Bonami Prospect</td>
<td>46° 55.339'</td>
<td>116° 37.110'</td>
<td>@ adit; in thick tree cover</td>
</tr>
<tr>
<td>PL-80</td>
<td>Ruby Creek Mine, shaft 2</td>
<td>46° 48.570'</td>
<td>116° 17.384'</td>
<td></td>
</tr>
<tr>
<td>HM-167</td>
<td>Bole Prospect</td>
<td>46° 29.356'</td>
<td>115° 45.248'</td>
<td>@ shaft</td>
</tr>
<tr>
<td>HM-95</td>
<td>New Red Lead Prospect</td>
<td>46° 40.271'</td>
<td>114° 50.717'</td>
<td>@ adit</td>
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</table>