Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Nez Perce National Forest: Volume II: Dixie Area, Idaho County, Idaho

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Field Inspection conducted by Earl Bennett and Ted Erdman
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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 Dixie area of the Nez Perce 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, and field work in the Nez Perce National Forest was completed in the 2000 field season.

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

1. Systematically identify all mine sites with possible human health, environmental, and/or safety related problems that either are on or affecting Forest Service lands.
2. Identify the human health and environmental risks at each location based on site characterization factors (see Section 1.5), including screening-level soil and water samples taken and analyzed in accordance with Environmental Protection Agency (EPA) protocols and quality control procedures.

3. Based on site characterization factors, identify those sites that are not affecting Forest Service lands and that can therefore be eliminated from further consideration.

4. Cooperate with other state and federal agencies, and integrate the Northern Region program with their programs.

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

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

1.3 ABANDONED AND INACTIVE MINES DEFINED

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

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

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

1.4 HEALTH AND ENVIRONMENTAL PROBLEMS AT MINES

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

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

1.4.1 Acid Mine Drainage

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

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

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

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

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

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

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

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

Under acidic conditions, the solubility of the metal controls how much will be released into the environment:

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

**Aluminum** solubility is most often controlled by alunite [KAl₃(SO₄)₂(0H)₆] or by gibbsite [Al(OH)₃], depending on pH. Aluminum is one of the most common elements in rock-forming minerals such as feldspars, micas, and clays.

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

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

**Copper** solubility in natural waters is controlled primarily by the amount of carbonate present; malachite [Cu₂(OH)₂CO₃] and azurite [Cu₃(OH)₂(CO₃)₂]
form when CO₃²⁻ ions are available in sufficient concentrations. In soil, copper combines readily with iron to form cupric ferrite. Other compounds, such as sulfate and phosphates, may also control copper solubility in soils. Copper is present in many ore minerals, including chalcopyrite [CuFeS₂], bornite [Cu₉FeS₄], chalcocite [Cu₂S], and tetrahedrite [Cu₃Sb₄S₁₃].

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

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

1.5.3 Field Inspection Procedures

The sites which could not be screened out by using the criteria in Table 1.5-1 were visited by an IGS geologist. At sites for which little geologic or mining data existed, geologists characterized the geology, collected samples for geochemical analysis, evaluated the deposit, and described 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—Total Recoverable Metals Screen (EPA Test 200.7).
Water Samples—Arsenic (EPA Test 200.8), Lead (EPA Test 200.8), and Mercury (EPA Test 200.8); or Dissolved Heavy Metals Screen (EPA Test 200.8, which includes arsenic and lead) and Mercury (EPA Test 200.8).
Water Samples—Dissolved Metals Screen (EPA Test 200.7).
Soil and Waste Material—Element Screen (EPA Test 3050), 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>---</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 for the granitic rocks can be made from the analyses presented by Bennett (1980). In this study, stream sediment samples were grouped according to the major rock type in the source area. The mean and standard deviation for granitic rocks of the Idaho batholith are presented in Table 1.5-3. These samples were analyzed by atomic absorption spectrophotometry.
Table 1.5-3. Mean and standard deviation of elements in stream sediment samples derived from rocks of the Idaho batholith (data from Bennett, 1980; ppm = mg/Kg).

<table>
<thead>
<tr>
<th>Element</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molybdenum (ppm)</td>
<td>2.43</td>
<td>0.43</td>
</tr>
<tr>
<td>Nickel (ppm)</td>
<td>11.85</td>
<td>5.31</td>
</tr>
<tr>
<td>Copper (ppm)</td>
<td>5.82</td>
<td>2.40</td>
</tr>
<tr>
<td>Lead (ppm)</td>
<td>17.79</td>
<td>6.32</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td>60.14</td>
<td>104.21</td>
</tr>
<tr>
<td>Silver (ppm)</td>
<td>0.83</td>
<td>4.23</td>
</tr>
<tr>
<td>No. of Samples</td>
<td>384</td>
<td></td>
</tr>
</tbody>
</table>

There are no federal standards for concentrations of metals and other constituents in soils; acceptable limits for such are often based on human and/or environmental risk assessments for an area. Since no assessments of this kind have been done, concentrations of metals in soils were compared to the limits postulated by the U.S. EPA for the Clark Fork Superfund site (Table 1.5-4). 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 1.5-4. 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., “00” if the samples was taken in 2000); 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 DIXIE AREA, IDAHO COUNTY, IDAHO

2.1 INTRODUCTION

This volume, Volume II of the Nez Perce National Forest report, describes forty-three properties in the Dixie area of the Nez Perce National Forest. Twenty-two properties discussed in this volume reported lode production between 1900 and 1963, and three of these properties had over 1,000 tons of total lode output. Two of the twenty-two properties also reported placer production in addition to the lode output.

The study area covers part of the Red River Ranger District, which is in Idaho County (Figure 2.1-1). The mineralized areas in the Dixie area are in the drainage of Crooked Creek or in smaller drainages that are tributary to the Salmon River. The War Eagle Mine is within the boundary of the Gospel Hump Wilderness Area. Access to the area is via Road 222 from Elk City through Red River Ranger Station to Dixie; by numerous Forest Service roads throughout the study area; and by trails that connect to the Forest Service roads. Most of the drainages with past mining activity have dirt roads.

The forty-three mines and prospects described in this volume are located on four 7.5-minute topographic maps (U.S. Geological Survey). The locations of these properties are shown in Figure 2.1-1. Elevations in the study area range from about 2,960 feet on Crooked Creek at the mouth of Fitz Creek to 7,178 feet at an unnamed peak on the drainage divide northwest of Dixie; elevations near Dixie are around 5,600 feet. The area is heavily forested with dense brush and conifers, and the topography is generally steep.

2.1.1 Summary of the Dixie Study Area

There were forty-three mining properties (Table 2.1-1) examined in the Dixie area. Of these properties, ten have the potential to have an environmental impact on or near USFS lands. Seven have water discharges that exceed one or more water quality standards, one has both water quality concerns and waste rock impinging on an active waterway, and two have mill tailings near active waterways.

Of the forty-three sites discussed in this volume, eight have open adits or shafts. Of these, one property has multiple open workings. In addition, several properties had unfenced pits or caved shafts. Some of these openings pose significant safety hazards.

2.2 GEOLOGY

The most recent references showing the geology of the Dixie area are Mitchell (1996), Stanford (1996a, 1996b), Lewis and others (1993), and Mitchell and Bennett (1979). The geology and ore deposits of the area are discussed in Bennett and others (1999), Capps and Roberts (1939), Lorain (1938), Neumann and Close (1991), and unpublished reports on individual deposits.
Figure 2.1-1a. Location of properties in the Dixie area (Idaho Transportation Department Elk City 1:100,000-scale map).
Figure 2.1-1b. Location of properties in the Dixie area (Idaho Transportation Department Warren 1:100,000-scale map).
Table 2.1-1. Summary of properties visited in the Dixie area. The properties are arranged according to site number. Sites were visited in 1999 and 2000.

Explanation:

Site Number: Idaho Geological Survey file number, or field designation number.
Surface Owner: FS = Forest Service; P = Private or Patented claims.
Water/Solid Sample: numbers indicate the number of samples collected.
Environmental Concerns: W = water; D = waste dump, T = tailings. Environmental concerns are noted as follows:
W - samples of adit water or seeps from waste dumps that exceed one or more water quality standards in the Dissolved Metals Screen, the Total Recoverable Metals Screen, or the arsenic, lead (or the Dissolved Heavy Metals Screen), or mercury tests; D or T - dump or tailings samples that exceed background or environmental standards for one or more elements in the Element Screen, and/or dump or tailings samples that show significant leaching of one or more metals in the TCLP for Metals Screen.
Physical Conditions: AO = open adit; AC = caved or otherwise closed adit; SO = open shaft; SC = caved shaft; T = trench; C = cut; P = prospect pit; OP = open pit. Numbers indicate how many of each are at the site; queried when type or condition of workings is uncertain or unknown.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Mine Name</th>
<th>Surface Owner</th>
<th>Water Samples</th>
<th>Solid Samples</th>
<th>Environmental Concerns</th>
<th>Physical Conditions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC-157</td>
<td>Burpee Mine</td>
<td>FS</td>
<td>1</td>
<td>W</td>
<td>1AC, 2P</td>
<td></td>
</tr>
<tr>
<td>EC-159</td>
<td>64 Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC-166</td>
<td>L &amp; L Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>2AC, 1SC</td>
<td></td>
</tr>
<tr>
<td>EC-169</td>
<td>Slip Easy Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>1SC, several P</td>
<td></td>
</tr>
<tr>
<td>EC-172</td>
<td>Tiawaka Mine</td>
<td>FS</td>
<td>1</td>
<td>W</td>
<td>1AC</td>
<td></td>
</tr>
<tr>
<td>EC-174</td>
<td>Unnamed Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>1AO, 1AC</td>
<td></td>
</tr>
<tr>
<td>EC-175</td>
<td>Ajax Mine</td>
<td>P</td>
<td></td>
<td></td>
<td>1SC, several P</td>
<td></td>
</tr>
<tr>
<td>EC-176</td>
<td>American Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>2AC, several P</td>
<td></td>
</tr>
<tr>
<td>EC-178</td>
<td>Skylark Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>2AC</td>
<td></td>
</tr>
<tr>
<td>EC-180</td>
<td>Prichard Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>3AC, 1C</td>
<td></td>
</tr>
<tr>
<td>EC-185</td>
<td>Dixie Queen Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>1SC, 1AC, several T</td>
<td></td>
</tr>
<tr>
<td>EC-190</td>
<td>Ontario Mine</td>
<td>P</td>
<td>1</td>
<td>W</td>
<td>3AC, several P and T</td>
<td></td>
</tr>
<tr>
<td>EC-191</td>
<td>Juanita Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>1SC, 1AC, 1P</td>
<td></td>
</tr>
<tr>
<td>EC-192</td>
<td>Bonanza Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>2SO(?), 1P</td>
<td></td>
</tr>
<tr>
<td>EC-193</td>
<td>Penn-Dixie Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>3AC</td>
<td></td>
</tr>
<tr>
<td>EC-195</td>
<td>North Star Mine</td>
<td>P</td>
<td></td>
<td></td>
<td>1AC, 1P (?)</td>
<td></td>
</tr>
</tbody>
</table>
Table 2.1-1 (continued). Summary of properties visited in the Dixie area.

<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>EC-196</td>
<td>Dixie Royal Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC</td>
</tr>
<tr>
<td>EC-199</td>
<td>Black Diamond Mine</td>
<td>P</td>
<td>1</td>
<td></td>
<td>W</td>
<td>1AO</td>
</tr>
<tr>
<td>EC-200</td>
<td>Dillinger Mine</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td>IAC</td>
</tr>
<tr>
<td>EC-201</td>
<td>McKinley Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC</td>
</tr>
<tr>
<td>EC-202</td>
<td>Robinson Dike Mine</td>
<td>FS</td>
<td>1</td>
<td></td>
<td>W</td>
<td>IAC, proposed OP</td>
</tr>
<tr>
<td>EC-203</td>
<td>Gold Leaf Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC, several P and T</td>
</tr>
<tr>
<td>EC-204</td>
<td>Comstock Mine</td>
<td>P, FS</td>
<td>1</td>
<td>T</td>
<td></td>
<td>IAC</td>
</tr>
<tr>
<td>EC-206</td>
<td>Unnamed Prospect</td>
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<td></td>
<td></td>
<td></td>
<td>IAC</td>
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<tr>
<td>EC-207</td>
<td>Swastika Mine</td>
<td>FS</td>
<td>2</td>
<td>1</td>
<td>D, W</td>
<td>IAO</td>
</tr>
<tr>
<td>EC-601</td>
<td>Hematite Mine</td>
<td>FS</td>
<td></td>
<td>1</td>
<td>T</td>
<td>IS(?), 2AC, 1T</td>
</tr>
<tr>
<td>EC-602</td>
<td>Gold Master Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC</td>
</tr>
<tr>
<td>EC-603</td>
<td>Eutopia Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1S(?), C, several P</td>
</tr>
<tr>
<td>EC-609</td>
<td>Union Group</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IT, 1P</td>
</tr>
<tr>
<td>EC-625</td>
<td>War Eagle Mine</td>
<td>FS</td>
<td>1</td>
<td></td>
<td>W</td>
<td>2AC</td>
</tr>
<tr>
<td>EC-783</td>
<td>Mammoth Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IT (long), several P and T</td>
</tr>
<tr>
<td>B7139901a</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC, 1SC</td>
</tr>
<tr>
<td>B7139904</td>
<td>Four Deuces Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO</td>
</tr>
<tr>
<td>B7149903</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC</td>
</tr>
<tr>
<td>B7149904</td>
<td>Dawson-Hugo/ M &amp; E Claims</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>several P</td>
</tr>
<tr>
<td>B7159906</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC</td>
</tr>
<tr>
<td>B7159907</td>
<td>Unnamed Prospect</td>
<td>FS</td>
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<td></td>
<td>IAC</td>
</tr>
<tr>
<td>B7159910</td>
<td>Republican Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAC, numerous P and T</td>
</tr>
<tr>
<td>B7169901</td>
<td>Unnamed Prospect</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>IAO</td>
</tr>
<tr>
<td>B7169903 and B7169904</td>
<td>Unnamed Prospects</td>
<td>FS</td>
<td></td>
<td></td>
<td></td>
<td>1AO, IAC or P</td>
</tr>
</tbody>
</table>
Table 2.1-1 (continued). Summary of properties visited in the Dixie area.

<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>B7169905</td>
<td>Unnamed Mine</td>
<td>FS</td>
<td>1</td>
<td>W</td>
<td>1AO</td>
<td></td>
</tr>
<tr>
<td>B8010002</td>
<td>Gold Bug Mine</td>
<td>FS</td>
<td></td>
<td></td>
<td>1SC</td>
<td></td>
</tr>
<tr>
<td>Reference sample — Hundred Dollar Gulch</td>
<td>FS</td>
<td>1</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference sample — Fitz Creek</td>
<td>FS</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bennett (1980) discussed the geochemistry of sediments derived from Idaho batholith rocks similar to those that underlie much of the study area. A brief description of the geologic framework of the area follows.

Most of the ore deposits in the Dixie area formed within 1,500 feet of the subhorizontal contact between the Idaho batholith and the overlying Proterozoic metamorphic rocks (Figure 2.2-1). Although these metamorphic rocks have been separated into the Syringa and Elk City metamorphic sequences farther north, in the Dixie area these rocks are too close to the contact with the batholith for them to be identified with certainty (Reed Lewis, 2001, personal communication). The granitic rocks in the Dixie area are mostly biotite granodiorite (Stanford, 1996a, 1996b; Mitchell, 1996), which forms the bulk of the Atlanta lobe of the batholith (Lewis and others, 1987). Both the Idaho batholith and the Precambrian metamorphic rocks are intruded by northeast-trending Tertiary dikes (Neumann and Close, 1991; Stanford, 1996a, 1996b). The most prevalent ore deposits in the area are gold-silver veins, with or without base metals. These veins are probably related to the intrusion of the Idaho batholith (Snee and Lund, 1984; Lund and Esparza, 1990).

A series of major northeast-trending faults cross the area. These faults intersect a secondary set of northwest-trending faults that control much of the gold mineralization (Neumann and Close, 1991; Stanford, 1996a, 1996b; Mitchell, 1996).

2.3 ECONOMIC GEOLOGY

2.3.1 General Characteristics of the Ore

Most of the lode mines in the Dixie area consist of gold-bearing quartz veins or disseminations filling northwest-trending faults or shear zones (Neumann and Close, 1991). These deposits occur in the granitic rocks of the Idaho batholith or in the overlying metasedimentary rocks (Figure 2.2-1). Most of these deposits formed within 1,500 feet of the subhorizontal contact between the Idaho batholith and the Proterozoic metamorphic rocks (Reed Lewis, 2001, personal
Figure 2.2-1a. Geology of the properties in Dixie area and vicinity, Idaho (Stanford, 1996a). pCq3, pCqcs = Middle or Early Proterozoic (?) Syringa sequence; pCfg, pCbg, pCbs, bs = Middle or Early Proterozoic (?) Elk City sequence; Ys = Middle Proterozoic calc-silicate gneiss and schist; Kgds = Cretaceous granodiorite; Tds = Eocene dike swarm; Tr, Td, Ta, Tu = Eocene dike rocks; Qal, Qu = Quaternary alluvium.
Figure 2.2-1b. Geology of properties in the Dixie area and vicinity, Idaho (Stanford, 1996b). pCqs = Middle or Early Proterozoic(?)
quartzite and schist; pCbg = Middle or Early Proterozoic(?) biotite gneiss and schist; pCqs = Middle or Early Proterozoic(?)
quartzite and calc-silicate rocks; Kgd = Cretaceous granodiorite; Kg = Cretaceous muscovite-biotite granite; Tgd = Eocene
hornblende-biotite granodiorite; Tg = Eocene granite; Tds = Eocene dike swarm.
communication). Pyrite carries most of the gold values, and accessory sphalerite, galena, and chalcopyrite are sometimes present in the quartz (Neumann and Close, 1991).

Production was recorded from twenty-two lode mines in the study area, with three mines producing over 1,000 tons of ore between 1900 and 1963. All of these mines produced gold and silver, sometimes accompanied by based metals. Two of these mines also reported placer production. Active exploration projects in the 1980s did not bring any mines into production.

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:

Comstock Mine—stamp mill and flotation tailings
Hematite Mine—flotation tailings
Tiwakaka Mine
Ajax Mine
American Mine
Juanita Mine
Dixie Queen Mine
Slip Easy Mine
L & L Mine
64 Mine
Burpee Mine
Swastika Mine
Robinson Dike Mine
Dillinger Mine
North Star Mine
Penn-Dixie Mine
War Eagle Mine
Mammoth Mine
Dixie Royal Mine
Gold Master Mine

Several hundred thousand tons of ore were mined and milled at the Comstock Mine, with a reported recovery of $60,000-$250,000. A four-stamp mill with a capacity of 18 tons per day (tpd) was installed in 1897. The mine closed around 1900 and reopened in 1905, processing the ore through the four-stamp mill, which saved about 5 percent of the values, and a cyanide plant that treated the concentrates, saving 85 percent of the concentrates' values. Operations probably continued until World War I. In 1935 a new 25- or 50-tpd flotation mill was installed, and several
hundred tons of ore were milled with a recovery of about $15 per ton. In 1940 and 1941, the mill processed ore from several mines in the area, including the Comstock.

The mill for the Hematite Mine was completed in 1946 or 1947. It operated intermittently until 1964. The mill used gravity separation and flotation.

A 5-tpd Kincaid mill was installed at the Tiawaka Mine in 1906. In 1907 the operators began roasting their ore to improve the results from the amalgamation process. The mill did not operate for long because the amalgamation process was not suited to the sulfide ores. By 1911, there was a small Merrill mill and a Christensen concentrator on the property. By 1930, this equipment had been scrapped and a new mill was installed on the property. In November 1934 a new 15-tpd mill began to operate, and flotation cells were added to the mill in 1935. Loyalty Mines added a 10-tpd cyanide circuit to the mill in 1936. By 1939, the mine was shipping its ore to a custom mill. No tailings were noted at the site, but some may be present in the pond.

In the late 1890s there was a two-stamp, steam-powered mill at the Ajax Mine. By 1901 the mill had been enlarged to ten stamps. Cyanidation was tried as a treatment method, but reports on the success of this processing method are contradictory. Eventually, the owners sold the mill to the American Eagle Company of Elk City.

A two-stamp, steam-powered mill was built at the American Mine in 1897 or 1898. It was operated for one year, milling about 1,000 tons of ore. In 1934 lessees built a 15-tpd mill and treated a small amount of ore.

In 1892, a horse-powered arrastra was built at the Juanita Mine. It operated the following year, but the mine was sold in the fall. In 1898, a two-stamp mill, one of the first stamp mills in Dixie, was installed and operated at a profit. By the fall of 1903, the ore was being treated at the Dixie Queen mill.

A ten-stamp, steam-driven mill was installed at the Dixie Queen in November 1901. The mill ran five stamps on the Dixie Queen ore and five stamps on custom work for other mines in 1902, including several hundred tons of ore from the Ontario Mine. The mill (or possibly only five of the ten stamps) was moved to the LeRoy Mine in the Elk City district in 1903. No tailings were found at the site.

In 1939, the Slip Easy Mine had a steam-powered mill with flotation cells and cyanide tanks. The mill probably operated that year and the following year.

The L & L treated its ore in an arrastra from about 1900 until at least 1932. In the 1930s, the tailings were cyanided for additional gold recovery. A small flotation mill was installed in the late 1930s. This mill could process 6 tons of partly oxidized ore each day with a 70 percent recovery by amalgamation.
Six tons of ore from the 64 Mine were milled in an arrastra in 1909 and yielded $40 per ton in gold. The ore was later treated at Trader's mill on Olive Creek, where a cyanide tank was installed in the early 1930s to help process the ore.

In 1908, a steam-powered arrastra, which was later powered by a gas engine, was built at the Burpee Mine. The arrastra was later replaced by a Chilean mill.

The Swastika Mine installed a ten-stamp mill, vanners, and leaching tanks in 1913. Additional equipment was added around 1917, but the company still had not figured out the best way to treat its ore.

In 1935, the Robinson Dike Mine built a 50-tpd test mill that had a ball mill, flotation units, and cyanide tanks. During 1935 and 1936, over 4,000 tons of ore were mined and milled with a reported recovery of 95 percent.

A small arrastra was built at the Dillinger Mine in 1895. After the fall of that year, the mine was sold to the Idaho Comstock Mining and Milling Company and operated with that property.

A four-stamp mill was built at the North Star Mine in 1902, and plans were made to install a cyanide plant. Over the next several years, the North Star milled ore from the Black Diamond and Dillinger mines and, occasionally, the North Star itself. In 1937, the mill was remodeled to include two flotation cells and a concentrating table.

In the summer of 1909, a four-stamp mill with a capacity 10-12 tpd was moved from the Comstock Mine to the Penn-Dixie. It was started up in December of that year. In 1912 the company added cyanide tanks. In 1915, a steam-powered stamp mill was installed. The mill was sold in 1917 and moved to the Swastika Mine.

In 1929, the 25-tpd mill at the War Eagle Mine had a flotation plant. The mill was upgraded in 1931. This mill was probably active until around 1939.

A small rotary reduction mill was built at the Mammoth Mine in 1931. This mill broke down after crushing less than five tons of ore. In 1935, a 25-tpd flotation mill was built. Large-scale operations continued until August 1938, and the mine operated intermittently until 1963.

In 1907, ore from the Dixie Royal was milled in an arrastra and reportedly yielded $5,000 in gold. A two-stamp, water-powered mill was built on the property in 1924. This mill processed a small tonnage of ore. By 1939, the mill building was in ruins and the ore was sent to the Comstock mill.

It is not known when the Gold Master mill was built. Parts of a Wilfley table found in the ruins of the mill indicate at least some of the ore was processed by gravity separation.
2.4 HYDROLOGY AND HYDROGEOLOGY

The study area covers the Forest Service lands in parts of the drainage of Crooked Creek and in the drainages of other tributaries to the Salmon River (Figure 2.1-1). All of the streams in the study area eventually flow into the Salmon River.

As noted, a number of the mines in the study area are hosted by granitic rocks of the Idaho batholith. Most of the batholith rocks do not contain significant values of base metals. Table 1.5-3 (based on 384 samples taken from the southern part of the Atlanta lobe of the batholith) shows these rocks contain an average of 60 ppm zinc, 18 ppm lead, and 6 ppm copper. Water discharges from the mines in the area reflect the metal content of the underlying rocks. Neumann and Close (1991) analyzed samples from a number of properties in the study area.

To test how the metal content of the country rock was impacting stream waters, two reference water samples were collected. The chemical analyses for these samples are shown in Tables 2.4-1 and 2.4-2, along with water quality standards suggested by the Environmental Protection Agency (EPA). The following reference water samples were collected:

- B7169907—Hundred Dollar Gulch
- E8130002—Fitz Creek

Sample B7169907 equals or exceeds all standards for cadmium in the total recoverable metals test. Sample E8310002 from Fitz Creek did not exceed any water quality standards.

2.5 SUMMARY OF THE DIXIE STUDY AREA

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 at the Burpee Mine; aluminum, cadmium, iron, and manganese at the Tiawaka Mine; aluminum, cadmium, copper, lead, zinc, iron, and manganese at the Swastika Mine; and lead, iron, and manganese at the War Eagle Mine. Cadmium and copper in excess of one or more water quality standards are the most prevalent water quality variances in the Dixie study area. The elements detected in the water samples are also found in the rock units underlying the drainages.

2.5.2 Tailings and Mine Waste Samples

Samples were collected from most of the properties where tailings were present or 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 2.4-1. Dissolved metals in reference water samples from the Dixie study area, Nez Perce National Forest, Idaho County, Idaho.

<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>B7169907</td>
<td>Hundred Dollar Gulch, reference</td>
<td>---</td>
<td>0.00170</td>
<td>0.0150</td>
<td>---</td>
<td>0.0070</td>
<td>0.0830</td>
<td>---</td>
<td>0.0064</td>
<td>---</td>
<td>0.016</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>E8310002</td>
<td>Fitz Creek, reference</td>
<td>---</td>
<td>0.00078</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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</tr>
</tbody>
</table>

**EXPLANATION**

Blank space equals no analysis

Below Detection Limit is ---

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
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</thead>
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<tr>
<td>Primary MCL</td>
<td>0.050</td>
<td>2.000</td>
<td>0.005</td>
<td>0.100</td>
<td>0.050</td>
<td>0.100</td>
<td>0.100</td>
<td>0.100</td>
<td>0.002</td>
<td>0.100</td>
<td>0.100</td>
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<tr>
<td>Secondary MCL</td>
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<td></td>
<td>1.000</td>
<td>0.300</td>
<td>0.05</td>
<td>5.000</td>
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<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.360</td>
<td>0.004-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.8-2.0</td>
<td>0.0024</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
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<tr>
<td>Aquatic Life, Chronic</td>
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<td>0.190</td>
<td>0.001-0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.000012</td>
<td>0.16-0.28</td>
<td>0.11-0.19</td>
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<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.074</td>
<td>0.0007</td>
<td>0.0014</td>
<td>0.0019</td>
<td>0.0080</td>
<td>0.0067</td>
<td>0.0053</td>
<td>0.0025</td>
<td>0.0013</td>
<td>0.0005</td>
<td>0.001</td>
<td>0.0019</td>
</tr>
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</table>
Table 2.4-2. Total recoverable metals in reference water samples from the Dixie study area, Nez Perce National Forest, Idaho County, Idaho. Numbers in bold-face type exceed one or more water quality standards.

<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>B7169907</td>
<td>Hundred Dollar Gullch, reference</td>
<td>0.017</td>
<td>0.006</td>
<td>0.0100</td>
<td>0.011</td>
<td>0.200</td>
<td>0.0084</td>
<td>0.016</td>
<td>0.0220</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E8310002</td>
<td>Fitz Creek, reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**EXPLANATION**

Blank space equals no analysis

Below Detection Limit is ---

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.050</td>
<td>2.000</td>
<td>0.005</td>
<td>0.100</td>
<td>0.050</td>
<td>0.002</td>
<td>0.10</td>
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</tr>
<tr>
<td>Secondary MCL</td>
<td>0.05-0.2</td>
<td>0.360</td>
<td>0.004-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.08-0.2</td>
<td>0.050</td>
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</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.360</td>
<td>0.004-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.08-0.2</td>
<td>0.050</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.190</td>
<td>0.001-0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.00012</td>
<td>0.016</td>
<td>0.11-0.28</td>
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</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
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<td>0.003</td>
<td>0.0082</td>
<td>0.015</td>
<td>0.0025</td>
<td>0.0017</td>
<td>0.0005</td>
<td>0.013</td>
<td>0.0063</td>
<td></td>
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</tbody>
</table>
Table 2.5-1. Dissolved metals in water samples from the Dixie study area, Nez Perce National Forest, Idaho County, Idaho. Numbers in bold-face type exceed one or more water quality standards.

<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>B7139901</td>
<td>Tasiwaka Mine (EC-172), pond outlet</td>
<td>0.093</td>
<td>0.00440</td>
<td>0.0190</td>
<td>---</td>
<td>---</td>
<td>0.0083</td>
<td>0.7400</td>
<td>---</td>
<td>0.0520</td>
<td>---</td>
<td>---</td>
<td>0.0074</td>
</tr>
<tr>
<td>B7139903</td>
<td>Ontario Mine (EC-190), Adit 1</td>
<td>---</td>
<td>0.00130</td>
<td>0.0180</td>
<td>---</td>
<td>---</td>
<td>0.00073</td>
<td>0.0029</td>
<td>---</td>
<td>0.015</td>
<td>0.0053</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7149901</td>
<td>Burpee Mine (EC-157), adit seep</td>
<td>0.110</td>
<td>0.00190</td>
<td>0.0091</td>
<td>---</td>
<td>---</td>
<td>0.0230</td>
<td>0.0029</td>
<td>---</td>
<td>0.014</td>
<td>0.0034</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7159901</td>
<td>Svastika Mine (EC-207), adit water</td>
<td>1.400</td>
<td>0.00180</td>
<td>0.0076</td>
<td>0.0030</td>
<td>---</td>
<td>0.0180</td>
<td>0.7600</td>
<td>0.0091</td>
<td>0.1400</td>
<td>---</td>
<td>0.034</td>
<td>0.2100</td>
</tr>
<tr>
<td>B7159902</td>
<td>Svastika Mine (EC-207), upstream</td>
<td>---</td>
<td>0.00150</td>
<td>0.0120</td>
<td>---</td>
<td>---</td>
<td>0.0072</td>
<td>0.0160</td>
<td>---</td>
<td>0.0026</td>
<td>---</td>
<td>0.019</td>
<td>0.0071</td>
</tr>
<tr>
<td>B7159909</td>
<td>Robinson Dike Mine (EC-202)</td>
<td>0.079</td>
<td>0.00240</td>
<td>0.0170</td>
<td>---</td>
<td>---</td>
<td>0.0067</td>
<td>0.0700</td>
<td>---</td>
<td>0.0058</td>
<td>---</td>
<td>---</td>
<td>0.0022</td>
</tr>
<tr>
<td>B7159911</td>
<td>Black Diamond Mine (EC-199)</td>
<td>---</td>
<td>0.00140</td>
<td>0.0093</td>
<td>---</td>
<td>---</td>
<td>0.0110</td>
<td>0.0180</td>
<td>---</td>
<td>0.0048</td>
<td>---</td>
<td>0.013</td>
<td>0.0150</td>
</tr>
<tr>
<td>B7169905</td>
<td>Unnamed Mine (B7169905), adit water</td>
<td>---</td>
<td>0.00140</td>
<td>0.0160</td>
<td>---</td>
<td>---</td>
<td>0.0082</td>
<td>---</td>
<td>---</td>
<td>0.0025</td>
<td>---</td>
<td>---</td>
<td>0.0024</td>
</tr>
<tr>
<td>E8310001</td>
<td>War Eagle Mine (EC-625), Adit 1</td>
<td>---</td>
<td>0.03400</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.4300</td>
<td>0.0110</td>
<td>0.1100</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.0720</td>
</tr>
</tbody>
</table>

**EXPLANATION**

Blank space equals no analysis

Below Detection Limit is ---

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.050</td>
<td>2.000</td>
<td>0.005</td>
<td>0.100</td>
<td>1.0000</td>
<td>0.300</td>
<td>0.050</td>
<td>0.002</td>
<td>0.100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary MCL</td>
<td>0.05-0.2</td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
<td>0.300</td>
<td>0.05</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.360</td>
<td>0.004-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.082-0.2</td>
<td>0.0024</td>
<td>1.4-2.5</td>
<td>0.12-0.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.190</td>
<td>0.001-0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.00012</td>
<td>0.16-0.28</td>
<td>0.11-0.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.074</td>
<td>0.0007</td>
<td>0.0014</td>
<td>0.0019</td>
<td>0.0080</td>
<td>0.0067</td>
<td>0.0053</td>
<td>0.0025</td>
<td>0.0013</td>
<td>0.0005</td>
<td>0.001</td>
<td>0.0019</td>
</tr>
</tbody>
</table>
Table 2.5-2. Total recoverable metals in water samples from the Dixie study area, Nez Perce National Forest, Idaho County, Idaho.
Numbers in bold-face type exceed one or more water quality standards.

<table>
<thead>
<tr>
<th>Field No.</th>
<th>Location</th>
<th>Al (ppm)</th>
<th>As (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>B7139901</td>
<td>Tsiwaka Mine (EC-172), pond outlet</td>
<td>0.023</td>
<td>0.006</td>
<td>0.0160</td>
<td>0.017</td>
<td>0.840</td>
<td>0.0550</td>
<td>0.026</td>
<td>0.0140</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7139903</td>
<td>Ontario Mine (EC-190), Adit 1</td>
<td>0.021</td>
<td>0.008</td>
<td>0.0210</td>
<td>0.014</td>
<td>0.054</td>
<td>0.0046</td>
<td>0.018</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7149901</td>
<td>Burpee Mine (EC-157), adit seep</td>
<td>0.011</td>
<td>---</td>
<td>0.0100</td>
<td>--</td>
<td>0.086</td>
<td>0.0047</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7159901</td>
<td>Swastika Mine (EC-207), adit water</td>
<td>0.010</td>
<td>0.006</td>
<td>0.0130</td>
<td>0.025</td>
<td>0.750</td>
<td>0.1400</td>
<td>0.033</td>
<td>0.1800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7159902</td>
<td>Swastika Mine (EC-207), upstream</td>
<td>0.014</td>
<td>0.004</td>
<td>0.0150</td>
<td>0.014</td>
<td>0.055</td>
<td>0.0057</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7159909</td>
<td>Robinson Dike Mine (EC-202)</td>
<td>0.021</td>
<td>0.007</td>
<td>0.0160</td>
<td>0.014</td>
<td>0.130</td>
<td>0.0078</td>
<td>0.013</td>
<td>0.0088</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7159911</td>
<td>Black Diamond Mine (EC-199)</td>
<td>0.011</td>
<td>---</td>
<td>0.0150</td>
<td>0.013</td>
<td>0.034</td>
<td>0.0069</td>
<td>0.015</td>
<td>0.0330</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7169905</td>
<td>Unnamed Mine (B7169905), adit water</td>
<td>0.018</td>
<td>0.005</td>
<td>0.0150</td>
<td>0.011</td>
<td>0.035</td>
<td>0.0046</td>
<td>---</td>
<td>0.0110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E010001</td>
<td>War Eagle Mine (EC-625), Adit 1</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.400</td>
<td>0.1000</td>
<td>---</td>
<td>0.0670</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EXPLANATION**

Blank space equals no analysis

**Below Detection Limit is ---**

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>Al (mg/L)</th>
<th>As (mg/L)</th>
<th>Ba (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Cu (mg/L)</th>
<th>Fe (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Mn (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Ni (mg/L)</th>
<th>Zn (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.0500</td>
<td>2.000</td>
<td>0.005</td>
<td>0.100</td>
<td>0.0500</td>
<td>0.002</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary MCL</td>
<td>0.05-0.2</td>
<td>0.004-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.08-2.0</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>5.000</td>
</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.750</td>
<td>0.3600</td>
<td>0.004-0.009</td>
<td>1.7-3.1</td>
<td>0.018-0.034</td>
<td>1.000</td>
<td>0.08-2.0</td>
<td></td>
<td></td>
<td></td>
<td>0.00024</td>
<td>1.4-2.5</td>
</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.087</td>
<td>0.1900</td>
<td>0.001-0.002</td>
<td>0.21-0.37</td>
<td>0.012-0.021</td>
<td>0.003-0.008</td>
<td>0.000012</td>
<td>0.16-0.28</td>
<td>0.11-0.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.0007</td>
<td>0.002</td>
<td>0.003</td>
<td>0.0082</td>
<td>0.01</td>
<td>0.015</td>
<td>0.0025</td>
<td>0.0017</td>
<td>0.0005</td>
<td>0.013</td>
<td>0.0063</td>
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</tr>
</tbody>
</table>
Table 2.5-3. Element screen for dump and tailings samples from mines in the Dixie study area, Nez Perce National Forest, Idaho County, Idaho.

<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>B7159904</td>
<td>Swastika Mine (EC-207), waste dump</td>
<td>140</td>
<td>160.00</td>
<td>15.00</td>
<td>7.8</td>
<td>13.0</td>
<td>32,000</td>
<td>130.0</td>
<td>1,400</td>
<td>17.0</td>
<td>270</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7159908</td>
<td>Comstock Mine (EC-204), mill tailings</td>
<td>---</td>
<td>72.00</td>
<td>1.50</td>
<td>17.0</td>
<td>220.0</td>
<td>22</td>
<td>4,700.0</td>
<td>380</td>
<td>11.0</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B8010001</td>
<td>Hematite Mine, mill tailings</td>
<td>---</td>
<td>36.00</td>
<td>1.40</td>
<td>12.0</td>
<td>410.0</td>
<td>17,000</td>
<td>6,800.0</td>
<td>370</td>
<td>8.6</td>
<td>18</td>
<td></td>
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</tr>
</tbody>
</table>

Clark Fork Superfund Background Levels (mg/Kg) = ppm:

<table>
<thead>
<tr>
<th></th>
<th>As</th>
<th>Cd</th>
<th>Pb</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Mean Soil</td>
<td>6.7</td>
<td>0.7</td>
<td>20.0</td>
</tr>
<tr>
<td>Helena Valley Mean Soil</td>
<td>16.5</td>
<td>0.2</td>
<td>11.5</td>
</tr>
<tr>
<td>Missoula Lake Bed Sediments</td>
<td>NA</td>
<td>0.2</td>
<td>34.0</td>
</tr>
<tr>
<td>Blackfoot River</td>
<td>4.0</td>
<td>&lt;0.1</td>
<td>NA</td>
</tr>
<tr>
<td>Phototoxic 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 (TCLP) for dump and tailings samples from properties in the Dixie study area, Nez Perce National Forest, Idaho County, Idaho.

<table>
<thead>
<tr>
<th>Field No.</th>
<th>Location</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>B7159904</td>
<td>Swastika Mine (EC-207), waste dump</td>
<td>0.043</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>1.200</td>
<td></td>
</tr>
<tr>
<td>B7159908</td>
<td>Comstock Mine (EC-204), mill tailings</td>
<td></td>
<td>0.890</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>1.700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B8010001</td>
<td>Hematite Mine, mill tailings</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>8.100</td>
<td>0.0007</td>
<td>---</td>
<td>---</td>
<td>1.200</td>
</tr>
</tbody>
</table>

**EXPLANATION**

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

**WATER QUALITY STANDARDS**

<table>
<thead>
<tr>
<th></th>
<th>As (mg/L)</th>
<th>Cd (mg/L)</th>
<th>Cr (mg/L)</th>
<th>Pb (mg/L)</th>
<th>Hg (mg/L)</th>
<th>Se (mg/L)</th>
<th>Ag (mg/L)</th>
<th>Ba (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary MCL</td>
<td>0.050</td>
<td>0.005</td>
<td>0.100</td>
<td>0.050</td>
<td>0.002</td>
<td>0.050</td>
<td></td>
<td>2.000</td>
</tr>
<tr>
<td>Secondary MCL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.100</td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Acute</td>
<td>0.360</td>
<td>0.004 - 0.009</td>
<td>1.7 - 3.1</td>
<td>0.082 - 0.2</td>
<td>0.002</td>
<td></td>
<td>0.0041 - 0.0134</td>
<td></td>
</tr>
<tr>
<td>Aquatic Life, Chronic</td>
<td>0.190</td>
<td>0.001 - 0.002</td>
<td>0.21 - 0.37</td>
<td>0.003 - 0.008</td>
<td>0.000012</td>
<td>0.00012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Detection Level (33% confidence)</td>
<td>0.49</td>
<td>0.02</td>
<td>0.03</td>
<td>0.500</td>
<td>0.01</td>
<td>0.650</td>
<td>0.270</td>
<td>0.050</td>
</tr>
</tbody>
</table>
3.0 MINE DESCRIPTIONS—NEZ PERCE NATIONAL FOREST, DIXIE AREA

3.1 UNNAMED PROSPECT (Site No. B7139901a)

3.1.1 Site Location and Access (Figure 2.1-1)

This prospect is about 50 feet west of FS Road 222C1 in the NE¼ of the NE¼ of section 28 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.1-1). Road 222C1 turns north off FS Road 222C several hundred feet west of FS Road 222, on the north edge of the town of Dixie. Blue flagging marks several trees in the area. The prospect is on Forest Service land.

3.1.2 Geologic Features (Figure 2.2-1)

This prospect is in the schist and quartzite of the Middle or Early Proterozoic Syringa metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993). The dump is composed of granite and quartz fragments.

3.1.3 Site History

Nothing is known of the history of this prospect.

3.1.4 Environmental Conditions

3.1.4.1 Site Features

The prospect was visited by Earl Bennett on July 13, 1999. A video segment describing the site, which is called the 64 Mine in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:05:56-0:09:59). Documenting photos are Roll 99B1, frames 1-3.

The workings include a caved adit or trench and a shaft. The shaft is about 35 feet across, 15 feet deep, and is overgrown with vegetation. It is just south of the northeast-trending trench, which is probably a caved adit. A cone-shaped waste dump, consisting of granite with some quartz fragments, is probably from the shaft. The disturbed area covers about 1 acre.

3.1.4.2 Sample Locations

3.1.4.2.1 Solid Samples

No solid samples were collected.

3.1.4.2.2 Water Samples

No water samples were collected.
3.1.5 Structures
There are no structures at the site.

3.1.6 Safety
There are no safety hazards at the site.
Figure 3.1-1. Location of Unnamed Prospect, Site No. B7139901a, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
3.2 TIAWAKA MINE (Site No. EC-172)
Alternate names—Ti Waka; Loyalty; Old Rorie.

3.2.1 Site Location and Access (Figure 2.1-1)

The Tiawaka Mine is on a branch of Fourth of July Creek, about 1 mile northwest of Dixie, in the NW¼ of the NE¼ of section 28 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.2-1). From FS Road 222, the property can be reached via FS Road 222C1 north about 1 mile, then west about ½ mile on FS Road 9528. The site is on Forest Service land.

3.2.2 Geologic Features (Figure 2.2-1)

The Tiawaka Mine is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993). It is also possible these rocks may be Yellowjacket Formation. Weathered granite is exposed in the placer trenches. The underground workings explored quartz veins in granite.

3.2.3 Site History

McKay (1996, p. 185-187) reported the following on the history of the Tiawaka Mine:
The Tiawaka claim was located next to the Ajax on Fourth of July Creek, 1 1/4 miles northwest of Dixie. It was a producing mine for a number of years. In the late 1930s an estimated 550 tons of ore had been milled from the property. Rory Burke and Andrew J. Taylor located the claim in 1895. In 1981, former Dixie miner Lee Graves reported a rumor that the mine was started by two partners who argued; one murdered the other, and that man’s ghost, named “Bean,” comes out between 4 and 5 p.m. every evening (neither Burke nor Taylor were murdered, however).

By fall of 1904 F. M. Hinds, of Clearwater and Dixie, owned the mine. The 10’ vein had been developed by a 65’ shaft at that time. Within a year Rory Burke was again an owner, and in September of 1905 Charles Booi, Dixie merchant, obtained a third interest in the mine by agreeing to install and operate a five-ton Kincaid mill. The trio worked on the mine that winter and found that the ore assayed over $40 per ton. The mill was described as a new type invented by a man from Portland. In 1906 the mine produced gold bullion and iron concentrates, and the partners installed a concentrator there that year. In 1907 they began roasting their ore to improve the results from the amalgamation process. The mill, however, was not run for long because the amalgamation process was not suited to the sulfide ores; in fact, one report said that nearly as much gold was obtained in the tailings as in the feed. By 1911 the development consisted of a 100’ crosscut tunnel, a 62’ shaft, and a 30’ drift on the vein with a raise to the surface, revealing a vein of low-
grade ore 16' wide with a shoot of high-grade ore 3 1/2'-5' wide that gave mill returns of over $60 per ton. At that time there was a small Merrill mill and a Christensen concentrator on the property, plus a 1/2-mile ditch and a 300' tramway that ran from the mouth of the tunnel to the ore bin.

The Tiawaka is next mentioned in 1930, when it was again being developed. In 1932 Rory Burke, who still owned it, installed a mill on the property. That summer Charles Houchens, Bob Quigley, and Harry Michaud prepared to sink a shaft in the tunnel of the mine, which they had bonded from Burke, and they lived at the mine with their families. In 1933, the Tiawaka and the Gold Leaf mines produced 40 tons of gold ore combined. That year Rory Burke leased the mine to W. L. Crow & Company of Portland. The company incorporated as Tiawaka Mines, Inc., in 1934, and that year they employed an average of five men. In November 1934 a new 15-ton mill began to operate. The next year the crew was enlarged to ten men, and flotation cells and a cyanide plant were added to the mill. By 1935 the total development was 530', and five men were on the crew. In that year the mine was subleased to Carl Klink scales, H. C. Pownall, and Rodney Keating and incorporated as Loyalty Mines. In 1937 the company did 68' of development work, and in 1939 they shipped ore to the Clearwater Concentrating Company's custom mill near the confluence of the South Fork of the Clearwater and the Crooked River. The total development was 513'. The mine operated until at least 1939.

In 1937 the Tiawaka mine was equipped with the following: gas engine, hoist and skip, compressor, Straub jaw crusher, conveyor belt, McCormick-Deering diesel engine driving 37.5 kw., De Laval generator, motor-driven 15-ton Straub ball mill, cyanide tanks, and a half dozen new buildings, including the shaft house and mill. At that time the 150' inclined shaft was partly filled with water. In 1986 the Tiawaka had three log cabins, an outhouse, a root cellar, and the mill.

Development on the property in 1934 included several short tunnels totaling about 300 feet. A 50-foot shaft was sunk in 1935 by four men. Loyalty Mines added a 10 tpd cyanide circuit to the mill in 1936. The inclined shaft was 150 feet long at that time.

3.2.4 Environmental Conditions

3.2.4.1 Site Features

The Tiawaka Mine was visited by Earl Bennett on July 13, 1999. A video segment describing the site, which is identified as the 64 Mine in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:10:03-0:20:11). Documenting photos are Roll 99B1, frames 4-10.
The property consists of both lode and placer workings. The lode site consists of a shaft, a collapsed mill, and a collapsed log cabin. The placer site, which is 500 feet northeast and downhill from the shaft, has another cabin and a large placer trench (Figure 3.2-2).

Two pits and a waste dump are at the shaft site (Figure 3.2-3). The largest pit, which has timbers collapsed into it, is probably the caved shaft. The smaller pit may have been used as a base for the hoist or other equipment. The waste dump is composed of granite with some bull quartz and measures 90 feet long, 15 feet wide, and 20 feet thick on the nose. West of the shaft is a small pond that has a 30-foot dam on the south end (Figure 3.2-4). One side of the dam has been breached. This pond is probably a tailings impoundment, although no mill tailings were noted. However, some may be in the bottom of the pond. It is also possible the pond was used to provide water for the mill. The collapsed mill building is a pile of boards, timbers, and sheet metal (Figure 3.2-5). An old engine is in the ruins. This site covers about 1 acre.

The second collapsed cabin and the placered ground are bordered by Fourth of July Creek on the east. Several trenches and pits appear to be placer workings in weathered granite (Figure 3.2-6). The large trench is about 200 feet long and 60-70 feet wide at the widest. Small channels may have formed where gravel was washed out by the placer operations. Most of the site is overgrown with small trees. Several small piles of bull quartz are in the area. There is also a pit located about halfway between the placer site and the shaft site. The placer site covers 1-2 acres.

3.2.4.2 Sample Locations

3.2.4.2.1 Solid Samples
No solid samples were collected.

3.2.4.2.2 Water Samples

Sample B7159901 was collected from the outlet of the pond, which is probably a tailings impoundment.

<table>
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<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity ($\mu$S)</th>
<th>Temperature ($^\circ$ F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>32</td>
<td>58</td>
<td>6.8</td>
<td>10</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.2.4.2.3 Analytical Results

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

Sample B7139901 is within the range of the Secondary MCL and exceeds the Aquatic Life Chronic standard for aluminum and exceeds the Secondary MCLs for iron and manganese in the
dissolved metals screen. In the total recoverable metals screen, cadmium equals or exceeds all standards, iron and manganese exceed the Secondary MCLs, and copper and nickel are within the range of the Aquatic Life Chronic standard.

3.2.5 Structures

Two collapsed log cabins are at the Tiawaka, one at the shaft site (Figure 3.2-7) and one at the placer site (Figure 3.2-8). A junk car body and parts of several cars are next to the cabin at the shaft. The mill building is on the road due west of the cabin at the shaft site. The mill is completely collapsed, with some equipment still in the ruins.

3.2.6 Safety

Protruding nails in the lumber of the collapsed mill are a minor hazard at the site.
Figure 3.2-1. Location of the Tiawaka Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.2-2. Sketch of the Tiawaka Mine site.
Figure 3.2-3. Caved shaft and collapsed headframe(?) at the Tiawaka Mine. An abandoned car is in the trees at the upper left (Roll 99B1, frame #7).

Figure 3.2-4. Pond at the Tiawaka Mine, looking southeast. This pond is most likely a tailings impoundment (Roll 99B1, frame #9).
Figure 3.2-5. Collapsed mill building at the Tiawaka Mine (Roll 99B1, frame #8).

Figure 3.2-6. Placer trench northeast of the Tiawaka shaft along Fourth of July Creek (Roll 99B1, frame #4).
Figure 3.2-7. Collapsed log cabin near the Tiawaka shaft. An old stove and an abandoned car body are near the cabin (Roll 99B1, frame #6).

Figure 3.2-8. Collapsed log cabin near the placer trench at the Tiawaka Mine (Roll 99B1, frame #10).
3.3 AJAX MINE (Site No. EC-175)
Alternate name—Mountain Boy; Midas.

3.3.1 Site Location and Access (Figure 2.1-1)

The Ajax Mine is on the east side of Fourth of July Creek in the SE¼ of the NE¼ of section 28 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.3-1). Access from FS Road 222 is on FS Road 222C1 north about ¼ mile to a new access road that goes west to the mine. FS Road 222C is about 50 feet on the opposite side of Fourth of July Creek from the site. The mine is on patented claims surrounded by National Forest land.

3.3.2 Geologic Features (Figure 2.2-1)

The Ajax Mine is near the contact between the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) and Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.3.3 Site History

The following history of the Ajax Mine is from McKay (1996, p. 132, 136-8):

The Ajax lode mine was one of Dixie’s best producers. It was located 3/4 mile northwest of Dixie, in Midas Gulch on a ridge between Fourth of July and Boulder Creeks. The property included three claims patented in March of 1901: Ajax, Monitor, and Mountain Boy. The vein lay in a shear zone in granitic country rock, and it varied in width from a few inches to 11', making it one of the widest in the district. The vein struck north 40 degrees west and dipped 80 degrees north. Within 50-60' of the surface, the ore was free milling, but heavy sulfides were encountered below that level, and no ore was mined below 200'. An andesite dike that outcropped west of the shaft was encountered during the workings.

Sam Dillinger reportedly found the Ajax lode in the 1860s, getting assays of $8 per ton from the outcroppings, but he was not interested in the property. Thomas Pritchard and William Yolen Williams located the Mountain Boy in 1896. James P. Turner, Dixie’s first postmaster, developed the property for some six years, packing the ore on mules about four miles to Dillinger’s arrastra on Rhett Creek for removal of the gold. Turner sold the property in 1900 for $13,500 to John A. Finch and A. B. Campbell of Spokane. They had apparently been leasing the mine, as in December of 1899 Jesse Couiter was developing the Ajax for them. In 1899 Thomas Bollman, Dixie merchant, reported that the leading company in Dixie was the Midas Gold Mining Company, managed by William Springer, which was employing 17 or 18 men. By 1900, approximately 200 tons had been stoped out and milled, and the vein was said to be 11' wide. In the late 1890s the two-stamp steam-powered mill on the Ajax averaged $22 per ton, all free-milling gold.
Finch and Campbell spent approximately $75,000 developing the Ajax. They installed hoisting machinery, and at the end of 1901 they built a steam-powered ten-stamp mill. This mill (or the earlier two-stamp mill) was built by Green W. Dalias, a California miner who fought in the 1877 conflict with the Nez Perce. The stamps reportedly could handle 40 tons of ore per day, and in one 30-day period the company netted about $20,000. When the mill started operation in December of 1901, the company was employing 21 men underground to stope out the ore. Until reaching the sulfide ores, the company stope out free-milling gold ore with average values of over $22 per ton. Each five tons of the sulfide ore yielded one ton of concentrates assaying $80-90 per ton, and the concentrates were shipped to a smelter. The mine was developed by a 365' inclined shaft going about 300' below the surface, plus drifts and crosscut tunnels from each level totaling about 550', at times with three shifts of workers. Finch and Campbell became discouraged by the difficulty of treating the sulfide pegmatite ores, which at depth were too refractory for efficient milling and amalgamation. They considered installing a set of Huntington mills in the summer of 1902, to lessen the loss of values in the slimes, but they apparently did not do so. Cyanidation was tried as a treatment method but was not successful, according to one report; another version (Thomson and Ballard 1924) says the former owners reported that cyanidation of the mill concentrates was successful. In the fall of 1903, the owners pulled the pumps. Eventually they sold the mill to the American Eagle Company of Elk City and abandoned the property. According to Sweeney (1982), the mine closed because of litigation due to a disagreement over claim ownership of the Ajax properties. A little work continued to be done on the mine over the next few years. In 1904, a cyanide run of 80 tons of concentrates on the Ajax dump resulted in a saving of $82 per ton. In 1909, the average value of ore from a 16' vein on the Ajax was $13 per ton.

The Ajax was a large employer for the few years it operated, keeping as many as 100 men busy. A number of long-time Dixie residents, including Louis Larson and George Trader, worked at the Ajax, but many of the employees were transient laborers. The town of Midas, or Midasville, was started when the Midas Gold Mining Company began developing the Ajax mine. The town had a population of 200-300, making it larger than Dixie for a time, but it declined immediately when the mine closed in 1903. The community of Midas boasted a large boarding house and a general merchandise store. Besides cabins, many wall tents also housed company employees.

The Ajax mine was briefly reopened in the 1930s. In 1931 a small amount of gold ore was produced, and in 1934 the mine produced a concentrate assaying $22 a ton in gold. Mrs. Sophia Stantial of Los Angeles owned the Monitor claim from at least 1931 until 1937. In the 1940s, a caretaker lived at the Ajax mine.
By 1939, the mine buildings and equipment were in ruins and the workings had caved in. The ten-stamp mill was operated by steam, fueled by wood, and the Ajax woodyard is still evident today. By 1981, the only building still standing at the mine was a log stable.

3.3.4 Environmental Conditions

3.3.4.1 Site Features

The Ajax Mine was visited by Earl Bennett on July 13, 1999. A video segment describing the site, which is identified as the Slip Easy Mine in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:20:14-0:27:44). Documenting photos are Roll 99B1, frames 11-19.

The site has a caved shaft with two large waste dumps, several prospect pits, and three collapsed log structures (Figure 3.3-2). The pit of the shaft is about 15-20 feet in diameter and 10 feet deep (Figure 3.3-3). One of the waste dumps for the shaft extends southeast from the shaft to the access road. This dump is 80 feet long, 20 feet wide, and 20 feet thick, and has been partly removed by road construction (Figure 3.3-4). Some of the dump material may have been used as road metal. Adjacent to the southwest side of the pit is a large conical waste dump approximately 35 feet across at the bottom and 20 feet thick (Figure 3.3-5). Beams and timbers of a collapsed structure, probably a headframe, are on the dump and the side of the pit (Figure 3.3-6).

East of the shaft and across the access road are several shallow prospect pits (Figure 3.3-7). These pits are typically about 15 feet in diameter and 10 feet deep. A number of trenches scattered around the area were dug to explore for the vein. A small, recently constructed pond, which is lined with a blue tarpaulin, is several hundred feet south of the shaft and across the road. The pond is behind an earth-filled dam. A small amount of water has accumulated in the pond (Figure 3.3-8). The disturbed area covers about 7-10 acres.

3.3.4.2 Sample Locations

3.3.4.2.1 Solid Samples
No solid samples were collected.

3.3.4.2.2 Water Samples
No water samples were collected.

3.3.5 Structures

There are three collapsed buildings at the site. Two are near the shaft and one is along Fourth of July Creek south of the shaft. Near the shaft are a partly collapsed log cabin (Figure 3.3-9) and a completely collapsed building. The lower cabin along the creek is also nearly collapsed (Figure 3.3-10). The collapsed headframe at the shaft is the only other structure at the site.
3.3.6 Safety
   There are no significant safety hazards at the site.
Figure 3.3-1. Location of the Ajax Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.3-2. Sketch of the Ajax Mine.
Figure 3.3-3. Pit of the caved shaft at the Ajax Mine (Roll 99B1, frame #12).

Figure 3.3-4. Looking southeast across the waste dump for the shaft at the Ajax Mine. The access road crosses the center of the picture (Roll 99B1, frame #15).
Figure 3.3-5. Conical waste pile beside the shaft at the Ajax Mine. Boards and beams of a structure, probably the headframe, are collapsed on the side of the dump (Roll 99B1, frame #14).

Figure 3.3-6. Collapsed boards and beams, probably from the headframe for the Ajax shaft (Roll 99B1, frame #13).
Figure 3.3-7. Prospect pits east of the access road to the Ajax Mine (Roll 99B1, frame #11).

Figure 3.3-8. Small, recently constructed pond south of the Ajax shaft. The blue tarpaulin lining the pond has collected a small amount of water (Roll 99B1, frame #19).
Figure 3.3-9. Log cabin near the shaft at the Ajax Mine. The roof has collapsed, but the walls are still standing. A nearby structure (not seen in this picture) is completely collapsed (Roll 99B1, frame #16).

Figure 3.3-10. Nearly collapsed log cabin along Fourth of July Creek south of the shaft (Roll 99B1, frame #18).
3.4 AMERICAN MINE (Site No. EC-176)
Alternate names—American Gold; Standard.

3.4.1 Site Location and Access (Figure 2.1-1)

The American Mine is on the slope west of FS Road 222 near the north end of Dixie, in the SW¼ of section 27 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.4-1). The workings are on Forest Service land.

3.4.2 Geologic Features (Figure 2.2-1)

The American Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). McKay (1996, p. 138) cited the following information on the geology of the American Mine:

The vein was a gold-quartz-pyrite vein. According to Cosper (1938), “The ore shoots are sheared and brecciated lenses of quartz and oxidized pyrite, with varying thicknesses of gouge separating the vein-quartz from the partly-silicified granitic wall rock.” Capps and Roberts [(1939)] describe the vein as lying in a shear zone in granite, fractured and pinching out completely in places. The vein was about 2' wide, with a strike of north 80 degrees west and a dip of 65 degrees northeast.

3.4.3 Site History

McKay (1996, p. 138-139) reported the following on the history of the American Mine:
The American Gold mine is a group of three claims located on the east side of the road to Elk City about 3/4 mile north of Dixie. . . .

The first claim was originally located in 1893 by a Mr. Johnson and his partner, and they built a two-stamp steam-powered mill in 1897 or 1898. They operated the mill for one year, milling about 1,000 tons, and plated $10 to $14 per ton. The partner then left to join the rush to the Klondike, and Mr. Johnson quit. Next, Helen Smith of Dixie located the claim in approximately 1900 and hired Louis Larson of Dixie to sink a 75' shaft on the No. 2 vein. The mine was worked intermittently until 1931.

In 1931 Otto Gamson staked the property but did not record the claim or do location work. That year, A. C. Conrad cyanided about 30 tons of tailings at the American Gold, with a recovery of nearly $25 per ton. Betty and William Wiles of Lewiston and Maurice Vanrasdal of Dixie relocated claim No. 1 in 1932 and claims No. 2 and 3 in 1933 and 1934. They later also located the two claims of the Standard group. In 1934 Roberts and Hollingsworth leased the property, built a 15-ton ball mill, and treated a small amount of ore. H. H. Underhill of Spokane
and others incorporated the American Gold Mining Corporation in 1936 and subleased the mine, but they operated it only a few days in 1937 because of litigation. Samples of the ore were tested in 1938, and it was found that neither gravity concentration nor flotation treatment methods would work with the ore; treatment of the low-grade ore by cyanidation was recommended. The 1934 mill was located 100' west of and 25' above Crooked Creek, directly across the road from the portal of the main adit. The mill was in a wooden building and had an assaying room, and there was also a one-room 20' x 25' building on the site (the owners were living in a larger cabin 1/4 mile up the road on Boulder Creek). At that time the main adit was 277' long and was on the No. 2 claim. The No. 1 claim had a 39'-long adit and the old shaft sunk by Larson. The No. 3 had a 60' adit and an open cut. In 1940, the Bonanza Mining & Milling Company had a lease and option on the property and was employing an average crew of six men.

Between 1934 and 1938, the mine produced 40 tons of ore that yielded 12.6 ounces of gold and 10 ounces of silver. In 1989 or 1990, the property was held by Stanley and Hazel Linder of Bellingham, Washington (Neumann and Close, 1991).

3.4.4 Environmental Conditions

3.4.4.1 Site Features

The American Mine (Figure 3.4-2) was visited by Earl Bennett on July 13 and 14, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:27:48-0:29:55). Documenting photos are Roll 99B1, frame #20, and Roll 99B3, frames 23-25.

The upper adit (Figure 3.4-3) is caved and has a dump measuring about 20 feet long, 10 feet wide, and 10 feet thick. Two shallow prospect pits are near the adit. The adit and pits are in granite.

The lower, main adit (Figure 3.4-4) is near the north end of the town of Dixie along the west side of the main street (FS Road 222). This adit is also caved and has a very small seep. The waste dump has been removed by road building. Several prospect pits are on the slope between the upper and lower adits.

The total disturbed area covers less than 0.5 acre.

3.4.4.2 Sample Locations

3.4.4.2.1 Solid Samples

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

3.4.5 Structures
   There are no structures at the site.

3.4.6 Safety
   There are no safety hazards at the site.
Figure 3.4-1. Location of the American Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.4-2. Sketch map of the American Mine (Neumann and Close, 1991, Figure 7).
Figure 3.4-3. Caved upper adit at the American Mine (Roll 99B1, frame #20).

Figure 3.4-4. Caved lower (main) adit at the American Mine (Roll 99B3, frame #23).
3.5 FOUR DEUCES MINE (Site No. B7139904)
Alternate names—Four Dueces; Father Lode; Lucky Bar; Monitor.

3.5.1 Site Location and Access (Figure 2.1-1)

The Four Deuces Mine is on the north side of Fourth of July Creek in the SW¼ of section 27 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.5-1). The site is about ¼ mile west of Dixie along FS Road 222C, which connects to the 222 main road just north of the town’s fire station building. The mine is on Forest Service land.

3.5.2 Geologic Features (Figure 2.2-1)

The Four Deuces Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). The mine explored quartz veins in the granite. Few signs of sulfides were noted on the dump.

3.5.3 Site History

McKay (1996, p. 153) gave the following history of this property:

The Four Deuces lode mine was located on Fourth of July Creek. The first known owner was Shorty Lehman. In approximately 1942 Maude Pratt and Hazel Gibson purchased the property and worked the mine there. A privy still stands on the site, but other buildings have been moved off.

3.5.4 Environmental Conditions

3.5.4.1 Site Features

This site was previously visited by Earl Bennett in 1995 and was revisited by Earl Bennett on July 13, 1999. A video segment describing the site, which is referred to as the Four D in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:29:57-0:32:15). Documenting photos are Roll 99B1, frames 21-22.

When visited in 1995, this adit had a wooden gate and was caved (but fenced and signed “Danger”). The portal was covered with timber for about 100 feet in front of the adit. When revisited in 1999, the covered portal had been removed, but the logs from the covering remain on the ground in front of the adit. The adit was partially caved but open (Figure 3.5-2). Water from a minor seep trickles from the adit and flows into a long shallow trough extending from the adit (Figure 3.5-3) before disappearing into the dump. The waste dump contains granite with some quartz fragments, but no sulfides were noted. An outhouse in good condition is on the dump, and a small trench is behind the outhouse. An old abandoned car is directly across the road from the adit. The disturbed area covers about 1 acre.
3.5.4.2 Sample Locations

3.5.4.2.1 Solid Samples
   No solid samples were collected.

3.5.4.2.2 Water Samples
   No water samples were collected.

3.5.5 Structures

The outhouse was the only structure found at the site. Piles of timbers, probably from the portal structure that formerly extended from the adit, are along the trough in front of the adit.

3.5.6 Safety

The adit is partly open and can be entered.
Figure 3.5-1. Location of the Four Deuces Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.5-2. Opening into the adit at the Four Deuces Mine. Weathered granite debris blocks part of the timbered opening. A minor seep flows through the weathered rubble (Roll 99B1, frame #21).

Figure 3.5-3. Trough in front of the adit at the Four Deuces Mine. The timbers at the left may be from the portal structure that previously covered the entrance to the adit (Roll 99B1, frame #22).
3.6 PRICHARD MINE (Site No. EC-180)
Alternate names—Fourth of July; Pritchard.

3.6.1 Site Location and Access (Figure 2.1-1)

The Prichard Mine is on the south side of Fourth of July Creek in the SE¼ of section 28 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.6-1). The westernmost adit is on FS Road 222C about ¼ mile northwest of Dixie. The main workings are about ¼ west of Dixie on FS Road 9529. This road turns off FS Road 222 at the north side of the town’s fire station. All of the workings are on Forest Service land.

3.6.2 Geologic Features (Figure 2.2-1)

The Prichard Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). McKay (1996, p. 153) noted the following on the geology of the mine:

The only sulfide seen in the ore was pyrite, partly altered to limonite. The vein struck north 77 degrees west and dipped 70-80 degrees northeast. It was from 18" to 2' wide and lay in a shear zone in quartz monzonite.

3.6.3 Site History

The following history of the Prichard Mine is from McKay (1996, p. 153-154):

Thomas Pritchard, a native of Wales, located the Fourth of July group of three quartz claims on July 4, 1893 (the deposit may have been discovered in 1866, as a lode named Fourth of July was recorded then in the Elk City district). It was on the west side of Crooked Creek, near the mouth of the creek and the town of Dixie. Pritchard and R. E. Roberts also filed on the Fourth of July placer in 1894, which overlapped some with the Fourth of July quartz claim. Pritchard worked the claim alone for a number of years, and it was reported that by 1909 he had produced over $10,000 in gold from the mine. . . . In 1909, ore from the Fourth of July lode mine averaged $40 per ton on a 3' ledge. Pritchard soon drove an adit and stope out some ore. By 1900 the tunnel was 150' long and had numerous crosscuts. In 1896 Pritchard built an 8'-diameter (later called a 10'-diameter) arrastra powered by an overshot water wheel that was located at the adit mouth and could be operated only during the spring run-off season. The water wheel was about 22' high and about 4' wide, and the recovery rate was less than 75%, yielding about $40 per ton. The flume poured water into the buckets, and the weight of the water turned the wheels. Pritchard mined the ground until 1909. He roasted the ore before grinding it in the arrastra. After Pritchard left Dixie in approximately 1920, he married and settled in the Red River Valley. His arrastra and cabin were gone by 1966. Pritchard continued to own the Fourth of July until at least 1937.

In the 1930s Art McInroy leased the Fourth of July mine and hand-picked five tons of ore from the property, which he sent to the smelter at Kellogg. By the end of

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the 1930s it had been worked to a depth of about 25'. The Fourth of July mine reportedly yielded approximately $13,000 in gold. In 1986 a cabin and an outhouse were still standing on the Fourth of July lode claim.

3.6.4 Environmental Conditions

3.6.4.1 Site Features

The Prichard Mine was visited by Earl Bennett on July 13, 14, and 15, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:32:20-0:38:57). Documenting photos are Roll 99B1, frame 23; Roll 99B3, frames 21-22; and Roll 99B6, frames 23-25.

The westernmost adit is on the south bank of Fourth of July Creek. It is across from where a bridge on FS Road 222C crosses the creek and just below FS Road 9529. The adit has a log portal with a collapsing log gate, but the adit is completely caved behind the portal (Figure 3.6-2). The waste dump, composed of granite, is only 15 feet long and 3 feet thick. It is built out into the wetland along the creek. The disturbed area covers less than 0.25 acre.

The main workings are southeast of the westernmost adit and are also on the south side of the creek. A tar paper-covered shack is above a deep open cut in weathered granite (Figure 3.6-3). The cut is littered with garbage, timbers from a collapsed headframe, and parts of an old hoist. The dump material is so overgrown that size estimates are impossible.

Just east of the cut is a caved adit, probably the main tunnel at the mine. There is a large trench in front of the adit. Several of the portal timbers are intact, but others have collapsed (Figure 3.6-4). Heavy-duty mine rails cross the thin, overgrown waste dump.

Another caved adit is about 200 feet east of the previous adit. The portal of this adit is also timbered (Figure 3.6-5). The small waste dump is on the wetland along the creek. The disturbed area at these workings covers about 1 acre.

3.6.4.2 Sample Locations

3.6.4.2.1 Solid Samples
No solid samples were collected.

3.6.4.2.2 Water Samples
No water samples were collected.

3.6.5 Structures

The tar paper-covered shack (Figure 3.6-6) was the only structure found at the site.

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3.6.6 Safety
There are no safety hazards at the site.
Figure 3.6-1. Location of the Prichard Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.6-2. Portal timbers and collapsing gate at the western adit at the Prichard Mine (Roll 99B1, frame #23).

Figure 3.6-3. Deep open cut at the Prichard Mine. Parts of a hoist are in the cut, along with recent garbage. The steep roof of the shack is above the cut (Roll 99B3, frame #22).
Figure 3.6-4. Caved adit just east of the deep cut at the Prichard Mine. This may have been the main tunnel at the mine. The peak of the cabin is visible above the caved adit (Roll 99B6, frame #24).
Figure 3.6-5. Caved adit about 200 feet east of the main adit (Roll 99B6, frame #23).

Figure 3.6-6. Tar paper-covered shack above the deep cut at the Prichard Mine (Roll 99B3, frame #21).
3.7 JUANITA MINE (Site No. EC-191)
Alternate names—Great Eastern; Mammoth.

3.7.1 Site Location and Access (Figure 2.1-1)

The Juanita Mine is on the ridge south of Dixie and west of Crooked Creek, in the NE¼ of the SE¼ of section 33 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.7-1). The mine is just west of FS Road 9534 on spur road 9534F. Road 9534 joins FS Road 222 about ¼ mile south of the Dixie cemetery. The mine is also accessible on Road 9534 from roads going west from the main Dixie townsite. The mine is spread over several acres and includes an upper pit (caved shaft) and a lower pit and caved adit (Figure 3.7-2). Shaft, adit, and prospect symbols are noted on the topographic map at this site. All of the workings are on Forest Service land.

3.7.2 Geologic Features (Figure 2.2-1)

The Juanita Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.7.3 Site History

McKay (1996, p. 156-157) reported the following information on the history of the Juanita Mine, which she called the Great Eastern:

The Great Eastern was one of the earliest quartz discoveries in Dixie. It was located about one mile south of Dixie on a tributary of Crooked Creek, on the west slope of Mineral Hill (a little south of the Dixie Chief). It was not located near the later well-known Mammoth mine on Mammoth Mountain, as at least one author believed; the confusion derives from the fact that an early claim near the Great Eastern was called the Mammoth in the 1890s and early 1900s, and one company that developed the Great Eastern was known as the Mammoth and Great Eastern Company. In the summer of 1892 Charles "Woodtick" Williams and a Mr. Long (probably J. O. Long) owned the property. They spent the winter of 1891-1892 at the property, and in the spring of 1892 they built a horse-powered arrastra there.

In 1893 Charles Williams ran a tunnel at least 70' on the Great Eastern, and that summer they crushed free-milling ore in the arrastra. That fall, Frank Milhoan bought the Great Eastern for a company he represented. The next fall C. D. Galvin bonded Williams' interest in the claim, and he placed orders for nine months' provisions for a crew of 14 men to develop both the Great Eastern and the Buckeye. The mine is next mentioned in 1898, when Spokane parties through Gavin Johnson bonded it and planned to put a crew of men to work. By October Johnson had installed a two-stamp mill, one of the first stamp mills in Dixie, and
was making it pay. By 1899, the mine was being managed by a Mr. Gibson, representing British Columbia capitalists.

The pace of development increased in 1900 and 1901, when a crew of men did further development work on the Great Eastern. The mine reportedly had low-grade ore about 5' in width that averaged $25 per ton, and it was developed by tunnels and 150' of shaft. Andrew Prader was the superintendent of the Mammoth and Great Eastern Company in 1902 (the company was working on both claims, which were near each other). By January of 1902 880' of work had been completed. The Mammoth had free-milling gold in a pay streak 2'-3' wide, with average assays of $30 per ton. The Great Eastern ore shoot was 15'-30' wide with assays of $5-$6 per ton. By the fall of 1903 a shaft had been sunk on the Mammoth, and ore was being treated at the Dixie Queen mill. By 1905, however, the company had abandoned the claims. In 1904 Rory Burke and William Sendker owned the Great Eastern. Dixie residents Mark Perry and Snowshoe Brown ran a 50' tunnel on the Great Eastern. In 1912 Sendker organized a company to take over the Mammoth, but both mines were apparently again abandoned after this point, as there is no mention of them again under the names Mammoth or Great Eastern. In 1931 Shorty Modello bought the Juanita mine, formerly the Mammoth, from Dick Byers.

3.7.4 Environmental Conditions

3.7.4.1 Site Features

The Juanita Mine was visited by Earl Bennett on July 13, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:39:02-0:43:48). Documenting photos are Roll 99B1, frames 24-25, and Roll 99B2, frames 1-5. Several additional photos were taken during a visit to the site in 1995.

A large pit, measuring 20 feet in diameter and 15 feet deep, is probably a caved shaft (Figure 3.7-3). The pit is fenced with poles and has old danger signs posted (Figure 3.7-4). A notice at the pit (visible from the road) states that Lisa Auoriene Dawson Hill staked the property on 8/21/93. The waste dump is long and thin, measuring 115 feet long, 5 feet wide, and 15 feet thick on the nose (Figures 3.7-5 and 3.7-6).

About 200 feet northwest and downhill from the pit is a collapsed, dry adit (Figure 3.7-7). The waste dump is small, measuring 40 feet long, 5 feet wide, and 8 feet thick on the nose (Figure 3.7-8). A pile of timbers and steel-capped wooden rails are on the dump. Above the adit is a small pit or, more likely, part of the collapsed adit (Figure 3.7-9). A circular waste dump 15 feet in diameter is next to the pit. This dump may be material excavated in an attempt to gain access to the caved adit. Several prospect pits are also in the vicinity of these workings.

The site covers several acres, but the disturbed area covers less than 1 acre.
3.7.4.2 Sample Locations

3.7.4.2.1 Solid Samples
No solid samples were collected.

3.7.4.2.2 Water Samples
No water samples were collected.

3.7.5 Structures
There are no structures at the site.

3.7.6 Safety

Although the shaft pit is relatively deep, it is completely caved and is surrounded by a log fence to give ample warning. Therefore, it is not a significant hazard.
Figure 3.7-1. Location of the Juanita Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.7-2. Sketch of the Juanita Mine.
Figure 3.7-3. Pit of the caved shaft at the Juanita Mine (1995 Roll 517702, frame #19).
Figure 3.7-4. Log fence surrounding the caved shaft at the Juanita Mine (1995 Roll 517702, frame #20).

Figure 3.7-5. Waste dump for the shaft at the Juanita Mine (1995 Roll 517702, frame #18).
Figure 3.7-6. Waste dump for the shaft. The fence around the shaft is in the background (Roll 99B1, frame #24).

Figure 3.7-7. Caved adit at the Juanita Mine, looking southeast. The dump is for the pit above the adit (Roll 99B2, frame #1).
Figure 3.7-8. Looking northwest along the waste dump for the caved adit at the Juanita Mine (Roll 99B2, frame #2).

Figure 3.7-9. Pit above the caved adit at the Juanita Mine. The dump seen in Figure 3.7-7 is from this pit (Roll 99B2, frame #3).
3.8 ONTARIO MINE (Site No. EC-190)

3.8.1 Site Location and Access (Figure 2.1-1)

The Ontario Mine is about ¼ mile west of the Juanita Mine in the N½ of the SE¼ of section 33 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.8-1). Access is on an unnamed road off FS Road 9534 that goes to the Dixie Queen Mine, then on another unnamed road that turns off to the south, parallels Hundred Dollar Gulch, and ends at the Ontario Mine. The property is shown as a patented claim on the Forest Service engineering topographic map of the Dixie quadrangle.

3.8.2 Geologic Features (Figure 2.2-1)

The Ontario Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.8.3 Site History

McKay (1996, p. 173-174) reported the following on the history of the Ontario Mine: The Ontario mine was located about 1/2 mile southwest of Dixie, approximately 2,000' above the mouth of Hundred Dollar Gulch. P. S. “Jake” Pritchard and A. W. Brownell located the group in 1893 (or George Blaine in 1885), and they leased it to Thomas and Frank Hye in 1896. The ore shoot was about 3' wide, mostly free milling, and carried much quartz and iron sulfide.

By 1900 George Blaine and others owned the property, and Blaine continued to be associated with it through at least 1911, when he patented the claim. Some ore was milled in 1901 and 1902 by the Dixie Queen’s steam-driven, 10-stamp mill, but water in the shaft caused difficulties. Reported ore values ranged from $12 to $76 per ton. By 1911 the workings included a 40' shaft and a 300' tunnel that tapped the vein about 100' deep, and it was considered one of the best-developed claims in the district. In 1932 J. F. Millins relocated the Ontario group, and J. B. McDonald owned it in the early 1930s through 1937. In the late 1930s Leonard Rufus Baker and Frank and Ronald Roberson leased the mine, and they hauled ore to the Kellogg smelter and also to the local Comstock and Hugo mills. They had a hand windlass at the mine at that time.

3.8.4 Environmental Conditions

3.8.4.1 Site Features

The Ontario Mine was visited by Earl Bennett on July 13, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:43:52-0:49:30).
Documenting photos are Roll 99B2, frames 6-12. Several additional photos were taken during a previous visit to the site in 1995.

The access road ends at an extensive waste dump (90 feet long, 25 feet wide, and 35 feet thick on the nose, but only 6 feet thick at the adit; Figure 3.8-2) and a caved adit (Figure 3.6-3). Water (about ½ gallon per minute) flows from a pipe extending from the adit. Below the dump is a large, collapsed ore bin (Figure 3.8-4) and a big pile of quartz. Across from the waste dump and ore bin are the footings for another structure and a sheet-metal chimney. A small drainage flows along the east side of the dump and forms a small wetland below it.

Uphill and east of the main adit are several additional adits. About 40 feet above the main adit is a trench or collapsed adit. The small waste dump indicates no more than 75-100 feet of workings. Above this small adit(?) and slightly to the east is a larger caved adit with a fairly substantial double dump. Mine rails extend out from the adit onto the dump (Figure 3.8-5). Between this upper adit and the lower, main adit are several more pits and trenches.

The site covers about 4 acres.

3.8.4.2 Sample Locations

3.8.4.2.1 Solid Samples

No solid samples were collected.

3.8.4.2.2 Water Samples

Water sample B7139903 was collected from the lower, main adit.

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<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>not taken</td>
<td>7.9</td>
<td>0.5</td>
<td>Yes</td>
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</tbody>
</table>

3.8.4.2.3 Analytical Results

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

Sample B7139903 from the lower adit does not exceed any standards in the dissolved metals screen. In the total recoverable metals screen, cadmium equals or exceeds all standards, and copper and nickel are within the range of the Aquatic Life Chronic standard.
3.8.5 Structures

The only structure at the site is the ore bin, which is completely collapsed. The footings for another building and a sheet-metal chimney are near the lower adit. The foundation measures 30 feet long and 10 feet wide, but the purpose of the structure is unknown.

3.8.6 Safety

There are no safety hazards at the site.
Figure 3.8-1. Location of the Ontario Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.8-2. Waste dump for the lower adit at the Ontario Mine. The logs at the base are part of the collapsed ore bin (Roll 99B2, frame #7).

Figure 3.8-3. Caved lower adit at the Ontario Mine (1995 Roll 517703, frame #6).
Figure 3.8-4. Collapsed ore bin below the waste dump for the lower adit at the Ontario Mine (1995 Roll 517703, frame #5).

Figure 3.8-5. Larger of the upper caved adits at the Ontario Mine. Mine rails extend onto the dump from the caved adit (Roll 99B2, frame #12).
3.9 DIXIE QUEEN MINE (Site No. EC-185)

3.9.1 Site Location and Access (Figure 2.1-1)

The Dixie Queen Mine is on the west side of Hundred Dollar Gulch in the SE ¼ of the NE ¼ of section 33 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.9-1). Access is via FS Road 9534 and a poor spur to this road (not shown on the topographic map) that goes west across the gulch to the mine. The mine is on Forest Service land.

3.9.2 Geologic Features (Figure 2.2-1)

The Dixie Queen Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.9.3 Site History

The following historical account of the Dixie Queen Mine is from McKay (1996, p. 149-150): The Dixie Queen mine is located about two miles south of Dixie, about 2000' above the mouth of Hundred Dollar Gulch. There were eight veins on the property, and the group of claims included: the Dixie Queen, Evergreen, Pilgrim, Scrap Iron, and Marguerite. The assays reportedly averaged $14 per ton, but values up to $80 were reported. P. S. (Jake) Pritchard and A. W. Brownall located the claim in 1893 and leased it to Thomas and Frank Hye in 1896. The Hye brothers sank a two-compartment shaft 250' on the vein and drifted on the 120' level. In the winter of 1899 the Idaho Development Company (Frank Hye manager) had about 11 men working on developing the Dixie Queen and the Ironsides.

By the summer of 1901 a shaft had been sunk 175' and more drifting had been done. A sawmill on the property was producing the lumber needed for the ten-stamp mill, which was installed in November of that year (the sawmill was moved in 1903 to the LeRoy mine on Crooked River). The steam-driven Dixie Queen mill, described as the largest and most complete in the district in 1902, ran five stamps on its own ore and five stamps on custom work for other mines (it handled several hundred tons of ore from the Ontario mine, for example). In 1902 the owners (the Hye brothers and W. H. Plummer) bonded the Dixie Queen, with its $40,000 worth of machinery, to a Chicago party under an agreement that called for the expenditure of $1,000 per month until 1,000' of underground work had been done. By 1903, however, it was found that at depth the values diminished so much that their extraction and treatment by crushing and amalgamation was unprofitable, and water in the shaft caused problems. In 1904 the hoist from the Dixie Queen was installed on the Oregon mine in the Orograde district, and the mill was removed to the LeRoy mine in the Elk City district in 1903 (in 1908 the
Black Diamond bought a five-stamp mill from Frank Hye, which probably means that the LeRoy bought a five-stamp battery, not the full ten stamps. There was reportedly a three-story boarding house at the Dixie Queen, plus cabins; a log building and a cabin exist today. In 1932 J. F. Millins relocated the claim, but little additional development work was done.

3.9.4 Environmental Conditions

3.9.4.1 Site Features

The Dixie Queen Mine was visited by Earl Bennett on July 13, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:49:33-0:54:57). Documenting photos are Roll 99B2, frames 14-16. Several additional photos were taken during a visit to the site in 1995.

The site includes a caved shaft, a caved adit, trenches, and several partly and completely collapsed buildings (Figure 3.9-2). The caved shaft forms a pit 35 feet in diameter and 15 feet deep (Figure 3.9-3). Timbers on the dump probably mark the location of the hoist. The waste dump for this shaft is 80 feet long, 25 feet wide, and 40 feet thick on the nose (Figure 3.9-4).

A partly collapsed cabin is uphill from and northwest of the shaft. Directly below the cabin is the caved adit with a very minor seep (Figure 3.9-5). Below the adit and shaft are at least two collapsed buildings along Hundred Dollar Gulch (Figure 3.9-6). The remains of a partly collapsed cabin are below the dump for the shaft. The collapsed building is on the small, thin dump from a shallow trench, which may be a short, caved adit. The dump from this trench is 20 feet in diameter and 2 feet thick.

The gulch appears to have been placered, and there are placer spoils near the gulch below the workings. The buildings near the creek may be related to that activity. Several small trenches are on the hillside above the buildings. No remnants of the old stamp mill were noted, and no tailings were found. The disturbed area covers about 3 acres.

3.9.4.2 Sample Locations

3.9.4.2.1 Solid Samples

No solid samples were collected.

3.9.4.2.2 Water Samples

No water samples were collected.
3.9.5 Structures

Two partly collapsed cabins and one totally collapsed building are at the site. One partly collapsed cabin is above the caved adit, and the other is below the waste dump for the shaft. The collapsed building is on a small, thin dump from a shallow trench.

3.9.6 Safety

There are no safety hazards at the site.
Figure 3.9-1. Location of the Dixie Queen Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.9-2. Sketch of the Dixie Queen Mine.
Figure 3.9-3. Caved shaft at the Dixie Queen Mine (Roll 99B2, frame #14).

Figure 3.9-4. Part of the waste dump for the shaft at the Dixie Queen Mine. The pit of the caved shaft is near the center of the picture (1995 Roll 517702, frame #36).
Figure 3.9-5. Caved adit at the Dixie Queen Mine. A partly collapsed cabin is directly above the adit (Roll 99B2, frame #15).

Figure 3.9-6. Lower cabin at the Dixie Queen Mine. Most of the walls are intact, but the roof has completely collapsed (Roll 99B2, frame #16).
3.10 SLIP EASY MINE (Site No. EC-169)

3.10.1 Site Location and Access (Figure 2.1-1)

The Slip Easy Mine is on Boulder Creek in the SW¼ of the SW¼ of section 22 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.10-1). From FS Road 222 at the north end of Dixie, access is a short distance on FS Road 9527, then about ½ mile on spur Road 9527E along Boulder Creek to the mine. The property covers about 3 acres on both sides of the creek and is on Forest Service land.

3.10.2 Geologic Features (Figure 2.2-1)

The Slip Easy Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). The mine workings followed quartz veins in the granitic rocks.

3.10.3 Site History

McKay (1996, p. 182-183) noted the following information on the history of the Slip Easy Mine:
The Slip Easy was a group of five claims located 1 3/4 miles northwest of Dixie on the ridge between Boulder Creek and Dixie Gulch. The first known output was in 1933, when the mine treated four tons of gold-bearing ore by amalgamation and concentration. In 1939 William Willes was the owner, but the mine was under lease and bond to William Hugo. Eight tons of ore had been shipped to the Kellogg smelter and yielded $22 per ton. A steam-powered mill with flotation cells and cyanide tanks had been installed on the property, and some ore was treated in it. Three veins had been opened, the most productive of which struck north 38 degrees west and dipped steeply to the northeast. The mine was not in operation in 1937, and at that time most of the workings were caved in. In 1940, however, the mine did produce some gold. In 1986 two cabins and the mill were visible at the mine.

3.10.4 Environmental Conditions

3.10.4.1 Site Features

The Slip Easy Mine was visited by Earl Bennett on July 14, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 0:55:00-1:00:54). Documenting photos are Roll 99B2, frames 17-23.

The site consists of a caved adit with a large waste dump, a collapsed mill building, and three collapsed cabins (Figure 3.10-2). The access road ends at a parking area on the south side of the creek near two of the cabins; the third cabin is about 150 feet east of the parking area.

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The caved adit and waste dump are on the north side of the creek across from the parking area. A trough on the slope marks the caved adit (Figure 3.10-3). The dump measures about 90 feet long, 25 feet wide, and 10 feet thick (Figure 3.10-4). The toe of the dump approaches the creek, but does not impinge on it. A few small prospect pits in granite are above the adit (Figure 3.10-5). On the east side of the dump are the ruins of a collapsed mill building. An old engine and other scrap metal are near the collapsed building.

3.10.4.2 Sample Locations

3.10.4.2.1 Solid Samples
   No solid samples were collected.

3.10.4.2.2 Water Samples
   No water samples were collected.

3.10.5 Structures

The collapsed mill building is on the east side of the adit waste dump (Figure 3.10-6). A motor, some pipe, and scrap metal are in or near the ruins. Two collapsed log cabins are next to the parking area; one is on the west side and the other on the east (Figures 3.10-7 and 3.10-8). A third collapsed cabin is about 150 feet east of the parking area along the access road. Pieces of scrap metal are scattered around the site, particularly near the collapsed buildings.

3.10.6 Safety

The relatively minor hazards of protruding nails and sharp metal edges are associated with the collapsed buildings.
Figure 3.10-1. Location of the Slip Easy Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.10-2. Sketch of the Slip Easy Mine.
Figure 3.10-3. Caved adit at the Slip Easy Mine, looking north (Roll 99B2, frame #20).

Figure 3.10-4. Looking south at the waste dump from above the caved adit (Roll 99B2, frame #19).
Figure 3.10-5. One of the shallow prospect pits on the slope above the adit (Roll 99B2, frame #18).

Figure 3.10-6. Collapsed mill building at the Slip Easy Mine (Roll 99B2, frame #21).
Figure 3.10-7. The western of two collapsed log cabins near the parking area at the Slip Easy Mine (Roll 99B2, frame #22).

Figure 3.10-8. Collapsed log cabin and metal scrap on the east side of the parking area at the Slip Easy Mine (Roll 99B2, frame #23).
3.11 L & L MINE (Site No. EC-166)

3.11.1 Site Location and Access (Figure 2.1-1)

The L & L Mine is on the ridge between Boulder Creek and Dixie Gulch in the NW¼ of the SW¼ of section 22 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.11-1). Access from FS Road 222 at the north end of Dixie is north on FS Road 9527 about ¾ mile to Road 9527D. The mine is less than ½ mile northwest on Road 9527D and is on Forest Service land. A marked snowmobile route passes near the caved shaft.

3.11.2 Geologic Features (Figure 2.2-1)

The L & L Mine is in Cretaceous biotite granodiorite of the Idaho batholith near northeast-trending faults (Lewis and others, 1990, 1993). McKay (1996, p. 161) described the deposit as follows:

   The vein was about 3' wide and carried a pay shoot 8" wide that yielded $35 per ton. The ore occurred in shoots 20'-80' long that ran along the strike in a shear zone. The vein was 6"-8" in width, striking west, and was milky quartz with irregularly distributed sulfides. Locally it contained lenses of the silicified granitic country rock.

3.11.3 Site History

McKay (1996, p. 161-163) reported the following on the history of the L & L Mine:

   The L & L mine was a group of eight claims and a mill site located about two miles north of Dixie, on the divide between Boulder Creek and Dixie Gulch at an elevation of 6200'. In 1904 the claims were the Colfax, Quebec, Triangle, Wasp, Professor, Tenderfoot, Nipper, and Cimitar. Louis Larson came to Dixie in 1895, and he located the L & L mine in 1896. James Lynch was also interested in the claim, so the partners located and named it the L & L. In 1899 Larson bought out Lynch, and he continued to work the property in a small way for many years, treating the ore in an arrastra. Before he built his own arrastra, Larson treated about 250 tons of ore at the Pritchard arrastra on Fourth of July Creek, with a reported recovery of $6,000. In the 1930s he cyanided the tailings for additional gold recovery.... The work was concentrated on six ore shoots above the adit level, with about 1,300 tons of ore mined by the late 1930s. In 1909 the development work included a crosscut tunnel 300' long, plus a 125' shaft (by the late 1930s there was a 120' shaft and about 700' of tunnels, drifts, and crosscuts). The average recovery was $35 per ton in gold, with values up to $60, and there were some silver values. In 1909, ore from the Professor mine averaged $15 per ton on a 30" vein. By 1909 Rory Burke and F. M. Hinds owned the Professor claims, which at that time were developed by a 35' shaft showing both copper and gold, open cuts, and a 100' crosscut.
Larson’s arrastra, at the mouth of Dixie Gulch, was water-powered, using an undershot wheel fed by water from a ditch/flume system that came from Nugget Gulch. At the outlet of the ditch a flume brought the slow-moving water into the upper end of a penstock. A pipe carried the water from the bottom of the penstock to a 2” nozzle aimed at the bottom of the water wheel. Larson built a long snow shed over the ore car track from the portal of the tunnel, past a blacksmith shop and a small ore bin, to the dump. During the winters Larson would mine the ore and bring it over 1/4 mile to the arrastra using a light sled that he designed, a canvas sled that held 500 pounds. He roasted the ore during the winter, before the milling began in the spring or summer. Before feeding the ore to the arrastra, Larson would break it with a hammer to fist-sized or smaller pieces. When the arrastra was grinding ore, Larson lived at the site in a room close to the tub, and he would sprinkle quicksilver over the ore every once in a while and feed in more ore as necessary. The arrastra would grind ore continuously until with the ore or the water ran out. The arrastra saved only the free-milling gold, which represented about 50% of the values.

In 1903 M. F. Tytler of Seattle bonded a number of claims in the Dixie area, including the L & L, and he kept it under bond until 1905. He planned to put in a hoist and a cyanide plant and a Huntington mill. Although Tytler did accomplish some underground development work and put up the head frame for the hoist, it does not appear that he ever installed the proposed mill. By the spring of 1905 Larson was again at work at his mine, pounding out “a good grub stake.” He continued to mine and mill ore from the L & L using his arrastra through 1932.

To recover the gold in the sulfide ores, Larson hired A. C. Conrad to set up leaching tanks and zinc shavings boxes to treat the tailings by cyanidation. He converted the arrastra into a cyanide tank, using an improvised bucket-line and a shift on the undershot water wheel. Another bucket-line took the solutions from the cyanide tank to the settling tanks. The total cost of the plant was $7.80 plus the costs for lime and cyanide. Although he had not stockpiled all his tailings, he ran what he could through the cyanide tank to recover more of the remaining values. In 1933 Larson reportedly amalgamated 25 tons of gold ore from the L & L and cyanided 160 tons from old tailings and a prospect. By 1936 Larson had moved to Lewiston, where he died in 1941. He told a reporter that “the secret of his success in his chosen work is work.”

Ernest W. and Minnie Wagner bought the L & L mine from Larson (trading a home in Lewiston for the mine) in the late 1930s. Minnie Wagner was the aunt of Pearl Chittick, another Dixie resident, and she and her husband Jim and brother Frank Wagner helped work the mine. They replaced rotted timbers, cleared the track to the shaft, and rebuilt the shaft (they spanned the glory hole with trees and set up a gallows frame and ore bucket). They also installed a small flotation mill. The mine was active through at least 1939.
A 1938 description, of the L & L mine said that the ore was mined by hand and hoisted in a sinking bucket by a single-drum, 18"-diameter gasoline-driven hoist. The bucket dumped directly into an ore car that trammed the ore a short distance to a 50-ton ore bin. The ore from the bin was crushed in a 4" x 6" Straub jaw crusher and elevated by a small bucket elevator to the feed scoop of a 20" x 30" ball mill, which operated in closed circuit with a small Esperanza-type drag classifier. An amalgamating cylinder was attached to the discharge trunion of the ball mill. The classifier overflow passed through a launder lined with corduroy, then to a storage pond (where it was stored for future cyanidation). The mill could process six tons of partly oxidized ore per 24 hours. The recovery by amalgamation was 70%. The power source for the mill was a gasoline engine that used five gallons of gas per ten hours of operation. There was also a sawmill at the mine, with a 3,000 board feet per day capacity.

In 1986 the L & L mine site had a collapsed cabin reported to be the one built by Larson by 1896, plus a number of buildings built or moved in during the mid-1930s. The L & L #1-7 had a board-and-batten cabin, a saddle-notched log cabin, an outhouse, and two mill sites. A pole-and-shake arrastra “on Dixie Gulch,” with water wheel, was moved to Lewiston to be preserved some time before 1960; this may have been the L & L arrastra.

Some of the workings described in this history are similar to Site No. B7149903 (Section 3.13), which may have been part of the L & L Mine.

3.11.4 Environmental Conditions

3.11.4.1 Site Features

The L & L Mine was visited by Earl Bennett on July 14, 1999. A video segment describing the site, which is referred to as the 64 Mine in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:00:59-1:04:37). Documenting photos are Roll 99B2, frames 23-24, and Roll 99B3, frames 1-3. Several additional photos were taken during a visit to the site in 1995.

The property contains the large pit of a caved shaft and several small prospect pits (Figure 3.11-2). Also at the site are an ore bin and the collapsed hoist station. The pit of the caved shaft is 30 feet in diameter and about 15 feet deep (Figure 3.11-3). A collapsed structure on the south rim of the pit (Figure 3.11-4) was probably the hoist works. The waste dump is crossed by roads and divided into two lobes. The larger lobe extends to the northeast and measures 80 feet long, 10 feet wide, and 15 feet thick (Figure 3.11-5). The smaller lobe extends to the southwest and is about 35 feet long, 10 feet wide, and 4 feet thick. The ore bin is at the end of the smaller dump (Figure 3.11-6). An oblong pit about 25 feet in length is along the access road east of the shaft (Figure 3.11-7), and a smaller pit is just west of the shaft. Other small prospect pits pockmark the area. The disturbed area at the site covers about 1 acre.
3.11.4.2 Sample Locations

3.11.4.2.1 Solid Samples
No solid samples were collected.

3.11.4.2.2 Water Samples
No water samples were collected.

3.11.5 Structures

The ore bin at the southern end of the shorter lobe of the dump is mostly intact. Inside are distinctive, thin, sloping poles that are either an ore slide or a collapsed roof. Discharge chutes are at the base of the south wall of the structure. Logs and scrap metal on the ground below the bin may be the remains of the structures related to the milling operation. The collapsed building for the hoist works is the only other structure at the site.

3.11.6 Safety

The shaft is caved, but the pit is relatively deep and has steep side walls. A marked snowmobile trail passes near the north rim of the shaft. Other small pits in the area could also be a hazard to snowmobiles.
Figure 3.11-1. Location of the L & L Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.11-2. Sketch of the L & L Mine.
Figure 3.11-3. Pit of the caved shaft at the L & L Mine (1995 Roll 517702, frame #31).
Figure 3.11-4. Collapsed hoist works on the south rim of the pit of the L & L shaft (Roll 99B3, frame #3).

Figure 3.11-5. Larger of the two lobes of the L & L waste dump, looking northeast (1995 Roll 517702, frame #30).
Figure 3.11-6. Log ore bin south of the smaller lobe of the L & L waste dump. The end of the dump is visible behind the left side of the ore bin (Roll 99B2, frame #24).

Figure 3.11-7. Oblong pit along the access road east of the shaft at the L & L Mine (Roll 99B3, frame #2).
3.12 DAWSON-HUGO/M & E CLAIMS (Site No. B7149904)

3.12.1 Site Location and Access (Figure 2.1-1)

This prospect is 100 yards southeast of the L & L shaft in the NW¼ of the SW¼ of section 22 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.12-1). The prospect is on FS Road 9527D (the road to the L & L Mine). It is about ¼ mile west of Road 9527 on Road 9527D. The site is on Forest Service land.

3.12.2 Geologic Features (Figure 2.2-1)

This prospect is in Cretaceous biotite granodiorite of the Idaho batholith near northeast-trending faults (Lewis and others, 1990, 1993).

3.12.3 Site History

A claim notice at the site was posted by Gloria Dawson Teats, 2460 Mill Road, Lewiston, ID 83501. The claims were first located on 6/14/94 and were restaked on 1/27/95.

3.12.4 Environmental Conditions

3.12.4.1 Site Features

This prospect was visited by Earl Bennett on July 14, 1999. A video segment describing the site, which is described as part of the L & L Mine in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:04:41-1:07:02). Documenting photo is Roll 99B3, frame 4.

The site contains a small pit surrounded by a log fence. The pit has a small waste dump (Figure 3.12-2). Other small prospect pits 3-5 feet deep are in an area covering about 2 acres, although the actual disturbed area is probably less than 0.5 acre.

3.12.4.2 Sample Locations

3.12.4.2.1 Solid Samples

No solid samples were collected.

3.12.4.2.2 Water Samples

No water samples were collected.

3.12.5 Structures

There are no structures at the site.
3.12.6 Safety

There are no safety hazards at the site.
Figure 3.12-1. Location of the Dawson-Hugo/M & E Claims, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.12-2. Pit surrounded by a log fence at the Dawson-Hugo/M & E claims (Roll 99B3, frame #4).
3.13 UNNAMED PROSPECT (Site No. B7149903)

3.13.1 Site Location and Access (Figure 2.1-1)

This prospect is about 100 yards southeast of the Dawson-Hugo/M & E claims and about \( \frac{1}{4} \) mile southeast of the L & L Mine, in the NW\( \frac{1}{4} \) of the SW\( \frac{1}{4} \) of section 22 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.13-1). The prospect is just north of FS Road 9527D, which turns northwest off Road 9527. The site covers about 2 acres and is on Forest Service land. It could possibly be part of the L & L Mine.

3.13.2 Geologic Features (Figure 2.2-1)

This prospect is in Cretaceous biotite granodiorite of the Idaho batholith near northeast-trending faults (Lewis and others, 1990, 1993).

3.13.3 Site History

Nothing is known about the history of this site.

3.13.4 Environmental Conditions

3.13.4.1 Site Features

The prospect was visited by Earl Bennett on July 14, 1999. A video segment describing the property, which is identified as part of the L & L Mine in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:07:06-1:11:32). Documenting photos are Roll 99B3, frames 5-9.

This site (Figure 3.13-2) contains a caved adit (Figure 3.13-3) with a small seep that forms a puddle across the road. The overgrown, scallop-shaped waste dump measures 100 feet long, 100 feet wide, and 8 feet thick (Figure 3.13-4). The access road to the mine crosses the dump. The disturbed area covers less than 1 acre.

3.13.4.2 Sample Locations

3.13.4.2.1 Solid Samples

No solid samples were collected.

3.13.4.2.2 Water Samples

No water samples were collected.

3.13.5 Structures

Near the caved adit is a partially collapsed log cabin or lean-to (Figure 3.13-5). About 200 feet to the west of the adit and across a small creek is a newer collapsed building (Figure 3.13-6). A
small shelter near this building contains several 5-gallon and 1-gallon oil cans, most of which have rusted through. The contents, if any, of the other cans were not determined.

3.13.6 Safety

Protruding nails and sharp scrap metal constitute a minor hazard at the collapsed buildings, but no significant hazards were found at the site.
Figure 3.13-1. Location of Unnamed Prospect, Site No. B7149903, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.13-2. Sketch of Site No. B7149903.
Figure 3.13-3. Caved adit at Site No. B7149903 (Roll 99B3, frame #5).

Figure 3.13-4. Waste dump for the caved adit at Site No. B7149903 (Roll 99B3, frame #7).
Figure 3.13-5. Log cabin or lean-to at Site No. B7149903 (Roll 99B3, frame #6).

Figure 3.13-6. Newer collapsed building at Site No. B7149903 (Roll 99B3, frame #8).
Figure 3.13-7. Small shelter containing oil cans near the newer collapsed building (Roll 99B3, frame #9).
3.14 64 MINE (Site No. EC-159)  
Alternate names—Sixty-Four Mine; Monadnock.

3.14.1 Site Location and Access (Figure 2.1-1)

The 64 Mine is on the north side of Dixie Gulch near the center of the NW¼ of section 22 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.14-1). Access is on FS Road 9527C, which turns off of Road 9527 at Dixie Gulch. This road stops at a maintained cabin (with a green tar paper roof) and another collapsed building. The mine workings are 100 yards west of the cabin and are on Forest Service land.

3.14.2 Geologic Features (Figure 2.2-1)

The 64 Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). McKay (1996, p. 181) noted the following information on the geology of the deposit: The vein trended north 55-65 degrees west and dipped 55 degrees northeast. The vein was in a shear zone in quartz monzonite and varied from less than 1" to 3' wide. The vein was strongly sheared and banded by oxidized streaks and by lenticular inclusions of altered country rock. It was cut by a wide lamprophyre dike about 200' from the portal.

3.14.3 Site History

The following history of the 64 Mine is from McKay (1996, p. 181-182):

The Sixty-Four mine was located two miles north of Dixie, in Dixie Gulch. The group consisted of four claims: the 64, the Protection, the Dixie, and the South Nugget placer. It was reportedly discovered in 1864 and given its name at that time. The first known owner was J. B. Stowers, a banker from Oxford, Mississippi, who bought the Sixty-Four group in 1899. At that time the vein was about 3 1/2' wide and the ore assayed $8-10 per ton. The development work was two inclined shafts, 24' deep each, and a vertical shaft on the Protection claim, plus open cuts following the surface showing.

By 1900 T. S. Rackliff and B. B. Stuart owned the mine. George Trader, a Dixie blacksmith, owned the property from at least 1900 until 1930. Trader bonded the claims to Joseph Morris in 1900, who sank a shaft and had the ore treated at Trader’s mill on Olive Creek. In 1909 a tunnel was being driven 2 1/2' a shift. By 1909 there was a 100' shaft sunk on a 2 1/2'-wide vein. Six tons of ore had been milled in an arrastra and yielded $40 per ton in gold. A crosscut tunnel was being driven to tap the shaft at the depth of 90'. By 1910 Henry Hazlett was developing the property, and he worked on it until at least 1914.

In 1932 A. C. Conrad, C. P. Humphrey, and O. R. Hyde leased and bonded the Sixty-Four from George Trader, guaranteeing payment of a set amount at a later
date. They installed a cyanide tank at Trader's mill, which they planned to use to treat ore from the Sixty-Four. In 1935 William Frank Robberson leased the mine from Trader, and he shipped six tons of ore to the Kellogg smelter and received back 6 ounces of gold.

In 1986 claim numbers 1, 2, and 3 had a log cabin and an outhouse on the property.

3.14.4 Environmental Conditions

3.14.4.1 Site Features

The 64 Mine was visited by Earl Bennett on July 14, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:11:35-1:18:04). Documenting photos are Roll 99B3, frames 10-14.

The property consists of two caved adits and a caved shaft (Figure 3.14-2). An upper adit and the shaft are on the slope north of Dixie Gulch, and the lower adit, which was probably the main tunnel, is in the gulch bottom near the creek.

The caved shaft forms a pit about 20 feet in diameter and 12 feet deep. Timbers fallen into the shaft mark the location of the hoist works. The waste dump extends to the south from the pit and measures 35 feet long, 10 feet wide, and 20 feet thick on the nose (Figure 3.14-3). Several short trenches are near the shaft. East of the shaft is the trough of the upper caved adit (Figure 3.14-4). Some of the old adit timbers are near the mouth of the trough. The overgrown waste dump for this adit is about 100 feet long, 25 feet wide, and 6 feet thick (Figure 3.14-5). A few prospect pits are to the east of the adit.

About 100 yards south of and downhill from the shaft is the lower caved adit (Figure 3.14-6), which has a minor seep that disappears into the dump. A collapsed shed and a small stack of mine timbers are near the mouth of the adit trough. The irregularly shaped waste dump has several lobes, the longest of which measures 230 feet long, 15 feet wide, and 6 feet thick (Figure 3.14-7). Part of the creek near this adit appears to have been placered.

The total disturbed area at the site covers about 2 acres.

3.14.4.2 Sample Locations

3.14.4.2.1 Solid Samples
No solid samples were collected.

3.14.4.2.2 Water Samples
No water samples were collected.
3.14.5 Structures

The maintained cabin and collapsed building where the road stops may not be related to the mine. The only building at the site is the collapsed shed near the lower adit.

3.14.6 Safety

No safety hazards were found at the site.
Figure 3.14-1. Location of the 64 Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.14-2. Sketch of the 64 Mine.
Figure 3.14-3. Looking south across the caved shaft and waste dump at the 64 Mine (Roll 99B3, frame #10).

Figure 3.14-4. Looking northwest up the trough of the caved upper adit at the 64 Mine (Roll 99B3, frame #11).
Figure 3.14-5. Waste dump for the upper adit at the 64 Mine, looking southeast (Roll 99B3, frame #12).

Figure 3.14-6. Caved lower adit at the 64 Mine. This was probably the main adit. A collapsed shed is left of the adit trough, and a stack of mine timbers is in front of the trough (Roll 99B3, frame #13).
Figure 3.14-7. Waste dump for the lower adit at the 64 Mine. The dump is overgrown with small trees (Roll 99B3, frame #14).
3.15 BURPEE MINE (Site No. EC-157)
Alternate names—Lolo; Lo Lo; Pack Sack; Hewitt; Pack Saddle.

3.15.1 Site Location and Access (Figure 2.1-1)

The Burpee Mine is on FS Road 9527B (which is in poor shape) about ½ mile north of the junction with FS Road 1188, in the SE¼ of the NW¼ of section 16 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.15-1). The mine is on Forest Service land.

3.15.2 Geologic Features (Figure 2.2-1)

The Burpee Mine is near the contact between Cretaceous biotite granodiorite and Middle or Early Proterozoic biotite gneiss and schist of the Elk City metamorphic sequence(?), which forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.15.3 Site History

McKay (1996, p. 164) noted the following historical information on the Burpee Mine: The Lolo group of seven claims was located three miles northwest of Dixie on Nugget Gulch and was owned by Don A. Burpee for many years, from at least 1908 until 1930. Burpee and his sons worked the claims. In 1908 they built a steam-powered (later gas-powered) arrastra at the mine that was later replaced by a Chilean mill. Ore from the Lolo mine in 1909 averaged $30 per ton on a 3' vein. In 1911 the development work included a 45' shaft with a 154' cross-cut that was 175' long. The vein was 4' wide and averaged $10 in free gold. At approximately 50' in depth, the ore showed a dramatic decrease in gold content. The Burpees, for whom Burpee Mountain was named, left Dixie in 1915 and moved to Vermont after World War 1. In 1932, Rory Burke and A. Jess did assessment work on the mine, which they called the Pack Saddle. During the 1940s Harold Beacham worked the mine, and later Acey Hewitt built a cabin there and worked the mine until his death in 1979.

3.15.4 Environmental Conditions

3.15.4.1 Site Features

The Burpee Mine (Figure 3.15-2) was visited by Earl Bennett on July 14, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:18:08-1:21:09). Documenting photos are Roll 99B3, frames 15-17.

This is an old property consisting of two shallow pits with small waste dumps on the north side of the road, a small flattened cabin on the road, and a caved adit (Figure 3.15-3) south of the road across from the pits. The pits are probably two small shafts, both of which are caved and totally

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overgrown with alders. One of the pits is about 15 feet across and 10 feet deep. An alder-filled
ditch in front of the pits could be part of an old road.

The adit appears to go under the access road. Water is seeping from the adit at a rate of about 1-
2 gallons per minute. Wooden mine rails come out of the adit. The dump for the adit extends 50
feet from the road, but is only 3 feet wide and 3-4 feet thick. It is completely overgrown (Figure
3.15-4). The disturbed area covers about 0.5 acre.

3.15.4.2 Sample Locations

3.15.4.2.1 Solid Samples

No solid samples were collected.

3.15.4.2.2 Water Samples

Sample B7149901 was collected from the adit seep.

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<th>Flow (gpm)</th>
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<td>6.93</td>
<td>1-2</td>
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</tbody>
</table>

3.15.4.2.3 Analytical Results

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

Sample B7149901 from the adit seep exceeds the Aquatic Life Chronic standard and is within the
range of the Secondary MCL for aluminum in the dissolved metals screen. No standards are
exceeded in the total recoverable metals screen.

3.15.5 Structures

The collapsed cabin on the road is the only structure at the site.

3.15.6 Safety

There are no safety hazards at the site.
Figure 3.15-1. Location of the Burpee Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.15-2. Sketch map of the workings at the Burpee Mine (Rains, 1991, Figure 18).
Figure 3.15-3. Caved adit at the Burpee Mine, looking east (Roll 99B3, frame #17).

Figure 3.15-4. Waste dump for the adit at the Burpee Mine. The dump is completely overgrown with trees, brush, and bear grass (Roll 99B3, frame #15).
3.16 UNNAMED MINE (Site No. EC-174)

Note: Although this property was assigned the field site number of B7149902, it is actually Unnamed Mine (Site No. EC-174).

3.16.1 Site Location and Access (Figure 2.1-1)

This prospect is on the west side of Fourth of July Creek in the SW¼ of the NE¼ of section 28 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.16-1). The site is on FS Road 222C about 1 mile northwest of Dixie. It is shown by an adit and a prospect symbol on the topographic map about ¼ mile south of the Tiawaka Mine and is on Forest Service land.

3.16.2 Geologic Features (Figure 2.2-1)

This prospect is in Cretaceous biotite granodiorite near the contact with a roof pendant of Middle or Early Proterozoic quartzite and schist of the Syringa metamorphic sequence(?) (Lewis and others, 1990, 1993).

3.16.3 Site History

Nothing is known of the history of this site.

3.16.4 Environmental Conditions

3.16.4.1 Site Features

The prospect was visited by Earl Bennett on July 14, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:21:13-1:23:48). Documenting photo is Roll 99B3, frame 18.

The site contains two adits and an old cabin. The adit noted by the adit symbol on the map is open and dry, although it appeared to have previously been wet (Figure 3.16-2). The waste dump measures 20 feet long, 10 feet wide, and 3 feet thick. Iron-stained quartz fragments, an old cabin, sheet metal, and an old barrel stove are on the dump. Down the road to the east of this adit, at the location noted by the prospect symbol on the map, is a caved adit with a small waste dump that measures 30 feet long, 15 feet wide, and 20 feet thick on the nose. The disturbed area covers less than 0.5 acre.

3.16.4.2 Sample Locations

3.16.4.2.1 Solid Samples

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

3.16.5 Structures

   There is an old cabin on the dump of the open adit.

3.16.6 Safety

   The open adit is near the road and easily accessible.
Figure 3.16-1. Location of Unnamed Mine, Site No. EC-174, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.16-2. Open adit at Site No. EC-174 (Roll 99B3, frame #18).
3.17 SKYLARK MINE (Site No. EC-178)
Alternate names—Powelson; Lark; Larkspur.

3.17.1 Site Location and Access (Figure 2.1-1)

The Skylark Mine is at the head of Hundred Dollar Gulch in the SE¼ of the SW¼ of section 28 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.17-1). The property can be reached via FS Road 9534A, a spur to FS Road 9534. About ¼ mile north of the junction of these roads, Road 9534 connects with Road 222C. The property is on Forest Service land and covers 6-8 acres.

3.17.2 Geologic Features (Figure 2.2-1)

The country rock at this site is Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). The prospects are on quartz veins and stringers in the granitic rocks.

3.17.3 Site History

McKay (1996, p. 182) reported the following on the history of the Skylark:
The Skylark group of claims was located about one mile west of Dixie on the ridge between Hundred Dollar and Olive Gulches. Thomas Bollman and James P. Turner, Dixie businessmen, located the property in 1896. By 1897 Howard Powelson was the owner, and he owned and worked the mine until at least 1917. The ore was described as a soft, brown hematite with free gold and values of $10-$100 per ton, averaging about $40 (in 1909, the ore averaged $15 per ton on a 4' ledge). The country rock was quartz monzonite. Pyrite was the only sulfide seen in the ore, but small amounts of copper were reported in assays. In 1905 J. A. Whittaker of Elk City was Powelson's partner. The workings included approximately 500' of adits and crosscuts and a 40' shaft. Some ore from the mine was treated by amalgamation in 1916. After Powelson died, his son Leslie and Leslie's nephew Gosta Miller owned the property. Capps and Roberts [(1939)] reported in 1939 [1937] that 25 tons of selected ore were shipped to the Kellogg smelter and yielded $28 in gold per ton (they said the average value was $11 per ton).

3.17.4 Environmental Conditions

3.17.4.1 Site Features

The Skylark Mine was visited by Earl Bennett on July 14, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:23:53-1:27:39). Documenting photos are Roll 99B3, frames 19-20.
There are two short, caved adits at the sites noted on the topographic map. The upper, northwestern adit has a waste dump measuring 75 feet long, 4 feet wide, and 25 feet thick on the nose. The waste dump for the lower, southeastern adit is of a similar size. Numerous bulldozer trenches and cuts were dug in this area to explore for quartz veins in the granite.

3.17.4.2 Sample Locations

3.17.4.2.1 Solid Samples
No solid samples were collected.

3.17.4.2.2 Water Samples
No water samples were collected.

3.17.5 Structures
There are no structures at the site.

3.17.6 Safety
There are no safety hazards at the site.
Figure 3.17-1. Location of the Skylark Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
3.18 COMSTOCK MINE (Site No. EC-204)  
Alternate names—Idaho-Comstock; Independence; Dixie Comstock; Idaho Comstock; Comstock Independence; Seattle & Idaho.

3.18.1 Site Location and Access (Figure 2.1-1)

The Comstock Mine is on an unnamed tributary of Comstock Creek in the SE¼ of the SE¼ of section 10 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.18-1). Access from Dixie is south on FS Road 222D about 2 miles to Road 222D1. The mine is about ¼ mile southwest of this junction. The mill ruins are about ¼ mile farther down the road along Comstock Creek. The mine is on patented claims, but the mill site is on Forest Service land.

3.18.2 Geologic Features (Figure 2.2-1)

The Comstock Mine is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith. The mine is near intersecting northeast- and northwest-trending faults (Lewis and others, 1990, 1993). McKay (1996, p. 144-147) noted the following on the geology of the deposit:

The vein showed stringers and lenses of quartz in a shear zone trending north 53 degrees west, dipping steeply northeast. The country rock was mainly banded gneiss and pegmatite, and the hanging wall of the vein carried about a foot of gouge. Several lamprophyrite dikes struck northeast and cut the vein and the shear zone, but the dikes were unsheared. The only sulfide was pyrite, in part oxidized to limonite. The ore reportedly carried much lead vanadate or chromate.

3.18.3 Site History

McKay (1996, p. 144-147) reported the following history on the Comstock Mine:

The Comstock mine was one of the most productive mines in the Dixie mining district; several hundred thousand tons of ore were mined and milled there, with a reported recovery of $60,000-$250,000. The group of 12 patented and 15 unpatented claims was located on the east and south slopes of Mineral Hill about 3 1/2 miles southeast of Dixie, at approximately 5,560' on Comstock Creek. . . .

W. E. Thompson and C. A. Youngberg discovered the Comstock in the summer of 1895 and soon built quarters near the waste rock pile. William H. Phelps of Chicago and E. G. Wagner and others bought the mine by 1896. Phelps was president of the Idaho Comstock Mining and Milling Company, the Spokane and Chicago company that bought the mine from the locators. In the fall of 1895, Sam Dillinger sold his quartz claims in Dixie to the Comstock company, which continued to develop the Dillinger claim. In 1897 the company employed fourteen men excavating a mill site, clearing ground, and making flumes to bring in water.
As soon as the wagon road to Dixie was completed from Elk City in September of 1897, a four-stamp mill was hauled over it to the Comstock. It was installed 1/4 mile below the adit, on Rhett Creek [the mill ruins are on Comstock Creek, which used to be called the West Fork of Rhett Creek], and was a water-powered Fraser & Chalmers mill with a capacity of 18 tons per day, with a rock crusher, an automatic ore feeder, and two Frue vanners. At that time the shaft on the Comstock was 110' deep and on the Dillinger 42' deep. The mill, the first stamp mill in Dixie, was successful; in January of 1898 it reportedly ground out approximately $12,000 worth of gold. The company installed a steam hoist on the Dillinger lode. Ore was brought by team 1 1/2 miles from the ore bin to the mill, which was located in the center of the various claims.

The Comstock mine shut down in the early 1900s, largely because of costly litigation due to arguments among the owners. It was also reported that the original company ran all the ore in sight through the mill, divided the profits among the stockholders, and never considered further development (some, however, said there were no profits). The $50,000 mill and concentration plant sat essentially inactive until 1905, although some work was done underground. In 1903 M. F. Tytler bonded the Comstock and other claims. The Seattle and Idaho Mining and Milling Company, with Tytler as manager, operated the Comstock in 1905 with 15 employees, running the four-stamp mill and a cyanide plant that treated the concentrates (the stamp mill saved only about 50% of the values on the plates, but cyanidation saved 85% of the concentrates' values). The company installed a gasoline plant because cyanidation required much water. The new company discovered a richer vein only a few hundred feet above the mill, which they developed.

A 1906 description of the gold recovery process at the Comstock reported that the ore was crushed by two two-stamp batteries, with quadruple discharge mortars, crushing to a 4-mesh screen. The stamps ran one shift only and could crush 30 tons during that time. The ore was mined on the "glory hole" system, with one man breaking the rock and tramming it to the crusher. They leached the pulp for 24 hours. At that time the cost of mining and milling the ore was 90 cents per ton. In the summer of 1906, Richard Klesattel, who replaced Tytler as manager of the Comstock, installed a steam plant to operate the mill during times of low water, but little ore was milled after that. The mine paid for itself from the net profits of 1906 and was again sold. That fall the owner was the Hines, Burke & Booi Company (all local Dixie miners). In 1906 a strike at the Comstock (then called the Independence) showed 3' of ore assaying $358 per ton.

Development work continued on the Comstock through 1911. In 1909, ore from the Comstock Extension averaged $21 on a 30" ledge, and ore from the Dillinger averaged $40 on a 30" ledge. Thomas H. Minear, a miner from the Black Hills of
South Dakota, managed the company in 1910 and 1911. In the summer of 1910 workers built a two-story, 16' x 30' blacksmith and machine shop and ordered a 24-stamp mill (this was probably not delivered). They installed T-rails in their long tunnel that was intended to give a vertical depth of 750'. Lessees worked the Dillinger lode in 1912 and ran ore from it through the North Star mill. The Comstock was next mentioned in 1916, when 25-30 men were working there, but then it shut down during World War I. In 1922 the owner was Charles E. Shepherd of Seattle, and Minear was still the manager. At that time there were three tunnels with lengths of 700', 200', and 200' respectively. One shaft was 140' deep. In 1916 the owners patented the Comstock B, C, E, F, G, H, J, and K lode claims, and the Independence claim. In 1925 they patented the Dillinger lode claim.

The Comstock came back to life in 1934, at which time the buildings were renovated and plans were made to begin milling operations. The bunkhouse and cookhouse were relocated to their present locations by lessees Dean White and Don George. T. H. and Cleora Minear continued to own the mine; they lived in Tacoma most of the year but worked at the Comstock in the summers. In 1935 a new 25- or 50-ton flotation mill was installed at the camp, and several hundred tons of ore were milled with a reported recovery of about $15 per ton. During the year the company built housing facilities, a powder magazine, and a blacksmith shop. The equipment included a Gardner Denver compressor, ore cars, and other mining machinery. An average of 20 men were employed that year. The crew remained relatively large through 1936, and in 1937 the men built four cabins, improved the roads, and erected two fire tanks. In the 1930s most of the work was in the lowest adit. An adit was also driven across a small gulch from the main workings for several hundred feet on a small quartz vein and gouge seam in granite. In the summer of 1937 the mine's facilities included a gasoline-drive compressor, blacksmith shop, dry room, cook and bunkhouse, three family houses, and a 25-ton flotation mill about half a mile down the creek from the mine. The power source was a diesel engine.

In 1938 Dixie Gold, Inc., bought the Dixie Comstock Gold Mining Company and installed new equipment and machinery, including a ball mill. In 1940 and 1941 (until the U. S. entered World War II) the Comstock mill milled ore from the Comstock, Dixie Royal, North Star, and Ontario mines. William Frank, Clarice Robberson, and C. C. Clauson bought the Comstock some time after 1940. Lee Hida worked as the caretaker at the Comstock until his death in 1952. Elmer Wolff came to Dixie in 1949 and worked the Dillinger claim for a time. In 1959, Dixie residents Jack and Zip Wenzel bought the mine from Cecil Zortman. At present, some of the camp buildings and the mill are still standing.
The Dixie Comstock Mining Company was incorporated in May 1934. At that time, the mine was developed by 8 tunnels, the longest of which was 1,000 feet. A 50 ton-per-day mill was under construction in 1935, and 1,000 feet of underground work was completed.

Canyon Resources drilled 22 reverse circulation holes on the Comstock property in 1989. Nothing resulted from this exploration program.

See the sections on the Dillinger and Robinson Dike mines for more information.

Between 1901 and 1939, the Comstock Mine produced 1,804 tons of ore. This material yielded 239.52 ounces of gold, 131 ounces of silver, 137 pounds of copper, and 1,556 pounds of lead. In 1989 or 1990, the property was held by the Majestic Mine Partners of Spokane, Washington (Neumann and Close, 1991).

### 3.18.4 Environmental Conditions

#### 3.18.4.1 Site Features

The Comstock Mine (Figure 3.18-2) was visited by Earl Bennett on July 15, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:27:44-1:34:07). Documenting photos are Roll 99B4, frames 1-4 and 17-25, and Roll 99B5, frames 1-2. Several additional photos were taken previously during a site visit in 1995.

The mine site has two collapsed log buildings on the northwest side of the road (Figure 3.18-3) and a maintained cabin across the road to the east (Figure 3.18-4). A pole corral is connected to the back of the cabin, and a log shed is against the hillside about 25 feet from the cabin. An outhouse is another 30 feet to the south (Figure 3.18-5). The caved, dry adit is next to the south side of the outhouse in dense brush. The waste dump has been bulldozed and leveled for the building site (Figure 3.18-6). The mine site covers several acres.

The mill ruins are southwest of the mine at the location marked “Ruins” on the topographic map. The mill extends from the road down to creek level. The upper part of the mill is partly intact, although dilapidated (Figure 3.18-7), but the lower part has completely collapsed (Figure 3.18-8). Concrete footings protrude through the pile of boards and timbers. The base for the water tank is beside the upper part of the mill (Figure 3.18-9). Barrel staves from the tank are preserved nearby. Below the mill are what appear to be both coarse stamp mill tailings and finer flotation tails separated by a 4-foot bank. The tailings are in concentric areas, with coarser material (possibly waste rock from the mill) overlying the finer material. The tailings are totally overgrown but are visible in exposures along the creek bank (Figure 3.18-10).

Another collapsed building is just east of the base of the mill (Figure 3.18-11). This building may have been an assay shack, because it contains some fire brick. There are also the ruins of a few cabins west of the mill. This site covers about 2 acres.
3.18.4.2 Sample Locations

3.18.4.2.1 Solid Samples

Sample B7159908 is a composite of the tailings from below the mill.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7159908</td>
<td>Comstock Mine, mill tailings</td>
<td>Yes</td>
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</table>

3.18.4.2.2 Water Samples
No water samples were collected.

3.18.4.2.3 Analytical Results

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

Sample B7159908 of the tailings has elevated levels of cadmium, copper, and lead in the element screen. In the TCLP for metals test, lead is leaching from the sample.

3.18.5 Structures

The structures at the site have been mentioned previously. At the mine, these include the two collapsed log cabins, the maintained cabin, a small log storage shed, and the outhouse. At the mill, the structures include the ruins of the mill building, the collapsed shack, and the cabin ruins west of the mill.

3.18.6 Safety

The standing portion of the mill building is dilapidated and could easily collapse. There are abundant nails protruding from the boards and timbers of the collapsed structures.
Figure 3.18-1. Location of the Comstock Mine and mill, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.18-2. Map and cross-section of the Comstock Mine (Neumann and Close, 1991, Figure 17).
Figure 3.18-3. Collapsed log cabins at the Comstock Mine (Roll 99B4, frame #3).

Figure 3.18-4. Cabin, corral, and log shed at the Comstock Mine. The bare area in the foreground is the leveled part of the waste dump for the adit (Roll 99B4, frame #1).
Figure 3.18-5. Outhouse near the cabin and shed at the Comstock Mine. The caved adit is in the dense brush to the right of the outhouse (Roll 99B4, frame #2).

Figure 3.18-6. Bulldozed waste dump for the Comstock adit (Roll 99B4, frame #4).
Figure 3.18-7. Upper part of the Comstock mill building. Although standing, the building is dilapidated and could easily collapse (Roll 99B4, frame #17).

Figure 3.18-8. Collapsed lower part of the Comstock mill building. At the center left are the concrete footings for part of the mill (Roll 99B4, frame #19).
Figure 3.18-9. Base for the water tank at the top of the mill building (Roll 99B5, frame #1).

Figure 3.18-10. Tailings at the base of the mill. Sample B7159908 was collected from this material (Roll 99B4, frame #23).
Figure 3.18-11. Collapsed shack, possibly an assay lab, east of the base of the mill (Roll 99B4, frame #21).
3.19 SWASTIKA MINE (Site No. EC-207)
Alternate names—Majestic; Saradoc.

3.19.1 Site Location and Access (Figure 2.1-1)

The Swastika Mine is on the northeast flank of Blowout Mountain in the N½ of the N½ of the SW¼ of section 15 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.19-1). Access from Dixie is on FS Road 222D south to Road 222D1. The mine is past the Comstock Mine and mill ruins at the end of an unnamed spur road to Road 222D1 near the head of the drainage. The last ¼ mile to the adit is a muddy trail with an abundance of fallen timber. The mine is on Forest Service land.

3.19.2 Geologic Features (Figure 2.2-1)

The Swastika Mine is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993). McKay (1996, p. 166) noted the following on the geology of the deposit:

The Majestic was one of Dixie's large, disseminated deposits. The ore was in quartzite and schist cut by dikes of granite and pegmatite. All of the rock carried pyrite, and there were many lens-shaped veinlets of quartz, molybdenite, and pyrite.

3.19.3 Site History

McKay (1996, p. 166-167), who referred to the mine as the Majestic, included the following historical information on the Swastika:

The Majestic group included as many as 30 quartz claims plus one placer claim on the Salmon River; 13 of these claims ran in a chain to and along the Salmon River for water, mill, and tunnel sites. The Majestic had extensive development work done between the years 1906 and 1913, but very little ore from the mine had been treated as of the late 1930s. It was located four miles south of Dixie on the west fork of Rhett Creek [now Comstock Creek], on the north slope of Blowout Mountain. A quartz vein with average values of $4 per ton traversed the length of the group. . . . The Vidette claim, which was developed by a 230' tunnel by 1911, was in hematite and carried iron sulfides. The Majestic was located by Edward Davis in the 1890s, who sold the property in 1906 to the Majestic Gold and Silver Mining Company (a Washington, D. C. company) and served as its manager. That first year about 150' of development work was done, and free gold was reportedly found on the surface. W. H. Kirk of Washington, D. C., worked on the property in 1908, and in that year 15 men built cabins and roads. In 1909, ore from the Majestic averaged $3 per ton on a 300' dike. The property (then called the
Saradoc group) was developed by three tunnels (80', 140', and 40' long) and crosscuts.

Over the next couple of years the company performed quite a bit of development work, including surveying ditches, putting up cabins and buildings for winter work, and installing a sawmill. The underground miners progressed about 5'-6' a shift in the tunnels, with the use of compressed-air drills. In 1909 Henry Hazlett was superintendent of the property, but by 1910 A. H. McKnight was the manager, and he was long associated with the mine (he had worked for 18 years in the Government Printing Office of Washington, where Dixie-area promoter Robert G. Bailey had also been employed). In 1909 the company built a new wagon road connecting their proposed mill site to the Comstock mine road 1 1/2 miles away, and that winter the company ordered a 60-horsepower boiler, compressor, sawmill, stamp mill, and cyanide plants. By the summer of 1911 improvements at the property included a large bunkhouse and dining room, a blacksmith shop, timber sheds at the tunnels, an air compressor, and a steam-driven sawmill. The boiler and compressor were about 4200' from the main workings, and the air was delivered through a pipe. The company was planning to put in a stamp mill and cyanide plant at that time. Workers harvested the trees between the boarding house and compressor plant for cordwood in 1911 to reduce the fire danger. By 1913 there were 1250' of tunnels at the Majestic; the No. 2 and 3 tunnels were the longest.

The Majestic finally got a mill in 1913, after years of saying they were ordering one. They bought a ten-stamp mill, vanners, and leaching tanks from the Idaho-Champion Mining and Milling Company on Crooked River, about 10 miles west of Elk City, and had it moved to the Majestic. Dr. McLinn of Kamiah bonded the Swastika group in 1914, and by 1916 McLinn and his partner Rory Burke had sunk a 64' shaft and had 150' of tunnel. The 6' vein averaged $19.64 per ton. By 1917 the company, still under McKnight's management, had spent $120,000 opening up the ore, but did not yet know the best way to treat the ore nor whether the operation would pay. The company bought the mill and other property of the Penn-Dixie mine in Dixie and moved it onto the property. Some of the Majestic stockholders were discouraged by a negative report given by a mining engineer, and so McKnight and some associates got a bond and lease on the property for two years for $250,000. In 1918 the owners incorporated as the Swastika Mines Corporation. Some development work continued to be done through 1921, with only a couple of men working at the mine. It is not known whether the mine ever showed a profit; it appears that only development work was done before World War II. Vincent Modello of Dixie took up the expired lease some time after 1930. In 1981 the mine was being worked under the name Majestic. In 1986 there were two cabins at the Majestic #7 lode claim.
In 1985, Mines Management finished a drilling program on its 545-acre Majestic joint venture. The target was a gold anomaly found during a soil survey the previous year. In 1986, Nevex entered the joint venture to earn a 60 percent interest in the Majestic claim block. Nevex planned on having the heap-leach operation at Robinson Dike under way by the following summer. Any ore found on the Majestic ground would have been processed at the Robinson Dike facility. Around 1990, according to Neumann and Close (1991), the property was held by the Majestic Mine Partners.

3.19.4 Environmental Conditions

3.19.4.1 Site Features

The Swastika Mine was visited by Earl Bennett on July 15, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:34:10-1:37:03). Documenting photos are Roll 99B4, frames 5-8. Several additional photos were taken at the site during a previous visit in 1995.

The site contains an open adit with 1-2 gallons per minute flowing from it (Figures 3.19-2 and 3.19-3). Neumann and Close (1991) reported 675 feet of open workings in this tunnel (Figure 3.19-4) in 1989 or 1990, as well as three collapsed adits. The open adit is much less obvious than it was when visited in 1995 (Figure 3.19-5). The water is clear, but the bottom of the drainage is heavily iron stained and supports no vegetation (Figure 3.19-6). A few lengths of pipe and several wooden poles are stuck in the ground near the adit. The iron-stained waste dump is at creek level and measures 110 feet long, 10 feet wide, and 30 feet thick on the nose (Figure 3.19-7). The creek flows along the edge of the dump. The disturbed area covers less than 0.5 acre.

3.19.4.2 Sample Locations

3.19.4.2.1 Solid Samples

Composite sample B7159904 was collected from the waste dump.

<table>
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<th>Sample No.</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
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<tr>
<td>B7159904</td>
<td>Swastika Mine, adit waste dump</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.19.4.2.2 Water Samples

Sample B7159901 was collected from the adit water. Sample B7159902 was collected upstream from the adit from a tributary to Comstock Creek. Water quality measurements of specific conductivity and pH were taken where Road 222D1 crosses Comstock Creek. Measurements were: conductivity - 3; pH - 6.4; water slightly acidic but clear.
<table>
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<th>Sample No.</th>
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<th>Specific Conductivity (µS)</th>
<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
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<tr>
<td>B7159901</td>
<td>Swastika Mine, adit</td>
<td>90</td>
<td>46</td>
<td>4.28</td>
<td>1-2</td>
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<tr>
<td>B7159902</td>
<td>Swastika Mine, upstream</td>
<td>11</td>
<td>48</td>
<td>6.34</td>
<td>---</td>
<td>Yes</td>
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</tbody>
</table>

3.19.4.2.3 Analytical Results

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

Waste dump sample B7159904 has elevated levels of arsenic, cadmium, iron, manganese, lead, and zinc in the element screen. Cadmium is leaching from the sample in the TCLP for metals test.

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

Adit water sample B7159901 exceeds all standards for aluminum, the Aquatic Life Chronic standard for cadmium, the Secondary MCLs for iron and manganese, and both Aquatic Life standards for copper and zinc in the dissolved metals screen. Lead exceeds the Aquatic Life Chronic standard. In the total recoverable metals screen, cadmium equals or exceeds all standards, iron and manganese exceed the Secondary MCLs, nickel exceeds the Aquatic Life Chronic standard, and zinc and copper equal or exceed both Aquatic Life standards.

Upstream sample B7159902 equals or exceeds both Aquatic Life standards for cadmium and is near the lower limit of the Aquatic Life Acute standard for copper in the total recoverable metals screen. No standards are exceeded in the dissolved metals screen.

3.19.5 Structures

There are no structures at the site.

3.19.6 Safety

The open adit can be entered, but the access road to the site is very poor for the last ¼ mile. Frequent visitors to the site are unlikely.
Figure 3.19-1. Location of the Swastika Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.19-2. Open adit at the Swastika Mine. The opening is the dark area at the center of the picture (left of the dead tree). A small area of iron-stained water is visible through the brush in front of the adit (Roll 99B4, frame #8).

Figure 3.19-3. Close-up of the opening into the adit. Even this close, the opening is difficult to see in the brush (Roll 99B4, frame #5).
Figure 3.19-4. Map of the open adit at the Swastika Mine (Neumann and Close, 1991, Figure 18).
Figure 3.19-5. Open adit at the Swastika Mine as it was in 1995. Compare this photo to that in the previous figures. The iron-stained adit water is plainly visible in this picture (1995 Roll 517702, frame #2).

Figure 3.19-6. Close-up of the iron-stained drainage from the adit. The water is clear, but the precipitating iron coats the bottom of the channel (Roll 99B4, frame #6).
Figure 3.19-7. Flat surface of the waste dump at the Swastika Mine (Roll 99B4, frame #7).
3.20 UNNAMED PROSPECT (Site No. EC-206)

Note: This site was assigned a field number of B7159905. However, later examination of the database showed that Unnamed Mine EC-206 corresponded to this site.

3.20.1 Site Location and Access (Figure 2.1-1)

This prospect is along the road to the Swastika Mine in the SW¼ of the NE¼ of section 15 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.20-1). Access is the same as for the Swastika Mine, and the adit is on the poor access road to the Swastika. The property is just west of where FS Road 222D1 becomes Trail 223. The site is on Forest Service land.

3.20.2 Geologic Features (Figure 2.2-1)

This prospect is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.20.3 Site History

Nothing is known of the history of this site.

3.20.4 Environmental Conditions

3.20.4.1 Site Features

This prospect was visited by Earl Bennett on July 15, 1999. No video was taken at this site. Documenting photos are Roll 99B4, frames 9-10.

The property contains a caved, dry adit and a completely collapsed cabin. The trough of the caved adit (Figure 3.20-2) is about 50 feet west of and behind the cabin. The small waste dump is totally overgrown. The disturbed area covers less than 0.5 acre.

3.20.4.2 Sample Locations

3.20.4.2.1 Solid Samples

No solid samples were collected.

3.20.4.2.2 Water Samples

No water samples were collected.
3.20.5 Structures

A collapsed cabin at the site is in an area overgrown with alders.

3.20.6 Safety

There are no safety hazards at the site.
Figure 3.20-1. Location of Unnamed Prospect, Site No. EC-206, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.20-2. Trough of the caved adit at Unnamed Prospect, Site No. EC-206. One of the mine timbers near the mouth of the adit is at the lower left (Roll 99B4, frame #9).
3.21 UNNAMED PROSPECT (Site No. B7159906)

3.21.1 Site Location and Access (Figure 2.1-1)

This unnamed site is about ¼ mile east of the previous site (EC-206) and is on the road to the Swastika Mine, in the SW¼ of the NE¼ of section 15 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.21-1). An adit symbol is noted on the topographic map at this site. Access is the same as for the Swastika Mine. The adit is near where FS Road 222D1 becomes Trail 233 and is on Forest Service land.

3.21.2 Geologic Features (Figure 2.2-1)

This prospect is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa-metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.21.3 Site History

Nothing is known of the history of this site.

3.21.4 Environmental Conditions

3.21.4.1 Site Features

This prospect was visited by Earl Bennett on July 15, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:37:31-1:38:28). Documenting photos are Roll 99B4, frames 11-13. A few pictures of the site were taken during a previous visit in 1995.

The site contains a caved, dry adit (Figure 3.21-2) about 100 feet up the hill from and west of an old log cabin. The adit has a small, brown-stained waste dump measuring 10 feet long, 10 feet wide, and 20 feet thick on the nose. The disturbed area covers less than 0.5 acre.

3.21.4.2 Sample Locations

3.21.4.2.1 Solid Samples

No solid samples were collected.

3.21.4.2.2 Water Samples

No water samples were collected.

3.21.5 Structures

A large, old log cabin is along FS Road 222D1 (Figure 3.21-3). The roof has partly collapsed, and some of the wall logs are bent or leaning inward. The roof has long wooden shakes. Sheets
of corrugated metal, which may have been used to cover part of the roof, and other metal and wood debris are on the ground behind the cabin (Figure 3.21-4).

3.21.6 Safety

Nails and sharp metal debris are at the cabin, but no significant safety hazards are at the site.
Figure 3.21-1. Location of Unnamed Prospect, Site No. B7159906, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.21-2. Caved adit at Site No. B7159906 (Roll 99B4, frame #11).

Figure 3.21-3. Front and side of the old log cabin at Site No. B7159906 (Roll 99B4, frame #13).
Figure 3.21-4. Side and back of the old log cabin at Site No. B7159906. Sheets of metal and other scrap are on the ground behind the cabin (Roll 99B4, frame #12).
3.22 UNNAMED PROSPECT (Site No. B7159907)

3.22.1 Site Location and Access (Figure 2.1-1)

This unnamed site is about ¼ east of the previous site (Site No. B7159906) and is also along the road to the Swastika Mine, in the SE¼ of the NE¼ of section 15 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.22-1). An adit symbol is noted on the topographic map at this location. The site is on FS Road 222D1 about ½ mile south of the Comstock mill ruins and is on Forest Service land.

3.22.2 Geologic Features (Figure 2.2-1)

This prospect is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa, metamorphic sequence (?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.22.3 Site History

Nothing is known of the history of this site.

3.22.4 Environmental Conditions

3.22.4.1 Site Features

This prospect was visited by Earl Bennett on July 15, 1999. No video was taken at the site. Documenting photos are Roll 99B4, frames 14-16.

The site contains a caved adit (Figure 3.22-2) with a small waste dump measuring 30 feet long, 15 feet wide, and 8 feet thick. The adit is behind a nearly collapsed cabin, and the dump extends to the road. The disturbed area covers less than 0.5 acre.

3.22.4.2 Sample Locations

3.22.4.2.1 Solid Samples

No solid samples were collected.

3.22.4.2.2 Water Samples

No water samples were collected.

3.22.5 Structures

The nearly collapsed cabin (Figure 3.22-3) is the only building at the site.

3.22.6 Safety

There are no safety hazards at the site.
Figure 3.22-1. Location of Unnamed Prospect, Site No. B7159907, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.22-2. Caved adit at Site No. B7159907 (Roll 99B4, frame #15).

Figure 3.22-3. Wall of the nearly collapsed cabin at Site No. B7159907 (Roll 99B4, frame #14).
3.23 ROBINSON DIKE MINE (Site No. EC-202)
Alternate names—Gold Hill; Dixie Dike; Robinson; Earl Day; Robinson Dyke.

3.23.1 Site Location and Access (Figure 2.1-1)

The Robinson Dike Mine is near the head of an east-flowing branch of Comstock Creek near the center of the north-south section line dividing sections 9 and 10 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.23-1). Access from Dixie is on FS Road 222 south to Road 222D, south on Road 222D to FS Road 9537, and west and south on Road 9537 about 1½ miles to the mine. The property is on Forest Service land.

3.23.2 Geologic Features (Figure 2.2-1)

The Robinson Dike Mine is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) and granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). McKay (1996, p. 178) described the ore as follows:

The ore deposit was a disseminated deposit in a shear zone striking north 30 degrees west. The mineralized zone was approximately 100' wide and as long as 4,200'. The ore body contained pyrite disseminated through silicified and somewhat brecciated quartz monzonite (not concentrated along well-defined channels as with the larger quartz veins), and the best ore was where the shearing had been most intense. The upper workings were in iron-stained soft rock; the lower workings were in granite or quartzite, carrying much pyrite. The property was a mass of quartzite and schist intruded by granite dikes carrying disseminated pyrite and low gold values, similar to the Majestic mine of Dixie. Most of the ore was highly oxidized and assayed $2-$5 per ton in gold, but some unoxidized ore assayed about $7 per ton.

3.23.3 Site History

The following history of the Robinson Dike Mine is from McKay (1996, p. 178-181):

The Robinson Dike was located near the divide between Comstock Creek and Long Tom Creek, 3.4 road miles south of Dixie, northwest of the Red Cross, at an elevation of 6,000'. Louis Larson re-staked three claims known as the Gold Hill group in 1904 (they were originally located by C. H. Harding in 1897, but he abandoned them). Larson drove a 75' tunnel and crosscut it 45'. He sold the Gold Hill in 1907 to J. B. Brown and E. A. Cox, and additional locations were made later. Louis Larson and Brown owned the property for a time, and then Brown and the Perry brothers. Approximately 1,600' of underground development was done by the 1930s. . . . In 1909 ore from the Gold Hill lode mine averaged $4 per ton on a 300' ledge.

In 1934 W. “Billy” and Anson Robinson bought the Dixie Dike and incorporated the claim as the Robinson Mining and Milling Company, earning “a fair margin of
profit” for the next two years. Billy Robinson was a World War I veteran and long-time resident of Dixie; his brother Anson and his daughter Tess financed the Robinson Dike project. In 1935 they built a 50-ton test mill for the purpose of large-scale sampling that had a ball mill, flotation units, and cyanide tanks, and operated on ore from an open pit. During 1935 and 1936 over 4,000 tons of ore were mined and milled with a reported recovery of 95% from ore averaging $2.40 per ton. The ore was mined by hand from the open pit by a crew of five men; they mined, trammed, and crushed about 40 tons per day. In 1937 a 90' cross-cut was driven from the open pit diagonally across the ore body. In the fall of 1937 the Bunker Hill & Sullivan Mining and Milling Company decided to develop the property. They installed two diamond drills (one for surface work and one for underground work).

The operation of the mill at the Dixie Dike in 1935 and 1936 was as follows. A 12" x 15" jaw crusher crushed the ore from the mine to 3/4". The ore then dropped into a 20-ton surge bin. A plunger-type feeder delivered the ore from the bin to a short belt conveyor, which took it to the ball-mill scoop. A 4' x 5' overflow-type ball mill in closed circuit with a small blanket table and a Dorr simplex classifier ground the ore to minus 80 mesh. The classifier overflow passed over another small blanket table to a five-cell Denver Sub-A flotation machine, which produced a final tailings and a rough concentrate. Some difficulty was found in floating the highly oxidized ore; the addition of a flotation reagent eliminated the problem. Concentrates from the blanket tables and from all five flotation cells were roasted lightly and then treated by cyanidation. One-ton batches of concentrates were agitated in cyanide solution for 16 hours and then washed three times in an 8' x 10' Devereaux-type agitator. The pregnant solution was then passed through a sand filter and precipitated in zinc boxes. Forty tons of ore were milled each day, extracting 92% of the values by flotation and 98% by cyanidation. The value of the concentrate was eight ounces per ton in gold, two ounces per ton in silver. The mill was powered by a Russell steam engine driven by a wood-burning boiler that burned 3.5-4.0 cords of wood per day, which cost $15-$17 for cutting and firing (the firewood was cut on contract at $2.25 a cord). A 12-man crew of five miners, five millmen and power plant operators, and two woodcutters operated the mill, supervised by the owners.

As of 1946 there was approximately 715' of total development at the Robinson Dike, and only assessment work was being done. When the Bunker Hill & Sullivan ceased operations at Robinson Dike, they hired Vincent “Shorty” Modello of Dixie as caretaker. Since the company did not renew its lease, Modello staked the property. In 1986 the Nevex Gold Company entered into a joint-venture agreement with Mines Management, Inc. to develop an open-pit mine in combination with a cyanide heap leaching operation and recovery plant. In 1988 the company dropped the project when Nevex Gold was bought out by a larger company. That company decided the deposit was not large enough to develop.
Several buildings, most or all built by the Robinson Mining & Milling Company, are in various states of disrepair at the property, including 10 log buildings, a collapsed mill, a boiler on a concrete foundation, possible ore bins, stacks of wood, and several trash dumps.

The term “dike” was used locally in the Dixie area for well-defined and mineralized shear zones.

In 1935, 2,689 tons of ore, which was the most ore the mine produced, was mined from the open pit. This ore yielded 59 ounces of gold and 12 ounces of silver. The 1936 production was 150 tons, which yielded 8 ounces of gold and 4 ounces of silver. There were about 1,600 feet of underground workings on the property, most of which were caved, when Roberts visited the mine in 1937. The property was under option to the Bunker Hill and Sullivan Mining Company—that year, and a diamond drilling program was in progress (Capps and Roberts, 1939). Bunker Hill did not develop the mine.

In 1982, the first part of a two-phase drilling program was carried out at the mine by private investors known as the Robinson Dike Joint Venture Group (RDJVG). By 1984, approximately 191,000 tons of proven and probable ore averaging 0.06 ounce-per-ton (opt) gold were outlined. In 1985, Nevex Gold Company acquired the property and the contiguous claims under a purchase-option agreement. The claim group was expanded to 60 claims covering approximately 1,060 acres. Drilling during 1985 and 1986 increased undiluted reserves to approximately 410,000 tons averaging 0.053 opt gold in near surface material. Several untested soil geochemical anomalies were also indicated.

In 1985, Mines Management finished a drilling program on its 545-acre Majestic joint venture, which was adjacent to the Robinson Dike property. The target was a gold anomaly found during a soil survey in 1984. In 1986, Nevex entered a joint venture to earn a 60 percent interest in the Majestic claim block. Nevex planned to start the heap-leach operation at Robinson Dike by the next summer. Any ore found on the Majestic ground would have been processed at the Robinson Dike facility.

In 1987, Nevex and Canyon Resources Corporation merged, with Canyon the successor company. A large area was clear cut near the Robinson Dike Mine for a leach pad and processing plant. The stock market crash in 1987 precluded further development. In 1988, Canyon entered a $1.8 million venture with Golden Shamrock Mines, Ltd., to continue exploration and development at the mine. The venture planned to produce 10,000 ounces of gold per year. A drilling program improved reserves.

Canyon Resources drilled 22 reverse circulation holes in 1989 on the Comstock property adjacent to the Robinson Dike. By 1989, Robinson Dike had been probed by 195 reverse-circulation rotary holes totaling 25,069 feet. Reserves at the mine were about 855,000 undiluted tons of 0.041 opt gold in a mixed oxide-sulfide shear zone deposit that was amenable to heap leaching.
In 1991, the property reverted from Canyon back to RDJVG. In April 1992, the property was optioned to Seubert Excavators, Inc., of Cottonwood, Idaho. The site remains idle today.

3.23.4 Environmental Conditions

3.23.4.1 Site Features

The Robinson Dike Mine was visited by Earl Bennett on July 15, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:38:49-1:44:16). Documenting photos are Roll 99B5, frames 3-9. Several additional photos were taken during a visit to the site in 1995.

The site contains a big clear-cut (the proposed heap-leach site; Figures 3.23-2 and 3.23-3), several miles of drill roads, an old ore bin, an old mill with concrete footings and collapsed timbers, and a small pond. Water flows from a spring at the mill site (or from a possible caved adit behind the mill) to the pond (Figure 3.23-4). A small stream flows by the west side of the mill and mixes with the water from the mill. A large pit above and north of the mill may be the location of an old adit (Figure 3.23-5), but the area has been completely modified by drill roads and other construction; no indication of an adit or waste dump was evident. Several buildings at an old town site, described below, are about ⅓ mile from the mill. The clear-cut area of the proposed heap-leach site covers at least 20 acres. This area has been reseeded and the vegetation is doing well. The mine, mill, and cabin sites cover about 2-4 acres.

3.23.4.2 Sample Locations

3.23.4.2.1 Solid Samples

No solid samples were collected.

3.23.4.2.2 Water Samples

Water sample B7159909 was collected from the spring at the millsite.

<table>
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<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>
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<td>Robinson Dike Mine</td>
<td>14</td>
<td>58</td>
<td>5.75</td>
<td>5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.23.4.2.3 Analytical Results

Sample B7159909 was within the range of the Secondary MCL for aluminum in the dissolved metals screen. In the total recoverable metals screen, sample B7159909 equals or exceeds all standards for cadmium and was within the range of the Aquatic Life Chronic standard for copper.
3.23.5 Structures

The mill building has completely collapsed and is being overgrown with trees and brush (Figure 3.23-6). About ¼ mile from the old mill is a town site with three buildings in various stages of disrepair. The southernmost log cabin is in fair condition and has a metal roof and a small corral (Figure 3.23-7). Behind the cabin is a large steel boiler. A completely collapsed log cabin (Figure 3.23-8) is just north of the previous cabin. Still further to the north is a nearly collapsed log cabin (Figure 3.23-9). Some scrap metal is scattered near the cabins.

3.23.6 Safety

No significant safety hazards were found at the site.
Figure 3.23-1. Location of the Robinson Dike Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.23-2. Left frame of a two-frame panorama of the clear-cut at the Robinson Dike Mine (1995 Roll 517701, frame #22).

Figure 3.23-3. Right frame of a two-frame panorama of the clear-cut at the Robinson Dike Mine. This area was the proposed site for heap-leach pads, if the work in the 1980s had brought the mine into production (1995 Roll 517701, frame #21).
Figure 3.23-4. Old mill site at the Robinson Dike Mine. Some of the old beams and one of the concrete footings are in the foreground. The spring, or possibly a seep from a caved adit, is at the lower left corner of the picture (Roll 99B5, frame #3).

Figure 3.23-5. Scarp of the large pit above the mill at the Robinson Dike Mine (1995 Roll 517701, frame #16)
Figure 3.23-6. Collapsed mill building at the Robinson Dike Mine. Trees and brush are growing among the ruins (1995 Roll 517701, frame #19).

Figure 3.23-7. Cabin in fair condition at the old town site near the Robinson Dike Mine. The metal roof has helped to protect the building. A small log corral is behind the cabin to the left, and a large steel boiler is behind the cabin to the right (Roll 99B5, frame #6).
Figure 3.23-8. Completely collapsed log cabin north of the metal-roofed cabin (Roll 99B5, frame #7).

Figure 3.23-9. Nearly collapsed log cabin north of the cabins shown in Figures 3.28-7 and 3.28-8. This cabin had a wooden shingle roof (Roll 99B5, frame #8).
3.24 MCKINLEY MINE (Site No. EC-201)
   Alternate name—David C.

3.24.1 Site Location and Access (Figure 2.1-1)

The McKinley Mine is near the head of the northern branch of Comstock Creek in the NE¼ of the
NW¼ of section 10 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure
3.24-1). The mine is on FS Road 9537A just south of the junction with Road 9537. Road 9537
joins FS Road 222D about ½ mile northeast of the mine. The property is on Forest Service land.

3.24.2 Geologic Features (Figure 2.2-1)

The McKinley adit is in granite.

3.24.3 Site History

McKay (1996, p. 171) reported the following on the history of the McKinley Mine:
The first known mention of it was in 1901, at which time Sam Dillinger owned it.
That year he hired William Dow and Allen Stonebreaker to dig a tunnel on the
claim. The mine, which yielded free gold, had a 180' tunnel in 1902 that cut the
vein at a depth of 50'. For every 5' of ledge Dillinger took out about two tons of
$61.50 ore, and he said it carried values as high as $175 per ton (another report
said the ore averaged about $18). In 1909, however, ore from the McKinley
averaged $20 per ton on an 8' vein. Dillinger still owned the property in 1909, but
in 1912 J. B. “Snowshoe” Brown and Bill McDonald were doing the assessment
work on the claim. Little appears to have been done on the mine until after World
War II. In 1948 the McKinley Gold Mines, Inc. of Dixie, however, blocked out
7,000 tons of ore and placed stock on sale. In 1986 the McKinley had three log
cabins and an outhouse on it.

In 1938 and 1939, the McKinley produced 6 tons of ore, which yielded 6 ounces of gold and 5
ounces of silver. Around 1990, the McKinley and Republican properties were covered by the Dixie
claims, which were held by Ralph and Georgia Dawson, Vincent Modello, and Doug Jayne

3.24.4 Environmental Conditions

3.24.4.1 Site Features

The McKinley Mine (Figure 3.24-2) was visited by Earl Bennett on July 15, 1999. A video
segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1,
index 1:44:22-1:47:13). Documenting photos are Roll 99B5, frames 10-13. Several additional
photos were taken during a previous visit to the site in 1995.
The site contains a well-maintained log cabin, a log garage and shed, a caved adit with a waste dump, and a small pond just east of the dump. The adit had a timbered and lagged portal that was covered with plywood in 1995 (Figures 3.24-3 and 3.24-4), but is now completely caved (Figure 3.24-5). A minor seep trickles from the adit and disappears into the granitic grus. A large cut extends up the slope above the adit, and a one-rail log fence has been built along the top of the cut (Figure 3.24-6). The waste dump is 50 feet long, 10 feet wide, and 8 feet thick (Figure 3.24-7). Part of the dump has been graded and seeded with grass, and a small pond has formed behind the dump. The mine and cabin site covers about 2 acres.

3.24.4.2 Sample Locations

3.24.4.2.1 Solid Samples
   No solid samples were collected.

3.24.4.2.2 Water Samples
   No water samples were collected.

3.24.5 Structures

There is a well-maintained log cabin at the site (Figure 3.24-8) with a log garage and wood shed. A long steel tank, either a boiler or compressor tank, is at the edge of the trees behind the cabin.

3.24.6 Safety

The large cut above the caved adit has a precipitous headwall, although a rail fence along the edge provides a warning barrier.
Figure 3.24-1. Location of the McKinley Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.24-2. Sketch maps of the McKinley and Republican mines (Neumann and Close, 1991, Figure 11.)
Figure 3.24-3. Portal of the McKinley adit as it appeared in 1995 (1995 Roll 517701, frame #24).
Figure 3.24-4. Close-up of the portal as it was in 1995 (1995 Roll 517701, frame #29).
Figure 3.24-5. Caved McKinley adit in 1999 (Roll 99B5, frame #10).

Figure 3.24-6. Steep headwall of the cut above the McKinley adit. A rail fence has been constructed along the edge of the pit (Roll 99B5, frame #13).
Figure 3.24-7. Remainder of the waste dump for the McKinley adit. A small pond has formed behind the dam (Roll 99B5, frame #12).

Figure 3.24-8. Maintained log cabin and garage at the McKinley Mine. A long steel tank is at the far left at the edge of the trees (Roll 99B5, frame #11).
3.25 REPUBLICAN MINE (Site No. B7159910)

3.25.1 Site Location and Access (Figure 2.1-1)

The Republican Mine is about ¼ mile south of the McKinley Mine in the SE¼ of the NE¼ of the NW¼ of section 10 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.25-1). The mine is at the right angle bend on FS Road 9537A. This road connects with Road 9537 about ¼ to the north and with FS Road 222D about ¼ mile to the east. Although the road appears continuous on the map, it is blocked by several fallen trees and a large prospect trench near the bend. If entering from Road 222D, the mine is about 50 yards downhill from the trench that cuts the road. If entering from Road 9737, the adit and dump are next to the road. The property is on Forest Service land.

3.25.2 Geologic Features (Figure 2.2-1)

The Republican Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.25.3 Site History

McKay (1996, p. 178) noted the following on the history of this site:

The Republican lode mine was located near the McKinley three miles southeast of Dixie. It was owned by Sam Dillinger in the early 1900s. In 1908 he started a shaft on the claim, and in 1909 he had numerous shallow shafts and open cuts on the vein, which was about 10' wide and had ore of good value.

Canyon Resources, Inc., dug a trench on the Republican claim in 1988 or 1989 in an effort to expand the resources of the neighboring Robinson Dike property (Neumann and Close, 1991).

3.25.4 Environmental Conditions

3.25.4.1 Site Features

The Republican Mine (Figure 3.24-2) was visited by Earl Bennett on July 15, 1999. No video was taken at the site. Documenting photo is Roll 99B5, frame 18.

An adit and a building symbol are shown on the topographic map at this location. The adit at the site is caved and dry (Figure 3.25-2). The waste dump measures 60 feet long, 25 feet wide, and 4 feet thick. The hillside above the adit has numerous small prospect pits and trenches. The cabin or building was not found.
3.25.4.2 Sample Locations

3.25.4.2.1 Solid Samples
   No solid samples were collected.

3.25.4.2.2 Water Samples
   No water samples were collected.

3.25.5 Structures
   The structure noted on the topographic map was not found.

3.25.6 Safety
   There are no safety hazards at the site.
Figure 3.25-1. Location of the Republican Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.25-2. Caved adit at the Republican Mine (Roll 99B5, frame #18).
3.26 GOLD LEAF MINE (Site No. EC-203)

3.26.1 Site Location and Access (Figure 2.1-1)

The Gold Leaf Mine is on an unnamed tributary gulch to Comstock Creek in the NW¼ of the SE¼ of section 10 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.26-1). Access from FS Road 222 at Dixie is south on Road 222D about 2 miles to FS Road 9537B, then southwest about ¼ mile on FS Road 9537B to FS Road 77298, a short spur to the mine. The property is on Forest Service land.

3.26.2 Geologic Features (Figure 2.2-1)

The Gold Leaf Mine is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.26.3 Site History

The following brief history of the Gold Leaf was taken from McKay (1996, p. 155):

The Gold Leaf mine was approximately five miles from Dixie, and there was reportedly an arrastra on the property at one time. It produced a small amount of gold ore in 1931. In 1932 the mine was owned by Lee Hida and Don George. That year six men were stoping out ore from the mine. The Tiawaka and Gold Leaf mines produced 40 tons of smelting-grade gold ore in 1933. By 1934 the Dixie Comstock was owner or lessee of the Gold Leaf, and the company built a permanent camp and drove a 1000' drift on the property. A cabin, a can dump, a test pit, and an adit have been recorded as 10-IH-1964.

Between 1931 and 1933, the Gold Leaf Mine produced 5 tons of ore. This material yielded 9.51 ounces of gold and 5 ounces of silver. Around 1990, it was held by the Majestic Mine Partners of Spokane, Washington (Neumann and Close, 1991).

3.26.4 Environmental Conditions

3.26.4.1 Site Features

The Gold Leaf Mine (Figure 3.26-2) was visited by Earl Bennett on July 15, 1999. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:47:39-1:49:30). Documenting photos are Roll 99B5, frames 14-17.

The caved dry adit is overgrown with brush (Figure 3.26-3), as is most of the site. The waste dump measures 60 feet long, 25 feet wide, and 10 feet thick. An abandoned yellow bulldozer
(Cargo Road Builder, Seattle-Portland-San Francisco) is near the adit (Figure 3.26-4). A few prospect pits and trenches are along a road that follows the east side of the property.

3.26.4.2 Sample Locations

3.26.4.2.1 Solid Samples
   No solid samples were collected.

3.26.4.2.2 Water Samples
   No water samples were collected.

3.26.5 Structures

A collapsed log cabin is at the site (Figure 3.26-5).

3.26.6 Safety
   No safety hazards were found at the site.
Figure 3.26-1. Location of the Gold Leaf Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.26-2. Sketch map of the Gold Leaf Mine (Neumann and Close, 1991, Figure 16).
Figure 3.26-3. Caved adit in the brush at the Gold Leaf Mine (Roll 99B5, frame #14).

Figure 3.26-4. Old bulldozer at the Gold Leaf Mine (Roll 99B5, frame #16).
Figure 3.26-5. Collapsed log cabin at the Gold Leaf Mine (Roll 99B5, frame #17).
3.27 BLACK DIAMOND MINE (Site No. EC-199)
Alternative names—Diamond; Blue Diamond.

3.27.1 Site Location and Access (Figure 2.1-1)

The Black Diamond Mine is at the head of a southeast-flowing tributary of Rhett Creek in the SE¼ of shortened section 3 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.27-1). Access is on FS Road 222D south from Dixie to the South Star Resort. The mine is behind and a short distance downhill from the resort. An unnumbered road crosses the mine dump and continues on to the Dillinger and North Star mines on the 9545 road. The mine is on patented land which is being subdivided for home sites. National Forest land surrounds the claims.

3.27.2 Geologic Features (Figure 2.2-1)

The Black Diamond Mine is near the contact between the quartzite and calc-silicate unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) and the Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). McKay (1996, p. 141) noted the following information about the deposit:

The Diamond group included two converging veins. One vein had a strike of north 40 degrees west and a dip of 30-65 degrees southwest. This vein was faulted and cut off by the other one, which struck north 70 degrees west and dipped to the south. The chief sulfides were pyrite and arsenopyrite, and the ore bodies were intersected by narrow basic dikes.

3.27.3 Site History

McKay (1996, p. 141-142) related the following history of the Black Diamond Mine:

The Black Diamond mine was located about three miles southeast of Dixie, adjacent to the North Star. In 1927 Black Diamond Mines, Inc., patented six claims in the Diamond group: the Diamond, Black Diamond, Black Diamond #2, Blue Diamond Extension, Blue Diamond Extension #2, and Blue Diamond Extension #3. Other claims in the group included the Yellow Diamond, the Saradoc claims, the Videtta claims, the Neptune, and the Red Diamond. . . . For most of its active years the mine was operated by Richard Kleesattel, at first on behalf of an eastern syndicate and later as the owner. In 1909 the workings included a 300' tunnel and a 50' shaft, with an ore shoot about 8' wide. By 1939 there were approximately 1,600' of adits, drifts, and crosscuts.

The first mention of the mine is in 1905, when owners Mark Perry and J. P. "Snowshoe" Brown developed a 50' shaft and were driving a 250' tunnel. The ore at that time gave average values of $22 per ton, but later that year it was reportedly $48. In 1907 Perry and Brown sold the Black Diamond (and the
associated Yellow Diamond claim) to Seattle and Denver parties represented by Richard Klessett for approximately $25,000.

Richard Klessett served as the manager of the Black Diamond mine intermittently for the next 30 years. In early 1908 he installed an air pipe and had two tons of ore sent to Denver for a test run. That fall he bought a five-stamp mill on Frank Hye’s Dixie property and planned to install it on the Black Diamond, but that apparently did not work out, as two months later Klessett had leased the four-stamp mill 1/2 mile away on the adjacent North Star claim. In November of 1908 the Diamond Consolidated Mines Company was incorporated, with its headquarters in Seattle. Klessett was the president, and H. E. Orr was a major investor. The company soon was employing 18 men building cabins and roads and running mill tests. In 1909 an ore sample from a 4’ vein had an average value of $25. That same year, ore from the Videtta claim averaged $10 per ton on a 9’ vein.

Development work and treatment of small quantities of ore at the North Star mill continued in 1909, 1910, 1912, and 1914, with some work done on the Yellow Diamond claim. In 1916 and 1917 Richard Klessett was still the manager, and he reportedly had 400 tons of ore milled at the North Star mill, with an average recovery of $22 per ton. The surface improvements included a 150’ bunkhouse, an assay office, and two large cookstoves. Operations ceased in 1917 when the mine was taken over by the Alien Property Custodian during World War I, because it was owned by a German syndicate, and the Black Diamond was apparently inactive until 1930. In that year 13 employees reopened the Black Diamond, with Richard Klessett of Elk City listed as the owner until at least 1938. The new development work included fixing up the building and retimbering the mine. Work was still going in 1938, when about 300’ of tunnel had been “chopped out,” but there is no further mention of the mine.

The promoters of the Black Diamond apparently made good money, but they reportedly never ran the machinery they bought with their investors’ money. The company workers cut a large amount of 8” timbers to use as mine timbers. These were later used to build some of the buildings at the mine, and area prospectors eventually salvaged the timbers for use in construction projects in and around Dixie. The company’s employees cut hundreds of cords of 4’-length firewood to run their steam plant, and these rotted away unused in the 1930s.

Between 1909 and 1939, the Black Diamond Mine produced 47 tons of ore. This material yielded 23.14 ounces of gold and 11 ounces of silver (Neumann and Close, 1991).
3.27.4 Environmental Conditions

3.27.4.1 Site Features

The Black Diamond Mine (Figure 3.27-2) was visited by Earl Bennett on July 15, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 1, index 1:49:34-1:51:46). Documenting photos are Roll 99B5, frames 18-20. Several additional photos were taken during a previous visit to the site in 1995.

During the 1995 visit to the site, Bennett made the following observations:
- The main adit at the Black Diamond has had recent work and is boarded up and signed “Danger Keep Out” [Figure 3.27-3]. There is support metal above the timbers and a little water is coming out of the adit. The dump has a road across it, but extends from the adit at least 100 feet (Picture 9, far end of the dump towards the adit [Figure 3.27-4]). The face of the dump is 30 feet thick and there is a substantial amount of material. A water sample was clear with pH 6.6 and C. 50 [conductivity]. The adit is in granite and the adit water flows over dump. There are no rails in the adit, but there are new rails on the dump or these rails have been pulled from the workings.

The adit is now open and the board gate has been removed, although there is little evidence of recent activity (Figure 3.27-5). A trickle of water flows out of the adit. Old mine timbers, piles of rails, and other scrap iron are piled outside the portal (Figure 3.27-6). The buldozed waste dump measures 115 feet long, 95 feet wide, and 60 feet thick on the nose. A new house has been built on the bluff above the adit.

3.27.4.2 Sample Locations

3.27.4.2.1 Solid Samples
No solid samples were collected.

3.27.4.2.2 Water Samples

Sample B7159911 was collected from the adit seep.

<table>
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<th>Location</th>
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<th>Temperature (°F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<td>5.24</td>
<td>0.5</td>
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3.27.4.2.3 Analytical Results

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

Adit water sample B7159911 is within the limits of the Aquatic Life Chronic standard for copper in the total recoverable metals screen.

3.27.5 Structures

No mining-related structures were found at the site.

3.27.6 Safety

The adit is open and can be entered. Some slumping near the adit indicates the weathered granite may be prone to collapse or caving.
Figure 3.27-1. Location of the Black Diamond Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.27-2. Sketch maps of the Black Diamond Mine (Neumann and Close, 1991, Figure 12). The adit shown in Inset A, which is outside the patented claim block, was not examined during this study.
Figure 3.27-3. Close-up of the Black Diamond adit as it was in 1995. The portal was boarded over (1995 Roll 517702, frame #8).

Figure 3.27-4. Portal and waste dump of the Black Diamond in 1995 (1995 Roll 517702, frame #9).
Figure 3.27-5. Close-up of the Black Diamond adit in 1999. Compare with Figure 3.27-2. The boards covering the opening have been removed. The metal bands of the rock bolts are above the portal (Roll 99B5, frame #19).

Figure 3.27-6. More distant view of the Black Diamond adit in 1999. Compare with Figure 3.27-3. Note the slumping at the right and the roof of the new home on the skyline above the adit (Roll 99B5, frame #20).
3.28 DILLINGER MINE (Site No. EC-200)

Note: This property later became part of the Comstock Mine.

3.28.1 Site Location and Access (Figure 2.1-1)

The Dillinger Mine is south of North Star Meadows in the headwaters of a southeast-flowing tributary of Rhett Creek along the south edge of the SW\(\frac{1}{4}\) of section 2 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.28-1). Access is on RS Road 9545 about 1 mile from its junction with FS Road 222D. This junction is about \(\frac{3}{4}\) mile southeast of where Road 222D joins Road 222 at the Dixie cemetery. The mine is on patented claims that are being developed for summer home sites.

3.28.2 Geologic Features (Figure 2.2-1)

The Dillinger Mine is in the biotite schist and gneiss unit of the Middle to Early Proterozoic Elk City metamorphic sequence(?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith. The mine is near a northeast-trending fault (Lewis and others, 1993).

3.28.3 Site History

The following is known about the history of the Dillinger Mine (McKay, 1996, p. 147-148): Dixie pioneer Sampson Dillinger discovered the Dillinger lode vein in 1891 (the next year he located the Sampson and the Sampsonian). This vein, along with the North Star and South Star that he also discovered that year, were the first quartz claims in the Dixie mining district. In 1892 the Dillinger was described as an 18"-wide vein of free gold-bearing white quartz. By January of 1893 the tunnel was 60' long. He developed the Dillinger for four years and then built a small arrastra, with which he milled ore yielding $14 to $25 per ton in gold, beginning in July of 1895. The arrastra was located near the confluence of Meadow and Rhett Creeks and was powered by a water wheel, and a ditch brought the water to the site (some or all of it was a box flume set underground to keep the water from freezing). Dillinger reportedly took $1,000 out of the first 42' of a 4' x 6' shaft that he sank. This marked the start of the quartz boom in Dixie.

In the fall of 1895 Dillinger sold the Dillinger quartz lode to the Idaho Comstock Mining and Milling Company, and that company developed the vein along with their work on the Comstock lode.
3.28.4 Environmental Conditions

3.28.4.1 Site Features

The Dillinger Mine was visited by Earl Bennett on July 15, 1999. No video was taken at the site. Documenting photo is Roll B5, frame #21. Several additional photos were taken at the site during a visit by Bennett in 1995.

At the time the site was visited in 1995, Bennett noted:
[D]uring the visit a cat was smoothing over the old millsite and other workings [Figure 3.28-2], which are owned by a man in Seattle.

There was a newer house below the old mill, and a collapsed adit was between the mill and the house (Figure 3.28-3).

When revisited in 1999, the foundation for another new house was being built at about the site of the old adit (Figure 3.28-4). There is little indication of any mining activity left in this area.

3.28.4.2 Sample Locations

3.28.4.2.1 Solid Samples
No solid samples were collected.

3.28.4.2.2 Water Samples
No water samples were collected.

3.28.5 Structures

No mining-related buildings were found. New homes are the only structures in the area.

3.28.6 Safety
There are no safety hazards at the site.
Figure 3.28-1. Location of the Dillinger Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.28-2. Old millsite at the Dillinger Mine as it appeared in 1995. The bulldozer (left of center) was smoothing over the site (1995 Roll 517702, frame #12).

Figure 3.28-3. Caved adit and newer home at the Dillinger Mine site in 1995 (1995 Roll 517702, frame #11).
Figure 3.28-4. Construction of the foundation for a new home at about the site of the caved adit at the Dillinger Mine site in the summer of 1999 (Roll 99B5, frame #21).
3.29 NORTH STAR MINE (Site No. EC-195)
Alternate name—Northern Star.

3.29.1 Site Location and Access (Figure 2.1-1)

The North Star Mine is west of North Star Meadows near the headwaters of a southeast-flowing tributary of Rhett Creek, near the west edge of the NW¼ of shortened section 2 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.29-1). The mine is on FS Road 9545 about ¼ mile southeast of the junction with FS Road 222D. Road 222D joins FS Road 222 about 1 mile to the northwest at the Dixie cemetery. The mine is on patented claims, now being subdivided for home sites, which extend west into section 3 and southeast nearly to the Dillinger claim. National Forest land surrounds the claims.

3.29.2 Geologic Features (Figure 2.2-1)

Rock in the area consists of granite with quartz veins and stringers. The waste dump shows little evidence of sulfides.

3.29.3 Site History

McKay (1996, p. 172-173) reported the following on the history of the North Star Mine:

The North Star group of claims was located two road miles south of Dixie on an extension of the Dixie Queen. Sam Dillinger located the North Star and South Star quartz claims in 1891, reportedly the first lode claims in Dixie. He developed the property for four years and then built an arrastra to recover gold from this and other veins. The ore yielded $14-$25 per ton in gold. Thomas and Frank Hye bought the mine in 1898. Four of the claims (Northern Star, Center Star, Defender, and Evening Star) were patented in 1905. In the late 1930s two veins were exposed, one about 3' wide and dipping steeply northeast with a 400' adit, the other from a few inches to 2' wide with a 150' adit and a shallow shaft. The latter vein was cut off by a lamprophyre dike at the face of the adit. The country rock was quartz monzonite. The veins had gouge on both walls, and the sulfides occurred in sheared quartz on both the hanging wall and the foot wall of the zone of shearing.

In 1901 a crew working at the North Star installed a steam hoist and sank a shaft. The Hye brothers built a four-stamp mill, reported to be a “model mill,” in 1902, and they planned to install a cyanide plant. In 1904, Sam Dillinger sold the property to Col. Plummer and associates of Spokane. At that time, about 1,000' of development work had been done, and the ore had an average value of about $12 per ton. Over the next several years, the North Star milled ore from the Black Diamond and Dillinger mines and occasionally the North Star itself. In 1909, ore from the North Star averaged $20 per ton on a 30" vein. George Trader bought
the North Star group in 1912. Ten men worked on development of the mine in 1934. In 1936 he leased it to the Keith Star Mining Company, and the next year the mill was remodeled. The mill at that time had a jaw crusher, a 3' x 3' ball mill, a small Straub ball mill for regrinding, two Fagergren flotation cells, and a concentrating table. The mill was powered by an 18-horsepower steam drive driven by a fire-tube boiler that burned half a cord of wood in eight hours.

Between 1901 and 1941, the North Star Mine produced 1,138 tons of ore. This material yielded 138.89 ounces of gold and 118 ounces of silver (Neumann and Close, 1991).

3.29.4 Environmental Conditions

3.29.4.1 Site Features

The North Star Mine (Figure 3.29-2) was visited by Earl Bennett on July 15, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:00:54-0:03:17). Documenting photos are Roll 99B5, frames 22-25. Several additional photos were taken during a previous visit to the site in 1995.

The partially open, dry adit (Figure 3.29-3) has a moderate-size waste dump that measures 50 feet long, 30 feet wide, and 25 feet thick (Figure 3.29-4), indicating several hundred feet of workings. The dump is partly overgrown with trees 4-5 inches in diameter and consists mainly of granite with little sign of any sulfides. In front of the adit is a collapsed log cabin. An old Ingersoll-Rand air compressor and a boiler are at the cabin (Figure 3.29-5). A second dry hole is about 100 feet up the hill. The entire area is being developed for home sites, and a new home is above the adit and collapsed cabin. The area disturbed by mining is less than 0.5 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

The collapsed cabin at the adit was the only mining-related building found at the site.

3.29.6 Safety

The adit is partly opened and can be entered. With the new homes being built in the area, the adit could be a significant hazard.
Figure 3.29-1. Location of the North Star Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.29-2. Sketch of the North Star Mine and map of the adit (Neumann and Close, 1991, Figure 10).
Figure 3.29-3. Open adit at the North Star Mine. Old mine timbers are in the rock rubble from the collapsed part of the adit (Roll 99B5, frame #22).

Figure 3.29-4. Waste dump for the adit at the North Star Mine. The rock on the dump is mostly granite (Roll 99B5, frame #24).
Figure 3.29-5. Collapsed cabin, old Ingersoll-Rand compressor, and boiler tank at the site. The cabin, compressor, and tank are in the same condition now as when this photo was taken in 1995 (1995 Roll 517702, frame #15).
3.30 PENN-DIXIE MINE, UPPER ADIT (Site No. B7169901)

3.30.1 Site Location and Access (Figure 2.1-1)

This site is across the ridge to the northwest of the North Star Mine in the NE¼ of the NE¼ of shortened section 3 (unsurveyed), T. 25 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.30-1). Access is on FS Road 222D (which turns south off Road 222 at the Dixie cemetery) south and east about 1 mile to an unnumbered road that turns off to the west and goes to the Penn Dixie Mine. This turnoff is just before a new home on the east side of the road and across from the turnoff to FS Road 9545. The site is on Forest Service land about 200 yards down the Penn Dixie Mine road and about 150 feet downhill from a National Forest boundary sign.

3.30.2 Geologic Features (Figure 2.2-1)

The upper adit of the Penn-Dixie Mine is near the contact between the biotite gneiss and schist unit of the Middle or Early Proterozoic Elk City metamorphic sequence (?) and Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.30.3 Site History

See Section 3.31.1 for the history of the Penn-Dixie Mine.

3.30.4 Environmental Conditions

3.30.4.1 Site Features

The upper adit of the Penn-Dixie Mine was visited by Earl Bennett on July 16, 1999. A video segment describing the site, which is identified as an unnamed prospect (Site No. B7169901), is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:03:21-0:05:28). Documenting photos are Roll 99B6, frames 1-4. Several additional photos were taken at the site during a previous visit in 1995.

The site (Figure 3.30-2) has an open dry adit with new timbers in the portal and a partly enclosed framework in front of the entrance (Figures 3.30-3-3.30-6). The opening is partly boarded over with a painted warning sign, but the boards are almost covered with granite rubble sloughed from above the portal. A notch in the slope leads to the entrance (Figure 3.30-6). The waste dump (Figure 3.30-7) measures 60 feet long, 20 feet wide, and 10 feet thick. Old steel-capped wooden rails are on the dump, but no rails extend out of the adit. The disturbed area covers about 0.5 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
No water samples were collected.

3.30.5 Structures
No structures were found at the site.

3.30.6 Safety
Although partly boarded over, the adit is open and can be entered. The weathered granite appears to crumble and slough rather easily, so the workings may be prone to caving or collapse.
Figure 3.30-1. Location of the upper adit of the Penn-Dixie Mine (Site No. B7169901), Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.30-2. Sketch map of the Penn-Dixie Mine, showing location of the upper adit (Neumann and Close, 1991, Figure 9). The second adit shown on the map at this site was not noted in the field but may be obscured by brush.
Figure 3.30-3. Distant view of the portal of the upper adit of the Penn-Dixie Mine in 1995 (1995 Roll 517703, frame #15).

Figure 3.30-4. Close-up of the framework around the portal of the upper adit of the Penn-Dixie Mine in 1995 (1995 Roll 517703, frame #16).
Figure 3.30-5. Framework around the portal of the adit at the upper adit of the Penn-Dixie Mine in 1999. The entrance is partly boarded over, but the adit is open and can be entered (Roll 99B6, frame #1).

Figure 3.30-6. Close up of the entrance to the adit at the upper adit of the Penn-Dixie Mine in 1999 (Roll 99B6, frame #2).
Figure 3.30-7. Looking northeast from the portal toward the waste dump of the upper adit of the Penn-Dixie Mine (Roll 99B6, frame #4).
3.31 PENN-DIXIE MINE (Site No. EC-193)
Alternate name—Snowstorm.

Note: Site No. B7169902 is up the road to the east of the main Penn Dixie workings, but it is probably associated with the mine. Therefore, Site No. B7169902 is included in the description below.

3.31.1 Site Location and Access (Figure 2.1-1)

The Penn-Dixie Mine is on the east side of Crooked Creek at the south end of Dixie along the township line dividing townships 25 N. and 26 N., R. 8 E. In T. 26 N., the property is along the south edge of the SW¼ of section 34 (unsurveyed); in T. 25 N., the workings are in the center of the northern part of shortened section 3 (unsurveyed). Although the main workings are only about 100 yards east of Crooked Creek and FS Road 222, access is via FS Road 222D to an unnumbered road that turns west off Road 222D across from the junction with FS Road 9545. The unnumbered road is just north of a new house on the east side of the road. The property is on Forest Service land.

3.31.2 Geologic Features (Figure 2.2-1)

The Penn-Dixie Mine is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.31.3 Site History

The following history of the Penn-Dixie Mine is from McKay (1996, p. 174-177):
The Penn-Dixie was a group of eight claims and a millsite located on the east side of Crooked Creek one mile south of Dixie, across from the Dixie Chief. In 1909 it was considered the most developed property in the Dixie mining district. The owners were mostly from Bradford, Pennsylvania. The property was originally located in 1894 by Chris Mathison and Alex Kerr. In 1905 Rory Burke and William L. “Billy” Sendker relocated the ground. That year they put 90 tons of ore through the Comstock mill, recovering four lbs., 3 oz. gold (about 50% of the values). They sold the property in 1915 to the Penn-Dixie Gold Mining Company. The company installed a steam-powered stamp mill and mined several thousand tons of ore from a vein on the Snowstorm. That vein was 4' thick on average. The country rock included quartz monzonite, gneiss, and schist. By the late 1930s there were approximately 1,500' of workings on the property.

By 1906 a relatively large crew was working on the Penn-Dixie. Billy Sendker was superintendent (he was also superintendent of the Dixie Chief). The lower tunnel had reached a depth of 220'. Values from $9-$500 per ton were soon reported. By November of 1907 the company had a 100'-long ore bin, a
blacksmith shop (which burned in June of 1909), roads, and storehouses. In 1909 the two main veins were developed by over 2,000' of shafts, tunnels and crosscuts, with most of the work on the Snowstorm No. 1 and the Keystone No. 1 claims. No. 3 was the main working tunnel. The company was stockpiling ore to create a sufficient reserve before building a mill.

In the summer of 1909 the company moved in a four-stamp mill (capacity 10-12 tons per day) and concentrator from the Comstock mine and installed them at the mouth of the No. 3 tunnel on the Snowstorm No. 1 claim, the lowest of three tunnels. It was started up in December of that year. Ore taken from the No. 2 tunnel, 700' long, averaged about $20 per ton and was removed at the same level as the mill's ore bins. A crosscut tunnel ran from the Keystone to the Snowstorm. The company was using wood for fuel but planned to add an electric plant to reduce costs. The property was developed and ore was mined through at least 1914. In 1912 the company ordered cyanide tanks because they were needed to justify continuous operation. By that year S. R. Gayton was the manager, and he owned the mine through at least 1921. In 1917 the mill and personal property of the mine were sold and moved onto the Majestic mine of Dixie. The only other mention of the Penn-Dixie found is that in 1938 a crew was again doing development work there. A log cabin is located near an adit or shaft on the Penn-Dixie No. 2.

Between 1910 and 1941, the Penn-Dixie Mine produced 607 tons of ore. This material yielded 122.28 ounces of gold and 38 ounces of silver. In 1989 or 1990, the property was held by James and Pearl Chittick (Neumann and Close, 1991).

3.31.4 Environmental Conditions

3.31.4.1 Site Features

The Penn-Dixie Mine was visited by Earl Bennett on July 16, 1999. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:05:34-0:13:27). Documenting photos are Roll 99B6, frames 5-11. A series of photos was also taken during a previous visit to the site in 1995.

The main workings at the Penn-Dixie include two caved adits and an old millsite (Figures 3.30-2 and 3.31-2). The upper caved adit, which was the larger of the two, forms a long trough on the slope (Figure 3.31-3). The large waste dump measures 60 feet long, 60 feet wide, and over 100 feet thick (Figure 3.31-4). A small amount of water seeps from the adit and disappears into the dump. There is a collapsed cabin at the base of this dump. The trough of the lower caved adit is along the base of the dump for the upper adit (Figure 3.31-5). The dump for the lower adit is 100 feet long, 15 feet wide, and 10 feet thick (Figure 3.31-6). The lower adit is dry. West of the lower adit and below the upper waste dump is the old millsite. The disturbed area covers about 7 acres.
About 200 yards up the slope to the southeast at Site No. B7169902 is another caved adit and a waste dump. The adit appears to be Y-shaped, and the trough supports a thick stand of brush (Figure 3.31-7). The waste dump measures about 60 feet long, 12 feet wide, and 100 feet thick on the nose. It has a number of large lodgepole pine trees growing on it (Figure 3.31-8). Steel-capped wooden mine rails are on the dump, and an old collapsed log ore bin is on the west side of the dump. The disturbed area covers about 1 acre.

3.31.4.2 Sample Locations

3.31.4.2.1 Solid Samples
   No solid samples were taken.

3.31.4.2.2 Water Samples
   No water samples were taken.

3.31.5 Structures

Little remains of the mill building except rotting timbers (Figure 3.31-9). An old collapsed log cabin is at the base of the upper waste dump. There is also a nearly collapsed ore bin on the west side of the waste dump for the adit at Site No. B7169902 (Figure 3.31-10).

3.31.6 Safety
   No significant safety hazards were found at the site.
Figure 3.31-1. Location of the Penn-Dixie Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.31-2. Sketch of the main workings at the Penn-Dixie Mine.
Figure 3.31-3. Caved upper (main) adit at the Penn-Dixie Mine (Roll 99B6, frame #6).

Figure 3.31-4. Looking down the face of the waste dump for the main adit at the Penn-Dixie Mine. Although nearly hidden by brush, a collapsed log cabin is at the base of the dump at the center of the picture (Roll 99B6, frame #7).
Figure 3.31-5. Caved lower adit at the Penn-Dixie Mine main workings. The toe of the upper waste dump is at the upper left (Roll 99B6, frame #10).

Figure 3.31-6. Waste dump for the lower adit at the Penn-Dixie Mine (Roll 99B6, frame #11).
Figure 3.31-7. Caved adit at Site No. B7169902, about 200 yards above the main workings at the Penn-Dixie Mine (Roll 99B6, frame #12).

Figure 3.31-8. Waste dump for the adit at Site No. B7169902 (Roll 99B6, frame #13).
Figure 3.31-9. Ruins of the old mill at the Penn-Dixie Mine (Roll 99B6, frame #5).

Figure 3.31-10. Nearly collapsed log ore bin on the west side of the waste dump at Site No. B7169902 (Roll 99B6, frame #14).
3.32 UNNAMED PROSPECTS (Sites No. B7169903 and No. B7169904)
Alternate names—Site No. B7169903 may be the Dixie Chief Mine, also known as the Portland Group and the Blue Bucket, and was called the Juanita No. 5 Prospect by Neumann and Close (1991); Site B7169904 appears to be the Aziscoos.

3.32.1 Site Location and Access (Figure 2.1-1)
Site No. B7169903 is on the west side of FS Road 222 just south of the junction with Road 222D, in the NW¼ of the SW¼ of section 34 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5 minute quadrangle. Site No. B7169904, also on the west side of the road, is ¼ mile further to the south along Road 222, in the SW¼ of the SW¼ of section 34 (Figure 3.32-1). A new cabin is across the road from the first site. Both sites are on Forest Service land.

3.32.2 Geologic Features (Figure 2.2-1)
These adits are in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

3.32.3 Site History
The following history pertaining to the Dixie Chief is taken from McKay (1996, p. 148):
The Dixie Chief group consisted of five claims (the Blue Buckets and Blue Bucket No. 2, the Portland, the Crescent, and the Crescent No. 2, and the Keystone claims are mentioned in various accounts) on the west side of Crooked Creek and adjoining the Dixie townsite on the south. The Dixie Chief Gold Mining Company, formed in 1906 or 1907, was owned by Bradford and Pittsburgh, Pennsylvania, and German investors, and one of the primary investors, L. H. Sendker, was the father of the mine superintendent, W. L. “Billy” Sendker. According to the company prospectus, the younger Sendker spent all of his money opening and testing the claims and then borrowed money to advance the work, working six years alone on the claim. When he sold to the company, he took his pay in stock. Sendker and his wife Edna lived in a cabin near the Penn-Dixie mine, which he also had located and developed. His father, who had helped support the mine financially, died in 1912.

The development work on the Dixie Chief was done between 1905 and 1912. By the summer of 1911 the development included: a 500' tunnel on the Blue Bucket No. 1 with ore averaging $20 per ton; a 175' tunnel on the Blue Bucket (intended to be a waste tunnel); shallow shafts and open cuts on the vein on the Crescent claims; and a 50' shaft and numerous open cuts on the Portland, exposing an 18" pay streak of high-grade sulfide ore. A tunnel begun in the fall of 1910 was intended to intersect the ore shoot at a depth of 350', the deepest in the Dixie camp at that time. In 1907, the company claimed that the ore they had exposed had
values ranging from $10 to $208.31 per ton, but the true average appeared to be in the $20s. In 1910 Sendker had a blacksmith shop and a timber shed built at the Dixie Chief. The company planned to build a mill downgrade from the mine, using a tunnel and gravity system for the transport of loaded ore cars, but no mention of a mill has been found.

Neumann and Close (1991) identified Site B7169903 as the Juanita No. 5 Prospect. No historical information is reported for the site, and no information given in McKay (1996) links both names to this site.

According to McKay (1996, Figure 52), Site B7169904 was called the Aziscoos. The following historical information was noted for that site (McKay, 1996, p. 139-140):

The Aziscoos was a group of four claims located one mile south of Dixie on the west side of Crooked Creek, adjacent to the Ontario claim. After three years of work on the property, in 1905 John S. Danforth sold the various placer and quartz claims to an eastern corporation, the Boston-Idaho Gold Mines Company, that made him the manager. In 1906 Danforth had a ditch from Crooked Creek surveyed that would give him a head of 56' and would carry ten cubic feet of water per second. He was building cabins, shops, and other buildings and preparing to erect a mill. In March of 1908 Danforth and Pritchard began working on a 200' tunnel on the property that was intended to cut a vein that was an east extension of the Ontario vein. By June they were grading for a flume, and the next month they put in a headgate for the Aziscoos ditch. In the fall of 1908, Danforth resigned as manager of the Dixie Royal in order to work on his custom mill, designed to treat custom ores until the Aziscoos had developed sufficiently to supply the mill. The average value of the ore from a 6' vein on the Aziscoos was $12 in 1909. In 1911 John and Richard Danforth finally installed their mill, which had two two-stamp batteries and concentrators and was “of the Hendy type.” The stamp mill and sawmill were powered by a 60' overshot wheel that would develop 25-30 horsepower. They had good water power, a sawmill, and a covered flume that could run all year. The next year, Richard Danforth was reportedly developing the claim with good prospects, but the claim is not mentioned again under this name.

3.32.4 Environmental Conditions

3.32.4.1 Site Features

These prospects were visited by Earl Bennett on July 16, 1999. A video segment of Site No. B7169903, which is referred to as B7169904 in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:13:31-0:14:44). Documenting photos of the same site are Roll 99B6, frames 15-16. No video or photos were taken at Site No. B7169904.
An adit at Site No. B7169903 (Figure 3.32-2) is nearly caved but has an 18-inch-high opening at the top of the caved rock rubble (Figure 3.32-3). A very minor seep from the adit disappears into the dump. The waste dump for the adit measures 60 feet long, 30 feet wide, and 12 feet thick (Figure 3.32-4). FS Road 222 is just below the dump. The disturbed area covers less than 0.5 acre.

The pit or very shallow caved adit at Site No. B7169904 has no waste dump and is of little significance. This site was labeled “Unnamed prospect no. 1” by Neumann and Close (1991).

### 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 mining-related structures are at the site. A new home or cabin is across Road 222 from the adit.

### 3.32.6 Safety

The adit at Site No. B7169903 is open and can be entered. It is along the main road and within the southern part of Dixie.
Figure 3.32-1. Location of Sites No. B7169903 and No. B7169904, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.32-2. Workings at the Juanita No. 5 Prospect (Neumann and Close, 1991, Figure 20).
Figure 3.32-3. Small opening into the adit at Site No. B7169903 (Roll 99B6, frame #15).

Figure 3.32-4. Waste dump for the adit at Site No. B7169903. Note the new cabin across FS Road 222 from the site (Roll 99B6, frame #16).
3.33 BONANZA MINE (Site No. EC-192)
Alternate name—Golden Age.

Note: This site was given a field number of B7169905. It was later determined to be the Bonanza Mine.

3.33.1 Site Location and Access (Figure 2.1-1)

The Bonanza Mine is on the north side of FS Road 222 at mile marker 32 in the SE¼ of the SE¼ of section 33 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute topographic map (Figure 3.33-1). The property is about ¼ mile west of the turnoff to FS Road 9534. A short spur road, FS Road 77299, leads to the adit. The mine is on Forest Service land.

3.33.2 Geologic Features (Figure 2.2-1)

The adit is in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993). The dump is composed of granitic rocks and bull quartz with minor iron staining.

3.33.3 Site History

McKay (1996, p. 155-156), who called this property the Golden Age, reported the following history for this site:

The Golden Age group of claims was located 1 1/2 miles south of Dixie on Crooked Creek at the mouth of Hundred Dollar Gulch. S. W. Smith of Elk City staked the claims in 1896, and the property was developed by an adit more than 200' long and by a 120' crosscut. Some of the ore, a heavy iron sulfide, was milled. In 1909 the property had a 250' tunnel on a 3'-wide vein, and there were about 100 tons of ore on the dumps. In 1909, ore from the Golden Age lode mine averaged $40 per ton on a 4' vein. The workings were then abandoned until 1930, when Don George restaked the property. George sold the property to John Leonard and his sons in 1932, who lived in a cabin at the mouth of the gulch, and they staked several additional claims and reopened the partially caved adit. The quartz vein was 2'-3' wide and cut granitic rock, gneiss, and pegmatite, striking about north 45 degrees west and dipping 55-70 degrees northeast. Streaks of sulfides (mainly pyrite with some chalcopyrite) were irregularly distributed throughout sheared portions of the vein, which was traced approximately 1,500' on the surface.

Between 1932 and 1940, the Bonanza Mine produced 13 tons of ore. This material yielded 11.25 ounces of gold, 11 ounces of silver, and 8 pounds of copper (Neumann and Close, 1991).
3.33.4 Environmental Conditions

3.33.4.1 Site Features

This site was visited by Earl Bennett on July 16, 1999. A video segment describing the site, which is identified as Unnamed Mine (Site No. B7169905) in the videotape, is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:14:48-0:17:33). Documenting photos are Roll 99B6, frames 17-19. Several additional photos were taken during a previous visit to the site in 1995.

The adit at this site is open (Figure 3.33-2) and has water flowing from it at about 2-3 gallons per minute (Figure 3.33-3). This water disappears into the dump. Collapsed rock and old timbers in front of the entrance indicate the portal was originally about 20 feet in front of the present opening. The waste dump is very large, measuring about 230 feet long parallel to the road, 50 feet wide, and about 70 feet thick (Figures 3.33-4 and 3.33-5). A number of old boards and large timbers (with bolts through them) are scattered on the dump near the adit. The disturbed area covers about 2 acres.

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

Water sample B7169905 was taken from the adit discharge.

<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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<tr>
<td>B7169905</td>
<td>Bonanza Mine, adit</td>
<td>50</td>
<td>50</td>
<td>7.26</td>
<td>2-3</td>
<td>Yes</td>
</tr>
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3.33.4.2.3 Analytical Results

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

Sample B7169905 from the adit water does not exceed any standards in the dissolved metals screen. It equals or exceeds all standards for cadmium in the total recoverable metals screen.

3.33.5 Structures

There are no structures at the site.
3.33.6 Safety

The open adit is easily accessible from FS Road 222 and the short spur road. The Dixie area receives a significant amount of recreational traffic from tourists in the summer months.
Figure 3.33-1. Location of the Bonanza Mine, Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3.33-2. Underground workings of the Bonanza Mine (Neumann and Close, 1991, Figure 8).
Figure 3.33-3. Open adit at the Bonanza Mine. Adit water flows into the channel at the lower center of the picture (Roll 99B6, frame #17).

Figure 3.33-4. Top and face of the waste dump at the Bonanza Mine. Old boards and timbers are scattered on the dump (Roll 99B6, frame #18).
Figure 3.33-5. Face of the waste dump at the Bonanza Mine. The toe just reaches FS Road 222. The mile marker 32 post is to the left of the road along the lower edge of the picture (Roll 99B6, frame #19).
3.34 UNNAMED MINE (Site No. B7169906)
Alternate name—Unnamed Prospect No. 2 (Neumann and Close, 1991).

3.34.1 Site Location and Access (Figure 2.1-1)

This site, which is identified by Neumann and Close (1991) as “Unnamed Prospect No. 2,” is at the mouth of Hundred Dollar Gulch in the SW¼ of the SE¼ of section 33 (unsurveyed), T. 26 N., R. 8 E., on the Dixie 7.5-minute quadrangle (Figure 3.34-1). The mine is on the north side of FS Road 222 about ¼ mile west of mile marker 32 and is on Forest Service land.

3.34.2 Geologic Features (Figure 2.2-1)

The workings at this site are in Cretaceous biotite granodiorite of the Idaho batholith (Lewis and others, 1990, 1993).

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

3.34.4 Environmental Conditions

3.34.4.1 Site Features

This site was visited by Earl Bennett on July 16, 1999. A video segment describing the property, which is identified as the Bonanza Mine on the videotape, is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:17:36-0:21:15). Documenting photos are Roll 99B6, frames 20-22. Figure 3.34-2 shows the features mapped at the site by the U.S. Bureau of Mines (Neumann and Close, 1991).

Workings found at the site include two shafts, a small pit, and a large waste dump. The small pit (Figure 3.34-3) is just behind the main shaft. This shaft is open, timbered, and filled with water (Figure 3.34-4). The dump for this shaft is about 100 feet long, 12 feet wide, and only 4 feet thick. Old timbers and scrap metal on the dump may be remnants of the hoist system. The second shaft has vertical supporting boards around the opening and is also full of water (Figure 3.34-5). This shaft is beside Road 222 and has very little waste material. The dump may have been destroyed by the construction of the road. The disturbed area covers less than 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 samples were taken at the site, but a reference water sample was collected from the creek in nearby Hundred Dollar Gulch.

<table>
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<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Specific Conductivity (μS)</th>
<th>Temperature (° F)</th>
<th>pH</th>
<th>Flow (gpm)</th>
<th>Analyzed (Yes/No)</th>
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<tr>
<td>B7169907</td>
<td>Hundred Dollar Gulch, reference</td>
<td>6.94</td>
<td>not taken</td>
<td>6.94</td>
<td>2 ft. wide, 0.5 ft. deep</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.34.4.2.3 Analytical Results

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

Reference sample B7169907 from Hundred Dollar Gulch does not exceed any standards in the dissolved metals screen. It equals or exceeds all standards for cadmium in the total recoverable metals screen.

3.34.5 Structures

There are no structures at the site.

3.34.6 Safety

Both of the shafts are open and easily accessible from FS Road 222. Both are filled with water and of undetermined depth.
Figure 3.34-1. Location of Unnamed Mine (Site No. B7169906), Idaho County, Idaho (U.S. Geological Survey Dixie 7.5-minute topographic map).
Figure 3-34-2. Map of features at Unnamed Prospect No. 2 (Neumann and Close, 1991, Figure 21).
Figure 3.34-3. Small pit above the main shaft at Site No. B7169906 (Roll 99B6, frame #20).

Figure 3.34-4. Water-filled and timbered main shaft near the small pit at Site No. B7169906 (Roll 99B6, frame #21).
Figure 3.34-5. Second water-filled shaft at Site No. B7169906, alongside FS Road 222 (Roll 99B6, frame #22).
3.35 WAR EAGLE MINE (Site No. EC-625)
Alternate names—Little Bear; Blue Bell; Magnetite.

3.35.1 Site Location and Access (Figure 2.1-1)

The War Eagle Mine is along Fitz Creek in the SE¼ of section 20 (unsurveyed), T. 25 N., R. 7 E., on the Mackay Bar 7.5-minute quadrangle (Figure 3.35-1). Access from Dixie is on FS Road 222 south and southwest about 5 miles to FS Road 311A, then south about 1½ miles to the end of Road 311A at Halfway House Campground. At the campground, FS Trail 215 heads west for a little more than 2 miles, then southwest along Crooked Creek another 3 miles to Fitz Creek. Trail 203 turns northwest from Trail 215 at Fitz Creek. The mine is about 1 mile northwest on Trail 203 from this junction, on the southwest side of Fitz Creek, and is on Forest Service land. An old mill reported at the War Eagle was probably on a flat at the confluence of Fitz Creek and Crooked Creek. The mine is on Forest Service land.

3.35.2 Geologic Features (Figure 2.2-1)

The War Eagle Mine is in granitic rocks of the Cretaceous Idaho batholith (Mitchell and Bennett, 1979). According to Chauvot (1986), this Cretaceous gold deposit is hosted by muscovite-biotite granite and the ore is in quartz lenses that occur in northeast-trending fractures that intersect with major north-northeast-trending faults. The sulfide minerals include pyrite, chalcopyrite, galena, sphalerite, and freibergite; the gold probably occurs in solid solution with the base metals in the sulfide minerals. The mine geology and mineralogy is also well described in Shenon and Reed (1934).

3.35.3 Site History

McKay (1996, p. 187-191) reported the following on the history of the War Eagle Mine: The War Eagle mine was one of the producing lode mines of the Dixie mining district, and the group of 48 claims carried values in gold, silver, copper, zinc, and lead. The approximately 1,000-acre property was located on Fitz Creek, a tributary of Crooked Creek, about nine miles south of Dixie, a day’s trip on horseback from the Dixie townsite. William Boyce located the mine in 1898 (the Blue Bell claim). He worked on an Elk City ranch each year to earn enough cash to spend the winter and spring developing his mine, mostly by adits. In 1912 he located a boulder of high-grade float near the mouth of the Boyce tunnel and then found the Boyce ore shoot. Boyce sold the property to George J. Bancroft and William H. Day, who were the owners by 1922. In that year the workers drove a cross-cut tunnel to tap a rich shoot about 200' below the surface. The mine was essentially dormant for about 10 years, though, reportedly because of the inability of the Iowa owners to agree on either sale or operating terms. All the production, about 1500 tons of ore, has come from the Boyce ore body since 1931.
The high-grade sulfide ore of the War Eagle mine occurred in granodiorite and is mainly quartz. The sulfides were mainly pyrite, galena, some sphalerite, and smaller amounts of copper sulfides. The vein was a shear zone in the granite, about 25-30' wide. The Boyce ore body was in the hanging wall of a fault zone known as the War Eagle fault and was made up of lenses. The gold content of the ore varied, but the Boyce ore shoots averaged $57.25 per ton, and the overall average was $30 per ton in gold and silver.

Beginning in 1929 the Central Idaho Gold Mining & Milling Company, based in Seattle, operated the mine under a bond and lease agreement. The company built trails, installed a sawmill and power house, and constructed a “comfortable” camp (the latter at the junction of Fitz and Crooked Creeks, about 3/4 mile below the mine). The 25-ton mill had a flotation plant. The ore concentrates were hauled by mule to the Dixie Ranger Station, by cat to Elk City, and then stored in Grangeville until enough for a railcar load (20 tons) was available to ship by rail to the smelter in Tacoma or to truck to the smelter in Kellogg.

During the winter of 1930 a ball mill and electric generator were taken into the mine over the snow. In February 1930 the War Eagle had 25 men employed at the mine. As of the spring of 1931 the company had invested nearly $60,000 in the mine. By the fall of 1931 the company had upgraded the mill and they were ready to begin working the ore left behind by the former owners. On Sept. 26, 1931, they began operating the 25-ton flotation mill, and it ran almost continuously through at least July of 1932. The equipment at the mill [and mine] included a 7 x 10 Blake crusher, a Dorr classifier, a 4 x 4 ball mill and two four-cell flotation units, a 250-cubic-foot-per-minute Sullivan compressor, a Sullivan stoper, a Gardner-Denver pack hammer [jackhammer], a Gardner-Denver 107 drifter, and an 8,000-board-feet per day sawmill. There were about 4,500' of wire transmission line, about 1,200' of 4 x 4 flume, and 106' of 36" steel penstocks that furnished water to the turbine under 50' effective head. The power plant was a 150 KVA Fairbanks-Morse generator driven by a Leffel turbine.

During the Depression the War Eagle provided winter jobs for some local Forest Service employees, and Salmon River miners worked at the mine. In the spring of 1932 there were enough employees with children at the mine to justify hiring Maud Hodgson to teach for a term. That August there were 30 men working at the mine, including a blacksmith. The company built sleeping quarters for the new employees that summer. In total, in 1932 the company spent $30,000 in developing the mine, and it produced 45 tons of concentrates valued at $416 per ton. In 1933, logs were sawed to provide 50,000 board feet of lumber for new camp buildings, and also about 7,000 running feet of mine timber was cut for use in the working tunnel. An assaying lab was built in 1933. The hydroelectric mill, built by W. B. Newton, at that time had a 25-40-ton capacity but could be
increased to 100 tons by adding ball mill and flotation capacity. In 1934 the company added a tramway, a tailings dam and flume, a crusher building, and new ore bins.

In 1931, 48 tons of ore were concentrated, producing 177 oz. gold, 77 oz. silver, and 936 lbs. copper. By June of 1932 the workers were mining 25 tons of ore a shift. The company planned to begin working three shifts and to install an intermediate grinding unit to increase the mill capacity to 40-50 tons per day. They expected to average at least $450 per ton in returns. That year the crew finished the mill building and installed a 25-ton flotation concentrator and a small hydroelectric plant. They also built trails and marketed a small tonnage of high-grade gold-lead concentrate. In November of 1933 the management reported that the mine was not yet on a paying basis, but they expected it to be by the next summer. The workers were busy driving the Blue Bell tunnel in further to block out enough ore to keep the mill running for two years.

In 1934, the development at the Boyce ore body consisted of a 340' upper level, 225' crosscut, and over 1,000' of drifts and short crosscuts. The Blue Bell workings had shallow surface cuts, a tunnel about 300' long, and several short crosscuts. The Holmes tunnel was in about 1200'. In 1935, the War Eagle group had a total development of 4,230'.

In September of 1935, the 25-ton flotation mill was operating on a part-time basis. It was powered by a hydroelectric power plant. At that time the mill was running two shifts and was making regular shipments to the Tacoma smelter with the value of the concentrates ranging from $600 to $900 per ton. The Central Idaho Mining and Milling Company, with mostly Seattle-area stockholders, spent approximately $250,000 in development. It was negotiating with New York interests for financing for a larger power plant and machinery to increase the mill to 100-ton capacity. For the previous three years a crew of 16-20 men had been maintained. The War Eagle was shipping ore from its 25-ton mill until at least 1936, and it was still reported as active in 1939.

One of the challenges of developing the War Eagle was the difficulty of reaching it. In 1922 one of the owners, George J. Bancroft, traveled to the mine from the south. He used an astonishing variety of means of transport to reach the property. He traveled by train to Nampa, by log train to McCall, by stage to Half-way House, by sleigh to Burgdorf, by dog sled to Warrens, by snowshoe to the Salmon River, by canoe across the river, and on foot by a steep trail, with the help of a rope, to the mine itself. The Forest Service constructed the trail that leads down Crooked Creek (the access from Dixie) in 1923 or 1924.
In 1983 the powerhouse, remains of a flume, two cabins, a log bunkhouse, historic trash scatter, a developed spring, cookhouse, foreman’s cabin, collapsed structure, generator/pump house, two privies, and another building still existed, plus four adits and the mill site. Another area had a powerhouse, a collapsed building, a large cabin, a wall tent frame, and the remains of a flume. All of the buildings have burned down since then.

In 1931, the company produced some gold-lead concentrate. The following year, 2,200 tons of ore were mined, yielding 803 ounces of gold, 3,432 ounces of silver, and some lead and copper. Maximum production was reached in 1935 when 3,462 tons were mined. The mine worked all year in 1934 and 1935, and over 2,500 feet of new underground workings were completed. Production tapered off in 1936 and 1937, when the mine closed. There was no further work until 1955 when C. F. Shawley and V. E. Anderson opened old tunnels and shipped 36 tons of gold concentrate mined in a few days. About three tons of ore were shipped from the property in 1962 by the Blue Bell Corporation.

In 1983, prospecting and a geochemical survey were conducted at the mine by Award Resources, Inc., and Score Resources, Ltd. In 1984, a drilling program was carried out (Chauvet, 1986). Six holes were drilled at two sites in 1984. An underground mapping and sampling program was planned for 1985 (Bennett and others, 1999).

Between 1934 and 1937, the War Eagle Mine produced at least 11,896 tons of ore. This material yielded 2,230 ounces of gold, 8,838 ounces of silver, 18,216 pounds of lead, and 5,374 pounds of copper. Inferred subeconomic resources at the property total 26,000 tons averaging 0.2 ounce of gold and 0.7 ounce of silver per ton (Esparza and others, 1984; Lund and Esparza, 1990).

3.35.4 Environmental Conditions

3.35.4.1 Site Features

The War Eagle Mine was visited by Ted Erdman on August 31, 2000. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:21:19-0:31:15). Documenting photos are Roll 00E26, frames 1-5.

As many as nine adits are reported for the War Eagle (Lund and Esparza, 1990), but only two were found (Figure 3.35-2). Adit 1 is at the second switchback of Trail 203 on the southwest side of Fitz Creek. The adit is caved and has a small seep (Figure 3.35-3). The waste dump measures 30 feet along the hillside, 25 feet wide, and about 10 feet thick. It is overgrown with low brush and thimbleberry bushes. Scrap iron, drill steel, and an ore car are on the dump (Figures 3.35-4 and 3.35-5). Down the slope to the east of Adit 1 and very close to the trail is an old ball mill and other scrap iron (Figure 3.35-6). The disturbed area at Adit 1 covers less than 0.25 acre.
Adit 2, also caved, is on a steep hillside about 500 feet south of Adit 1 (Figure 3.35-7). The waste dump has been stripped by erosion and washed down the steep brushy slope. The disturbance at this site is minimal.

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

Water sample E8310001 was collected from the seep at Adit 1. Reference sample E8310002 was collected from Fitz Creek at the junction of Trails 203 and 215.

<table>
<thead>
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<th>Sample No.</th>
<th>Location</th>
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<td>50</td>
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<td>E8310002</td>
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<td>44</td>
<td>55</td>
<td>7.7</td>
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</tr>
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</table>

3.35.4.2.3 Analytical Results

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

Sample E8310001 from Adit 1 exceeds the MCLs for iron and manganese in both the dissolved metals and the total recoverable metals screens. It also exceeds the Aquatic Life Chronic standard for lead in the dissolved heavy metals screen.

Reference sample E8310002, taken downstream from the mine on Fitz Creek, does not exceed any water quality standards.

3.35.5 Structures

A collapsed building and parts of a metal roof are on a flat near the confluence of Fitz and Crooked creeks (Figure 3.35-8). This may be the ruins of the War Eagle Mill. The entire area burned in the early 1990s.

3.35.6 Safety
No safety hazards were found at the site.
Figure 3.35-1. Location of the War Eagle Mine, Idaho County, Idaho (U.S. Geological Survey Mackay Bar 7.5-minute topographic map).
Figure 3.35-2. Sketch of the War Eagle Mine.
Figure 3.35-3. Caved Adit 1 at the War Eagle Mine, looking northwest (Roll E26, frame #1).

Figure 3.35-4. Waste dump for Adit 1 at the War Eagle Mine. An ore car (just left of center) is on the dump among the thimbleberry bushes (Roll E26, frame #2).
Figure 3.35-5. Scrap iron and drill rods on the waste dump for Adit 1 at the War Eagle Mine (Roll E26, frame #3).

Figure 3.35-6. Old ball mill and other scrap metal downslope from Adit 1 along the trail (Roll E26, frame #6).
Figure 3.35-7. Upper scarp of caved Adit 2 at the War Eagle Mine, looking northwest (Roll E26, frame #4).

Figure 3.35-8. Scrap metal at the collapsed building, probably the old mill site, on the flat at the confluence of Fitz and Crooked creeks (Roll E26, frame #7).
3.36 MAMMOTH MINE (Site No. EC-783)
Alternate names—Mammoth; Black Tail.

3.36.1 Site Location and Access (Figure 2.1-1)

The Mammoth Mine is just west of Mammoth Mountain in the S½ of section 32 (unsurveyed), T. 25 N., R. 8 E., on the Fivemile Bar and Mackay Bar 7.5-minute quadrangles (Figure 3.36-1). Access from Dixie is south on FS Road 222 about 5-6 miles to Road 222F at Lemon Saddle, then southeast on Road 222F about 3 miles to the mine. The property is on Forest Service land.

3.36.2 Geologic Features (Figure 2.2-1)

The Mammoth Mine is in biotite granodiorite of the Cretaceous Idaho batholith (Lewis and others, 1990, 1993). Lorain (1938, p. 52) described the geology of the deposit as follows:
The vein, where exposed by drifting, was from 1 to 4 feet wide; the strike was south 75° east and the dip 45° to 60° northerly. The wall rocks were granite and gneiss. Sulphide mineralization consisted chiefly of sphalerite, galena, and pyrite. Although oxidation had taken place along permeable channels to the greatest depth mined, fresh sulphides occurred in the solid quartz to within a short distance of the surface.

According to Bennett and others (1999, p. 58):
The mine is in a series of large quartz veins described as a “blow outs,” an old mining term for a mass of mineralized quartz veins. Like all of the other mines in the area, the Mammoth is very close to the contact between the batholith and overlying metasediments.

3.36.3 Site History

McKay (1996, p. 167-171) reported the following on the history of the Mammoth Mine: The Mammoth group of 14 claims was located about seven miles southeast of the Dixie Ranger Station, at the head of Tepee Creek on the south slope of Blowout [sic; this should read “Mammoth”] Mountain. It contained values in gold and small amounts of silver and copper. From 1935 until 1938 the Bunker Hill & Sullivan Company of Kellogg operated the mine on an experimental basis. One kind of ore shoot at the Mammoth group was characterized by free gold embedded in a chalky quartz. The ore shoots were relatively small, but there were a great number of them. The main outcrop of free-milling gold ore was about 1,000' east of the Painter trail, on the ridge between the main fork of Tepee Creek and Jersey Creek. The Mammoth vein was mostly formed in a granite dike 20'-75' wide, but some was formed in gneiss. In places the veins were on the contact. Small chimneys, the “sweetener,” were scattered along the veins and contained small sulfide seams that were very rich in gold. The quartz vein lay in a shear zone that
struck north 75-85 degrees west and dipped about 66 degrees southwest. Pyrite, galena, sphalerite, and chalcopyrite occurred in streaks in the vein or disseminated through it. A lamprophyre dike 60' wide displaced the vein about 135'. The country rock included quartz monzonite, pegmatite, gneiss, and quartzite. The total underground workings by 1937 were 2,500'.

In 1891 or 1892 Chris C. Fink and J. T. Reser located the claims (Reser discovered it while hunting and called it the Black Tail). After Fink passed away, Reser and J. S. Danforth held the ground. Other owners included Martin Heckman of Elk City, W. L. Sendker, S. R. Gayton, and Rory Burke of Dixie, and Elmer Wandling. In the early 1900s someone drove a tunnel from the footwall side half through a large quartz vein on the property, but it was too low-grade at the time to be developed. Then, in 1919, a forest fire removed the thick vegetation from the outcrop, and in 1922 Argentin C. Carpenter and his partner Joe L. Q. McKnight restaked the claim, locating it as the Mammoth (Carpenter found the claim “almost by accident” after just one summer of prospecting). Carpenter is listed as the owner in the 1924-1930 Annual Reports [the annual reports of the Idaho Inspector of Mines]. The U. S. Smelting and Refining Company of Salt Lake City considered buying the property in 1923, but this deal fell through. In 1925, the Mammoth Mine Corporation was formed to develop the property, as the owners could not afford the necessary machinery, but Carpenter and McKnight stayed on as directors. The company was backed by eastern capital, and the secretary was Robert G. Bailey (Carpenter had previously worked with him in Washington, D. C.). In 1924 or 1925 Jim White and a group of Dixie men went in to examine the mine, with the option of buying it for $200,000. There was one cabin there at the time, and they built a much larger one in three days. White took out about 100 samples but reported that the mine was too isolated to be worked profitably (it was about 92 miles from the railroad in Grangeville, and there were two trails to the Salmon River, each 4 1/2 miles long).

The Mammoth Mining & Development Company incorporated in 1929 and developed the property under option. The president was from Milton, Oregon, the secretary from College Place, Washington. They actively sold stock in Washington. This company built a small rotary reduction mill in 1931 (located at the end of the ore dump in 1935) that broke down after crushing less than five tons of ore. Workers also installed a steam-driven compressor and built seven miles of road to the property.

The Bunker Hill & Sullivan Company bought the Mammoth for $200,000 in the fall of 1935, hoping to find a large vein of low-grade ore. This was one of the largest mining sales in central Idaho in the previous 25 years. At that time the mine had a 240' tunnel and a 75' crosscut, and one outcropping contained ore that assayed up to $80 per ton. They soon hired a 12-man crew to sample and develop
the claims. The company built cabins on the west side of the main ridge between the two forks of Tepee Creek, and they worked the area on the east side of the ridge. In September of 1937 they began operating a 15-ton ball mill powered by diesel engines. The company had a blacksmith on site, and a horse-drawn stoneboat hauled the equipment. Underground crews stope out ore, and much surface trenching was also done. In 1935, the men built camp buildings so that they could continue to work during the winter. By the summer of 1937 the company was doing some exploration with a diamond drill, and around that time the crew grew to 35 men.

The ball mill used the flotation method, and concentrates ran $1,000-$2,000 per ton. By October of 1937 three shifts were working in the mill, and there were about 3,000 tons of ore in sight that assayed over $30 per ton. In the spring of 1938 the mill was grinding about 18 tons of ore every 24 hours; the tailings averaged 0.04 ounce of gold from ore running from 0.6 to 0.8 ounce of gold per ton of ore.

The costs of running the Mammoth operations for the month of November 1937 were as follows:

- mining $6.96 per ton
- tramming $0.49
- crushing $0.35
- milling $2.18
- office, etc. $0.50
- roustabout $0.18
- development $0.33

At that time the mill’s capacity was 10 tons in two shifts (16 hours) because of the hardness of the quartz. The ore was assaying $18.30 per ton but was expected to have higher yields once the ball mill was cleaned of all its gold. The mill was located at the portal of an adit cross-cut to the vein; the main floor of the mill was at the level of the portal. The ore was trammed from the mine by hand, dumped into a mine ore bin just outside the portal, and hoisted in a small skip to the mill ore bin. At first a converted Bunker Hill-type hydraulic classifier was installed to recover coarse free gold, but there was little of this that would not float, so the classifier proved unnecessary. The flotation plant recovered both free gold and partly oxidized sulfides efficiently, with a theoretical recovery of over 92%.

By October of 1937 Bunker Hill had spent approximately $80,000 in development work, and that year it had a crew of 35 men working. Although the mine did yield a profit from the regular shipments of ore to the Kellogg smelter, it was not a large enough ore body to warrant continuing work. In August 1938, the company pulled out of the mine. The company trucked the machinery to Grangeville, where it was stored. In October of 1938 Nathaniel Pettibone and his son of Grangeville
(the former was a long-time stockholder in the Mammoth Mines Corporation) leased the mine and put in supplies for three men for winter operations; they shipped stockpiled ore out the next year.

The Mammoth mine was operated intermittently on a small scale until 1963. The mine was idle in 1946 and 1947, but in 1948 an average of two men were employed doing surface work with a bulldozer, and they milled 90 tons of ore at a small ball mill. They continued working in 1949, and George Grebe was the lessor. The total development was approximately 5,000', and between 1932 and 1963 1,963 tons of ore were processed that yielded 875 oz. of gold, 727 oz. of silver, 200 lbs. of copper, and 234 lbs. of lead.

Miles Painter leased the claims in 1949 but only did casual prospecting. The Mammoth claims were also worked by a Mr. Roberts, who did a fair amount of bulldozer work, flattening out a mill site and building a road down the Middle Fork of Tepe Creek and above the ore bin. In the late 1950s some work was done with a D-7 caterpillar and some ore was processed. The Golden Eagle bought the Mammoth mine in the late 1960s, and they explored a large area with large cuts. In the 1970s, only casual prospecting was done on the claim. Quite a few cabins still remain on the property, plus other structures.

Bunker Hill constructed a 25 tons-per-day mill in 1935. In 1937 most of the lode production in the district was from the Mammoth. However, in 1938 the mining equipment was moved from the property to Grangeville for storage after the mine turned in a record production of 1,300 tons of ore yielding 264 ounces of gold and 216 ounces of silver. There were about 2,200 feet of tunnels and drifts on the property at this time. The owners estimated that about $150,000 had been spent on the mine, mostly by lessees. In 1939, N. B. Pettibone of Grangeville shipped ore from the Mammoth under lease. George Grebe operated in 1941 under another lease and shipped ore worth $25,000 in smelter returns. Hard times hit the mine and most of the equipment had been removed from the property by 1942, when the mine closed for the war. A little gold ore was shipped in 1943. Following the war, the Mammoth Mine Corporation did some bulldozer work at the property and milled 90 tons of ore worth $5,000. George Grebe obtained another lease, recovering 233 ounces of gold and 64 ounces of silver from 135 tons of ore in an amalgamation plant. The lease produced 56 ounces of gold and 21 silver from 40 tons of ore the next year, when the mine again closed. There was very minor production reported from 1961-1963 by Clyde Painter and Alvin Mackay (Bennett and others, 1999).

Between 1932 and 1963, the Mammoth Mine produced 1,963 tons of ore. This material yielded 875 ounces of gold, 727 ounces of silver, 200 pounds of copper, and 234 pounds of lead. In 1989 or 1990, the property was held by Robert, Mary, and Alan Painter, and Jo Patterson (Neumann and Close, 1991).
3.36.4 Environmental Conditions

3.36.4.1 Site Features

The Mammoth Mine was visited by Earl Bennett on July 31, 2000. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:31:18-0:36:43). Documenting photos are Roll 00B4, frames 2-6.

The site consists of two standing cabins, two collapsed cabins, and a long trench (Figure 3.36-2). From the historical description of the property, it appears the main underground workings were missed during this visit. They may be further to the west and south. Neumann and Close (1991) reported one collapsed adit, one 160-foot-long adit, ten trenches, and numerous pits at the site (Figure 3.36-3).

The access road leads to an open area, about 100 feet in diameter (Figure 3.36-4), with a log cabin at the northeast side and a collapsed log building on the south side. Several roads lead off from the open area, one of which passes a second collapsed log building. A board-covered cabin is about 150 feet east of this road and north of the second collapsed building. The trench, which measures about 150 feet long and 30 feet wide (Figure 3.36-5), is south of these latter buildings at the end of a short access road. A number of pits and short trenches are scattered around the area. The trenches appear to follow the quartz veins. The open area, buildings, long trench, pits, and minor trenches encompass several acres.

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

Two standing buildings and two collapsed buildings are at the site. A small log cabin (Figure 3.36-6) is at the northeast edge of the open area, and a collapsed log building is at the south edge of the open area. A board-sided cabin or shed and another collapsed log building are along a spur road east of the open area (Figures 3.36-7 and 3.36-8).

3.36.6 Safety

No safety hazards were found at the site.
Figure 3.36-1. Location of the Mammoth Mine, Idaho County, Idaho (U.S. Geological Survey Fivemile Bar and Mackay Bar 7.5-minute topographic maps).
Figure 3.36-2. Sketch of the Mammoth Mine site.
Figure 3.36-3. Sketch map of the Mammoth Mine workings (Neumann and Close, 1991, Figure 19).
Figure 3.36-4. Open area at the Mammoth Mine. Boards and scrap metal are scattered around the edges of the area (Roll 00B4, frame #6).

Figure 3.36-5. Long trench south of the buildings at the Mammoth Mine (Roll 00B4, frame #2).
Figure 3.36-6. Small log cabin at the Mammoth Mine, looking northeast (Roll 00B4, frame #3).

Figure 3.36-7. Board-sided cabin or shed at the Mammoth Mine (Roll 00B4, frame #4).
Figure 3.36-8. Collapsed log building south of the board-sided cabin at the Mammoth Mine (Roll 00B4, frame #5).
3.37 DIXIE ROYAL MINE (Site No. EC-196)
Alternate names—Gold Miter; Reser; Royal Dixie.

3.37.1 Site Location and Access (Figure 2.1-1)

The Dixie Royal Mine is on the west side of FS Road 222 in the NE¼ of the NW¼ of section 8 (unsurveyed), T. 25 N., R. 8 E., on the Silver Spur Ridge 7.5-minute quadrangle (Figure 3.37-1). The site is 3-4 miles southwest of Dixie, just north of the Dixie Work Center at Dixie Meadows, and is on Forest Service land.

3.37.2 Geologic Features (Figure 2.2-1)

The Dixie Royal is in the quartzite and schist unit of the Middle or Early Proterozoic Syringa metamorphic sequence (?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.37.3 Site History

The following historical account of the Dixie Royal is from McKay (1996, p. 150-152):
The Dixie Royal was a group of eight placer and five quartz claims located on 400 acres along Crooked Creek 1/2 mile north of the Dixie Ranger Station, near the Penn-Dixie. The quartz was a porphyry dike 100' wide that assayed $3.50 per ton with higher-value veins. The gneiss at this property, unlike elsewhere in the district, was almost vertical. The country rock was quartz monzonite, augen gneiss, and quartzite. By 1909 workers had completed about 400' of tunnels and crosscuts on a 100' vein. A sawmill, machine shop, large bunkhouses, cabins, and offices had been constructed. In 1932, there was a 50' tunnel on the east side of Crooked Creek and a 300' tunnel on the west side, with a 160' drift, and the veins were 1-4' wide.

The earliest known owners of the Dixie Royal were J. T. Reser and John Danforth. John S. Danforth sold the Golden Miter, the big Float, and several placer claims in 1905 to the Boston-Idaho Gold Mines Company. By 1907 Dr. A. J. Leonard of New York had an interest in the Dixie Royal, along with Danforth, who served as its superintendent. Ore from the Dixie Royal milled in an arrastra reportedly yielded $5,000 in gold. Five men worked on the mine the winter of 1907-1908. By summer the Dixie Royal Mining and Milling Company had uncovered a 5' vein averaging $40 per ton plus an 18" vein worth over $500 per ton. Soon they had a ditch with a 300' head and had installed a sawmill with a 30-horsepower boiler, which began sawing lumber in April of 1908 (they had been stockpiling logs). In the summer of 1908 a crew of eight to 15 men worked on underground development and surface improvements, including building a boarding house. That fall Danforth resigned as manager in order to work at the custom mill at his son’s
property, the Aziscoos. In 1909, ore from the Golden Miter claim averaged $24 per ton on a 1' ledge. Despite much talk about a stamp mill soon to be installed to test the ores, that was not done during the early 1900s. One observer (Jellum 1909) stated that the company should have developed the ores more before constructing the surface improvements. More work was done on the mine in 1909, and in 1911 the sawmill was cutting lumber for the Crooked Creek placer, but activity seems to have ceased at this point.

In 1924 A. C. Carpenter built a two-stamp water-powered mill on the property and milled a small tonnage of ore. The mine was developed by 650' of drifts and tunnels at that time. The Dixie Royal reportedly yielded about an ounce of free gold per day in 1928. By 1939 the mill and other buildings were in ruins, but ore from the mine was being milled at the Comstock mill just before World War II. In 1986 there was one log building at the mouth of an adit at the Dixie Royal.

In 1941, the Dixie Royal Mine produced 13 tons of ore. This material yielded 58 ounces of gold, 20 ounces of silver, and 116 pounds of copper. In 1989 or 1990, the property was held by Robert Davidson (Neumann and Close, 1991).

3.37.4 Environmental Conditions

3.37.4.1 Site Features

The Dixie Royal Mine (Figure 3.37-2) was visited by Earl Bennett on July 31, 2000. A video segment describing the site, which refers to the property as the Royal Dixie in the narrative, is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:36:46-0:38:28). Documenting photos are Roll 00B4, frames 7-9.

The adit at the Dixie Royal is caved and dry (Figure 3.37-3). The small waste dump (Figure 3.37-4) measures 15 feet long, 10 feet wide, and 30 feet thick. Old boards and rails are on the dump and FS Road 222 truncates the toe of the dump (Figure 3.37-5). The disturbed area 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
There are no structures at the site.
3.37.6 Safety

There are no safety hazards at the site.
Figure 3.37-1. Location of the Dixie Royal Mine, Idaho County, Idaho (U.S. Geological Survey Silver Spur Ridge 7.5-minute topographic map).
Figure 3.37-2. Sketch of the Dixie Royal Mine (Neumann and Close, 1991, Figure 14).
Figure 3.37-3. Caved adit at the Dixie Royal Mine, looking west (Roll 00B4, frame #7).

Figure 3.37-4. Small waste dump at the Dixie Royal Mine. Old boards and mine rails are on the dump (Roll 00B4, frame #9).
Figure 3.37-5. Looking down from the dump of the Dixie Royal Mine at FS Road 222. The road truncates the toe of the dump just off the lower left corner of the picture (Roll 00B4, frame #8).
3.38 UNION GROUP (Site No. EC-609)

3.38.1 Site Location and Access (Figure 2.1-1)

The Union Group is along FS Road 311 in the S½ of the NE¼ of section 25 (unsurveyed), T. 26 N., R. 7 E., on the Silver Spur Ridge 7.5-minute quadrangle (Figure 3.38-1). The workings that were found are on the ridge west of Road 311 and can be reached by FS Trail 206, a good trail along the Gospel Hump Wilderness boundary. Two adit symbols are noted on the topographic map at this location. A third adit symbol is shown on the topographic map on the east side of Road 311, but nothing was found at that location. The property is on Forest Service land.

3.38.2 Geologic Features (Figure 2.2-1)

The Union Group is in the biotite schist and gneiss unit of the Middle to Early Proterozoic Elk City metamorphic sequence (?) that forms a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.38.3 Site History

McKay (1996, p. 187) noted the following information on the history of this site: The Union group of 11 lode and placer claims was located on both sides of Big Creek just above the mouth of Herman Creek. The country rock was quartz, monzonite, and quartzite. The claim was being worked by the spring of 1898, when owners Wiley and Dahl were working on the lower tunnel of the Union and struck a 4' vein with assays over $27 per ton. By 1900 the four claims were owned by the Olson and Dahl brothers and had 600' of tunnels, developed by a crew of men. Four of the claims were on one vein, with an average width of 2 1/2', that assayed $12 per ton. Development work continued through 1906, at which time the claims had 1000' of underground work, but after that there was no more mention of the mine. By 1934 the Union group was owned by the Robert Puelz estate.

3.38.4 Environmental Conditions

3.38.4.1 Site Features

The Union Group was visited by Earl Bennett on August 1, 2000. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:38:33-0:41:27). Documenting photos are Roll 00B4, frames 10-12.

Only two pits were found in the vicinity of the adit symbols on the topographic map. The larger, upper pit is 20 feet across and 15 feet deep (Figure 3.38-2) and has an associated waste dump
(Figure 3.38-3). The lower pit, which is about 30 feet long, has a densely overgrown waste dump. A small trench with a waste pile is between the two pits. The disturbed area covers about 0.3 acre.

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
   No structures were found at the site.

3.38.6 Safety
   There are no safety hazards at the site.
Figure 3.38-1. Location of the Union Group, Idaho County, Idaho (U.S. Geological Survey Silver Spur Ridge 7.5-minute topographic map).
Figure 3.38-2. Upper pit at the Union Group (Roll 00B4, frame #12).

Figure 3.38-3. Waste dump for the upper pit at the Union Group (Roll 00B4, frame #11).
3.39 HEMATITE MINE (Site No. EC-601)

3.39.1 Site Location and Access (Figure 2.1-1)

The Hematite Mine is near the head of Eutopia Creek in the N½ of the NE¼ of section 11 (unsurveyed), T. 26 N., R. 7 E., on the Silver Spur Ridge 7.5-minute quadrangle (Figure 3.39-1). Access is on FS Road 311, the road connecting Orogrande with Dixie Meadows, to the mouth of Eutopia Creek and the junction with Road 311F. The mine and mill are about 2 miles west on Road 311F; the road ends at the Hematite mill on the northeast slope of Columbia Ridge. The property is on Forest Service land.

3.39.2 Geologic Features (Figure 2.2-1)

Rock units present near the Hematite Mine include the quartzite and schist unit and the quartzite and calc-silicate rock unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) and the biotite granodiorite of the Cretaceous Idaho batholith (Lewis and others, 1990, 1993). The shaft waste dump is composed of granitic material.

3.39.3 Site History

McKay (1996, p.157-160) reported the following on the history of the mine:

The Hematite mine is located on a hillside below Columbia Ridge in the headwaters of Eutopia Creek, a tributary of Big Creek. The Hematite mine complex as it stands today reflects the hard, skilled physical labor of one man, Hjalmer Odin Noben. Noben began prospecting in the Columbia Ridge area in 1935, and in 1936 he located the first of the four claims that form the Hematite mine. The three relocated abandoned mining claims and the new claim have since been known as the Hematite mine. Noben almost single-handedly developed and began production at the mine (he did have one employee, who worked for a percentage of the returns). Noben financed the purchasing of machinery and other expenses by selling hand-picked ore and by working some winters at the Kellogg smelter. With the exceptions of a truck and a chainsaw, he had no power tools. Noben worked the mine from 1936 until his death in 1964 at the age of 76.

The Hematite produced gold and also some silver. Before Noben got the mill up and running, he took some hand-picked ore to Kellogg and sold it to the smelter there to get money to finance the purchasing of machinery for the continuing development of the mine. When the United States entered World War II in 1942, the Hematite mine and all the other gold mines in the country were shut down by government order until 1945. Noben spent some winters at the mine, snowshoeing out to Orogrande for mail and supplies, but other winters he spent at the family homestead above Lewiston or with his sister’s family in Spokane, either at their city house or his nephew’s farm south of the city. Until the late 1930s, when the
Forest Service built a road from the Dixie ranger station to Big Creek Meadows, the only road access to the Hematite mine was from Orogrande. This road provided seasonal access only. By 1927 a trail led from Big Creek Meadows a few miles northeast of the mine to the Columbia Ridge Trail. According to historic maps, the trail apparently crossed Eutopia Creek in the vicinity of the Hematite mine and mill. Noben braced up a tumbled-down prospector’s cabin in Big Creek Meadows and stored matches, dry firewood, and other supplies in it. He used the cabin as a shelter when he was traveling from the mine to Orogrande in the winter (he called it the Halfway House).

Some years Noben worked in the winter at the Kellogg smelter, where he was given his choice of jobs because he was known to be a reliable worker. He chose to work in the yard where the company took its replacement machinery, and because of this job he was able to buy used parts and machinery at low cost to use at the Hematite mine.

Noben built a small cabin near the mill in approximately 1936 to serve as his living quarters. The “big house,” the larger log structure to its south, was built in the following years and was also intended to be a residence, but it was used for storage instead. The eaves of the two buildings overlapped to provide a snow-free passageway between them during winter. All of the wood shakes on the buildings were hand split.

At the time of Noben’s death the shaft had reached 120' in depth and the adit 1,200' in length. The shaft had a log framework at the collar and a winch house (the latter burned). Noben and his one employee rode in a large bucket down into the shaft. Noben used sledge hammers and star drills in the underground drilling on the ore face. He was getting ready to retool and convert to compressed-air drills when he passed away. Noben stored various equipment in a blacksmith shop near the adit portal, and this was where he sharpened his drill steels. There was also a small shelter at this location that was heated by a barrel stove, which was used as a warming hut.

Noben is described by his nephew as a person who handled physical challenges in a very direct way. He was a skilled log carpenter, as is shown by the log buildings he has left behind; he squared the timbers in the mill with an ax with such precision that he was able to mount bearings for machinery on them.

Noben finished the mill for the ore from his mine in 1946 or 1947, soon after World War II ended. He then operated the mill intermittently until his death in 1964. Cyanidation was never used at this mill. The ore traveled by gravity through the following processes: primary crusher, ball mill, classifier (the larger pieces), strake (an inclined trough-like board for collecting the larger material), to
flotation cells. Noben also tried a Vanner table but found that the gold from the mine was too fine for this to be very effective. He also used corduroy to capture the coarse gold on the strake. Water used in the ball mill and other parts of the recovery process is brought to the mill by a hand-dug ditch whose source is a spring not far southwest of the mill. Noben was able to adjust the amount of water flowing into the mill through the use of pipes and valves.

Henry Pierce, II, is the nephew of Hjalmer Noben, and he describes his uncle as follows:

He displayed endless determination on most serious undertakings, although not in a frantic manner. He was immune from most advertised fads and procedures and realized that most accomplishments had to be executed in a painstaking manner. He would often devise machines from discarded materials and was (pleasantly) shocked when he found that I had obtained a welder, as he had always laboriously drilled and riveted pieces together. He was an astute observer of human accomplishments as well as foibles, and although he had a limited number of experiences in female companionship, he remained a bachelor all his life, but never was a woman-hater.

He enjoyed the achievements of his work if not always the process... "riches" to him was a very relative term. About 1950 he bought a 1948 model 1 1/2 ton Chevrolet truck which he used at the mine and for other chores and also as his passenger car. He told me that if someone gave him a car he would not accept it because this good truck did everything he needed a car for (this truck replaced a 1929 model truck which he had...). He was making a living from the mine at a time when gold was pegged at $35.00 per ounce, and when virtually all gold mines had shut down. This living gave him a high degree of independence and probably a sense of achievement.

... [N]o doubt when he decided on a policy or course of action, he would follow it with strong persistence. At the same time he never had a “success at all costs” gloomy mental attitude. He had a sense of humor born of insight, and good intellect, loved good food, and interesting situations.

...From time to time people would urge him to incorporate and sell stock in the mine. - He said it would be dishonest to take money that way when one couldn't guarantee a return. I once delicately asked him if compressed air jackhammers wouldn't speed up operations. - He said, "Oh yes, but what would I be doing better with my time."
Henry Pierce, II, and his son continue the assessment work at the Hematite. They operated the mill once since 1964, when gold prices reached $800 per ounce. Today, the machinery at the mill is essentially ready to operate, although the flotation cells are currently loaned out.

3.39.4 Environmental Conditions

3.39.4.1 Site Features

The Hematite Mine was visited by Earl Bennett on August 1, 2000. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:41:27-0:57:13). Documenting photos are Roll 00B4, frames 13-25.

The site contains a mill with several buildings, a shaft about ¼ mile west of the mill, a caved adit with a seep about halfway between the mill and shaft, and two trenches (or possibly one or two caved adits) behind the mill (Figure 3.39-2). One of the trenches contains PVC pipe that goes to the mill. A seep on the dump may come from a collapsed adit behind the mill.

The shaft is on top of a flat northeast-trending spur of Columbia Ridge west of the mill. The old headframe has fallen into the shaft (Figure 3.39-3). The shaft appears to be caved but may be open below the collapsed headframe timbers. Old rails are on the dump, which measures about 140 feet long, 15 feet wide, and 6 feet thick (Figure 3.39-4). A few small trees are growing on the dump. A collapsed log frame and sheet metal roofing beside the shaft housed the hoist, which is now lying on the ground next to the dump (Figures 3.39-5 and 3.39-6). The hoist was powered by a gasoline engine. The shaft was fenced, but the fence has fallen down.

The caved adit is about halfway between the shaft and mill. Boards and collapsed timbers are at the portal (Figure 3.39-7). The waste dump measures 75 feet long, 40 feet wide, and 30 feet thick. The dump is heavily overgrown with small evergreen trees (Figure 3.39-8). A collapsed log building with sheet-metal roofing is on the dump beside the adit (Figure 3.39-9). A small seep comes out of the adit, trickles around the left side of the dump, and disappears into the waste rock.

The trench or caved adit behind the mill building (Figure 3.39-10) has a waste dump that extends to the mill (Figure 3.39-11). An old jaw crusher and other scrap metal are on the dump. A second trench contains PVC pipe that goes into the mill.

The disturbed area at the property, including the workings and the buildings, encompasses about 10 acres.
3.39.4.2 Sample Locations

3.39.4.2.1 Solid Samples

Sample B8010001 was collected from tailings below the mill building.

<table>
<thead>
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<th>Sample No.</th>
<th>Location</th>
<th>Analyzed (Yes/No)</th>
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<td>Hematite Mine, mill tailings</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.39.4.2.2 Water Samples

No water samples were collected.

3.39.4.2.3 Analytical Results

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

Sample B8010001 from the mill tailings contains elevated levels of cadmium, copper, and lead in the element screen. In the TCLP for metals test, lead and mercury are leaching from the sample.

3.39.5 Structures

The mill building contains a Union Iron Works (Spokane, Washington) ball mill, a classifier (?) and other equipment, and a diesel motor to drive the machinery. Several empty 55-gallon drums are on the small tailings pile below the mill.

In addition to the mill building, two log buildings (one completely collapsed and the other with a collapsed roof) are about 100 feet east of the mill along the access road (Figures 3.39-12 and 3.39-13). These buildings, both with shake roofs, are probably the two structures with overlapping eaves built by Noben. Behind these is a cold cellar with log walls and a sod roof. Trees are growing on the sod. Across the road from the collapsed buildings are a large boiler (Figure 3.39-14) and the bed from a large Wilfley table. Another collapsed cabin is about ¼ mile east of the mill along FS Road 311F.

3.39.6 Safety

The shaft appears caved but may be open beneath the collapsed headframe timbers. No other significant hazards were found at the site.
Figure 3.39-1. Location of the Hematite Mine, Idaho County, Idaho (U.S. Geological Survey Silver Spur Ridge 7.5-minute topographic map).
Figure 3.39-2. Sketch of the Hematite Mine and mill.
Figure 3.39-3. Pit of the Hematite shaft. Note the collapsed timbers of the headframe (Roll 00B4, frame #15).

Figure 3.39-4. Waste dump for the shaft at the Hematite Mine. A few rails remain on the dump (Roll 00B4, frame #16).
Figure 3.39-5. Collapsed hoist housing beside the Hematite shaft (Roll 00B4, frame #14).

Figure 3.39-6. Winch and gasoline engine from the hoist, along with other scrap metal, at the Hematite shaft (Roll 00B4, frame #13).
Figure 3.39-7. Collapsed adit at the Hematite Mine. The collapsed portal timbers are in the foreground beside a pile of mine timbers (Roll 00B4, frame #17).

Figure 3.39-8. Small evergreen trees growing on the waste dump for the Hematite adit (Roll 00B4, frame #19).
Figure 3.39-9. Collapsed log building beside the Hematite adit (Roll 00B4, frame #18).

Figure 3.39-10. Trench or caved adit behind the mill at the Hematite Mine (Roll 00B4, frame #20).
Figure 3.39-11. Waste dump for the trench or caved adit behind the Hematite mill building. A jaw crusher and some scrap metal are on the dump (Roll 00B4, frame #21).

Figure 3.39-12. Two log buildings about 100 feet east of the mill. The one on the left has completely collapsed. The building on the right has a collapsed roof, but the walls are standing (Roll 00B4, frame #22).
Figure 3.39-13. Another view of the two buildings. Both had shake roofs (Roll 00B4, frame #24).

Figure 3.39-14. Large boiler across the road from the two log buildings (Roll 00B4, frame #23).
3.40 GOLD BUG MINE (Site No. B8010002)
Alternate name—Gold Bug-Trinity; G.M. Claim Group; Goldbug.

3.40.1 Site Location and Access (Figure 2.1-1)

The Gold Bug Mine is on the ridge top south of Eutopia Creek in the SW¼ of the NE¼ of section 12 (unsurveyed), T. 26 N., R. 7 E., on the Silver Spur Ridge 7.5-minute quadrangle (Figure 3.40-1). The mine can be reached from FS Road 311F, the road to the Hematite Mine, on Road 311F1. The site is on Forest Service land.

3.40.2 Geologic Features (Figure 2.2-1)

The Gold Bug is in the biotite gneiss and schist unit of the Middle or Early Proterozoic Elk City metamorphic sequence(?) near the contact with the biotite granodiorite of the Cretaceous Idaho batholith (Lewis and others, 1990, 1993).

3.40.3 Site History

McKay (1996, p. 154-155) reported the following on the history of this site:
The Gold Bug group of six claims was located about 1/2 mile north of the Columbia in the Big Creek drainage and was referred to as an extension of the Hillside. In 1899 a good strike was made on the group. One of the original owners was William A. Wylie of Dixie. The winter of 1899-1900 Frank Rice was developing the Gold Bug under bond to Frank P. Sherwood of Spokane. Eight men working at the mine had dug a 50' shaft with an adit tunnel at its bottom, and the owner planned to bring in a hoist over a snow road from the Badger mine in nearby Orogrande. The ore, on a 6' vein, reportedly assayed from $12 to $812 per ton, with an average value of $15 per ton. In January of 1900 Louis Dahl was seriously injured by a powder explosion at the mine. The mine was sold to a Lewiston company in mid-1901, then sold again in the fall to Charles Donahue of New Richmond, Wisconsin, and to John E. Glover, who also bought the nearby Columbia group. Their company, the Gold Bug Consolidated, planned to extend the Gold Bug shaft another 100' and develop a 300' drift, using a 30-horsepower boiler for hoisting. They also planned to install a compressed-air plant. This may never have been done, as in 1902 the mine shut down because of water. The Gold Bug was still being developed in 1904, but it apparently never became a producer. In 1906 people from Seattle bought the mine and ran a cross-cut tunnel on the Columbia to meet the shaft on the top of the hill.

In 1931 the Gold Bug Mining Company was incorporated at Yakima to operate in the Elk City mining district (it might have worked this mine). In 1982 the Gold Bug had not been worked since the late 1930s, but it had a 210' shaft and a 710' adit. The adit was reopened and sampled, and Evergreen Minerals bought the
claims from G. M. Associates of Richland, Washington. The mine was considered a part of the Orogrande mining district at that time.

3.40.4 Environmental Conditions

3.40.4.1 Site Features

The Gold Bug Mine was visited by Earl Bennett on August 1, 2000. A video segment describing the property is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 0:57:18-1:00:45). Documenting photos are Roll 00B5, frames 1-4.

A shaft and adit have been reported at the site (see Section 3.40.3) and are noted by symbols on the topographic map. Only the shaft site was visited (figure 3.40-2). The shaft is caved and consists of a pit 20 feet in diameter and 15 feet deep (Figure 3.40-3). The waste dump partly encircles the shaft, with the main part on the southwest side. This portion of the dump is about 50 feet in diameter at the base and about 16 feet thick. A collapsed log building and an iron boiler are west of the dump (Figure 3.40-4). Fire brick in the collapsed building was manufactured by the Washington Brick Lime & Manufacturing Company (1908-1912) in Spokane, Washington (Figure 3.40-5). A notice on a board at the site noted this as the “G.M. Claim Group, work done 1986-87-88-89” (Figure 3.40-6). The site covers about 1 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

No water samples were collected.

3.40.5 Structures

The collapsed log building containing the boiler on a base of fire brick is the only building at the site.

3.40.6 Safety

No safety hazards were found at the site.
Figure 3.40-1. Location of the Gold Bug Mine, Idaho County, Idaho (U.S. Geological Survey Silver Spur Ridge 7.5-minute topographic map).
Figure 3.40-2. Sketch of the Gold Bug Mine site.
Figure 3.40-3. Caved shaft at the Gold Bug Mine (Roll 00B5, frame #1).

Figure 3.40-4. Collapsed building and old boiler at the Gold Bug shaft (Roll 00B5, frame #3).
Figure 3.40-5. Fire brick in the collapsed building at the Gold Bug Mine (Roll 00B5, frame #4).

Figure 3.40-6. Claim group notice at the Gold Bug Mine (Roll 00B5, frame #2).
3.41 GOLD MASTER MINE (Site No. EC-602)
Alternate name—Goldmaster Deposit.

3.41.1 Site Location and Access (Figure 2.1-1)

The Gold Master Mine is west of the Gold Bug Mine in the NW¼ of the SW¼ of section 12 (unsurveyed), T. 26 N., R. 7 E., on the Silver Spur Ridge 7.5-minute quadrangle (Figure 3.41-1). The mine is about ½ mile west of the Gold Bug at the end of FS Road 311F1, a spur to Road 311F. Road 311F connects with Road 311 at the mouth of Eutopia Creek. Road 311 goes north to Orogrande and south to Dixie Meadows. The property is on Forest Service land.

3.41.2 Geologic Features (Figure 2.2-1)

The Gold Master is probably in the biotite gneiss and schist unit of the Middle or Early Proterozoic Elk City metamorphic sequence(?) near a fault contact with the quartzite and calc-silicate rock unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?). These Precambrian rocks form a roof pendant or inclusions in the granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993). The mine followed iron-stained quartz veins.

3.41.3 Site History

McKay (1996, p. 155) noted the following on the history of this site:

The Gold Master was located about seven miles from the Dixie Ranger Station in the Big Creek drainage and was generally considered to be in the Orogrande mining district. In 1937 it was reported that the Gold Master Consolidated Mining Company had developed 762' of tunnels and raises and had blocked out 22,000 tons of $16 per ton ore. In 1938 the company employed a crew of five but was idle by the summer. The company also held some gravel deposits on Eutopia Creek for mill tailings disposal (the gravels had not been tested for placer deposits). The total development in 1944 was reported to be 1,408', with 61 unpatented claims, a 210 Sullivan compressor, and a complete camp. In 1986 the lode claim had four log cabins (two collapsed) and the placer claim had two log cabins.

3.41.4 Environmental Conditions

3.41.4.1 Site Features

The Gold Master Mine was visited by Earl Bennett on August 1, 2000. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 1:00:49-1:08:32). Documenting photos are Roll 00B5, frames 5-12.

The site contains a caved dry adit with a large waste dump, a collapsed mill building, a powder house, and six collapsed log buildings (Figure 3.41-2). Old timbers are near where the portal for
the adit was, and steel rails extend from the adit. One of the collapsed buildings was in front of the caved adit (Figures 3.41-3 and 3.41-4). The waste dump for the adit measures 85 feet long, 50 feet wide, and 25 feet thick, and tapers to a narrow rib just above the mill building (Figure 3.41-5). Although a mill was at the site, no tailings were found. Some of the material below the mill may have been placered. The site, including the buildings described below, covers about 3-5 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
   No water samples were collected.

3.41.5 Structures

The log mill building below the waste dump has collapsed (Figure 3.41-6). Just below the mill, among scattered boards and rotten logs, are the remains of a small Wilfley table (Figure 3.41-7). Other structures include two collapsed log cabins east of the mill building (Figure 3.41-8), a collapsed log-and-board building next to a large, fallen spruce tree (Figure 3.41-9), a collapsed log building along the access road near the adit (Figure 3.41-10), a powder house constructed from rock, and a collapsed building north of the two shown in Figure 3.41-8.

3.41.6 Safety

Nails and scrap metal in the collapsed buildings comprise the only hazards at the site.
Figure 3.41-1. Location of the Gold Master Mine, Idaho County, Idaho (U.S. Geological Survey Silver Spur Ridge 7.5-minute topographic map).
Figure 3.41-2. Sketch of the Gold Master Mine.
Figure 3.41-3. Left frame of a two-frame panorama of the caved adit at the Gold Master Mine (Roll 00B5, frame #6).

Figure 3.41-4. Right frame of a two-frame panorama of the caved adit at the Gold Master Mine. A collapsed log building is in front of the adit (Roll 00B5, frame #5).
Figure 3.41-5. View from the adit across the waste dump. The rib at the end of the dump is just above the collapsed mill building (Roll 00B5, frame #7).

Figure 3.41-6. Collapsed log mill building at the Gold Master Mine (Roll 00B5, frame #9).
Figure 3.41-7. Remains of Wilfley table in the old mill ruins (Roll 00B5, frame #8).

Figure 3.41-8. Two collapsed log cabins east of the mill building (Roll 00B5, frame #10).
Figure 3.41-9. Collapsed log-and-board building with a fallen spruce tree (Roll 00B5, frame #11).

Figure 3.41-10. Collapsed log building along the access road to the adit (Roll 00B5, frame #12).
3.42 EUTOPIA MINE (Site No. EC-603)

3.42.1 Site Location and Access (Figure 2.1-1)

The Eutopia Mine is up the hill from the Gold Master Mine along FS Trail 205 in the NE¼ of the SE¼ of section 11 (unsurveyed), T. 26 N., R. 7 E., on the Silver Spur Ridge 7.5-minute quadrangle (Figure 3.42-1). The mine can be reached by a trail that goes from FS Road 311F1 (about 200 feet east of the Gold Master Mine) up the hill to Trail 205. Trail 205 also crosses FS Road 311, the road from Orogrande to Dixie Meadows, near the south end of Big Creek Meadows. The site is on Forest Service land.

3.42.2 Geologic Features (Figure 2.2-1)

The Gold Master is in the quartzite and calc-silicate rock unit of the Middle or Early Proterozoic Syringa metamorphic sequence(?) that forms a roof pendant or inclusions in granitic rocks of the Idaho batholith (Lewis and others, 1990, 1993).

3.42.3 Site History

The Eutopia Mine may be the same as the site McKay (1996) called the Columbia. The history of the Columbia is as follows (McKay, 1996, p. 144):

The Columbia group was three lode claims located in the Big Creek drainage near the Gold Bug and Union Groups. The vein was 35' wide, and in 1900 it had been cut by a crosscut drift at the bottom of a 40' shaft. The average value was $18 per ton (another report said $15-$30). The claims were owned by Daniel “Lemonade Dan” Trullinger in 1899, who later sold them to Captain J. R. Wood of Warren, representing a group of Chicago investors. In 1900 Jake Williams employed four men to sink a shaft and crosscut the lead.

In 1901 Charles Donahue of Wisconsin and John E. Glover bought the Columbia and Gold Bug claims and named their company the Gold Bug Consolidated. At that time the Columbia had a 45' shaft, with a 60' drift along the ledge, and the ore was $6-$75 per ton. They surveyed for a ditch to bring water in and planned to install a complete compressed-air plant to use for power (hoisting, drilling, etc.). Charles Donahue had recently returned from the Klondike gold rush.

3.42.4 Environmental Conditions

3.42.4.1 Site Features

The Eutopia Mine was visited by Earl Bennett on August 1, 2000. A video segment describing the site is on Nez Perce National Forest Dixie Area Videotape (Tape 2, index 1:08:35-1:10:13). Documenting photo is Roll 00B5, frame 13.
The site contains several small pits and waste dumps, marked by orange flagging, which are just south of Trail 205. The largest pit is 10 feet in diameter and 12 feet deep (Figure 3.42-2). This may be the shaft noted on the topographic map, although the small dump indicates it was probably never very deep. The disturbed area covers less than 0.5 acre.

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
There are no structures at the site.

3.42.6 Safety
There are no safety hazards at the site.
Figure 3.42-1. Location of the Eutopia Mine, Idaho County, Idaho (U.S. Geological Survey Silver Spur Ridge 7.5-minute topographic map).
Figure 3.42-2. Largest of the shallow pits at the Eutopia Mine (Roll 00B5, frame #13).
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 __________________________

| Commodity (s) | | | |
| Production (ounces) | | | |

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

| Commodity(s) | | | |
| Production (ounces) | | | |
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>TABLE 1 - ADITS, SHAFTS, PITS, AND OTHER OPENINGS</th>
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<tbody>
<tr>
<td>Opening Number</td>
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<tr>
<td>Type of Opening</td>
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<tr>
<td>Ownership</td>
</tr>
<tr>
<td>Opening Length (ft)</td>
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<tr>
<td>Opening Width (ft)</td>
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<tr>
<td>Latitude (GPS)</td>
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<tr>
<td>Longitude (GPS)</td>
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<tr>
<td>Condition</td>
</tr>
<tr>
<td>Ground water</td>
</tr>
<tr>
<td>Water Sample #</td>
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<td>Photo Number</td>
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</table>

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

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

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

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

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

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

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

<table>
<thead>
<tr>
<th>TABLE 2 - DUMPS, TAILINGS, AND SPOIL PILES</th>
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<td>Area (acres)</td>
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<td>Volume (cu yds)</td>
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<tr>
<td>Wind Erosion</td>
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<tr>
<td>Vegetation</td>
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<tr>
<td>Indicators of Metals</td>
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<tr>
<td>Waste Sample #</td>
</tr>
<tr>
<td>Soil Sample #</td>
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</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=>sand and <2", COBBLE=2"-6", BOULD=>6"
Wind Erosion, Potential for: HIGH=Fine, dry material that could easily become airborne, airborne dust, or windblown deposits, MOD=Moderate, Some fine material, or fine material that is usually wet or partially cemented; LOW=Little to any fines, or fines that are wet year-round or well cemented.
Vegetation (density on waste): DENSE=Ground cover > 75%, MOD=Ground cover 25% - 75%, SPARSE=Ground cover < 25%, BARREN=Barren
Surface Drainage (Include all that apply): RILL-Surface flow channels mostly < 1' deep, GULLY=Flow channels >1' deep, SEEP=Intermittent or continuous discharge from waste deposit, POND=Seasonal or permanent ponds on feature, BREACH=Breached, NO=No indicators of surface flow observe
Indicators of Metals (Enter as many as exist): NO=None, VEG=Absence of or stressed vegetation, STAIN=yellow, orange, or red precipitate, SALT=Salt deposits, SULF=Sulfides present
Stability: EMER-imminent mass failure, LIKE=Potential for mass failure, LOW=mass failure unlikely
Location w/respect to Stream: IN=In contact with normal stream, NEAR=In riparian zone or floodplain, OUT=Out of floodplain

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8. SAMPLES

Take samples only on National Forest lands.

**TABLE 3 - WATER SAMPLES FROM MINE SITE DISCHARGES**

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<th>Sample Number</th>
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<td>Discharging From</td>
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<td>Indicators of Sedimentation</td>
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<tr>
<td>Sample Longitude</td>
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<td>Field SC</td>
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<tr>
<td>Flow (gpm)</td>
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</tr>
<tr>
<td>Method of measurement</td>
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<tr>
<td>Photo Number</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

---

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

**Discharging From:** ADIT=Adit, SHAFT=Shaft, PIT=Pit/Trench, HOLE=Prospect Hole, WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, HIGH=Highwall, PLACER=Placer or hydraulic deposit, POND=Settling pond or lagoon, WELL=Well

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

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

**Indicators of Sedimentation** (enter as many as exist): NO=None, SLIGHT=Some sedimentation in channel, banks and channel largely intact, MOD=Sediment deposits in channel, affecting flow patterns, banks largely intact, SIGN=Sediment deposits in channel and/or along stream banks extending to nearest stream

**Method of Measurement:** EST=Estimate, BUCK=Bucket and time, METER=Flow meter

---

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

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

---

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

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

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

**Method of Measurement:** EST=Estimate, BUCK=Bucket and time, METER=Flow meter
<table>
<thead>
<tr>
<th>TABLE 5 - WASTE SAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Number</td>
</tr>
<tr>
<td>Date of sample</td>
</tr>
<tr>
<td>Sampler (Initials)</td>
</tr>
<tr>
<td>Sample Type</td>
</tr>
<tr>
<td>Waste Type</td>
</tr>
<tr>
<td>Feature Number</td>
</tr>
<tr>
<td>Sample Latitude</td>
</tr>
<tr>
<td>Sample Longitude</td>
</tr>
<tr>
<td>Photo Number</td>
</tr>
</tbody>
</table>

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

**Codes Applicable for all entries:** NA=Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none  
**Sample Type:** SING=Single sample, COMP=composite sample (enter length)  
**Waste Type:** WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, HIGH=Highwall, PLACER=Placer or hydraulic deposit, POND=Settling pond or lagoon sludge, ORE=Ore Stockpile, HEAP=Heap Leach  
**Feature Number:** Corresponding number from Table 2 *(Waste Number)*
<table>
<thead>
<tr>
<th>TABLE 6 - SOIL SAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Number</td>
</tr>
<tr>
<td>Date of sample</td>
</tr>
<tr>
<td>Sampler (Initials)</td>
</tr>
<tr>
<td>Sample Type</td>
</tr>
<tr>
<td>Sample Latitude</td>
</tr>
<tr>
<td>Sample Longitude</td>
</tr>
<tr>
<td>Likely Source of Contamination</td>
</tr>
<tr>
<td>Feature Number</td>
</tr>
<tr>
<td>Indicators of Contamination</td>
</tr>
<tr>
<td>Photo Number</td>
</tr>
</tbody>
</table>

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

---

**Codes Applicable for all entries:** NA= Not applicable, UNK= Unknown, OTHER= Explain in comments, NO= NO or none  
Sample Type: SING= Single sample, COMP= composite sample (enter length)  
Likely Source of Contamination: ADIT= Adit, SHAFT= Shaft, PIT= Open Pit, HOLE= Prospect Hole, WASTE= Waste rock dump, MILL= Mill tailings, SPOIL= Overburden or spoil pile, PLACER= Placer or hydraulic deposit, POND= Settling pond or lagoon, ORE= Ore Stockpile, HEAP= Heap Leach  
Feature Number: Corresponding number from Table 1 or 2 (Opening or Waste Number)  
Indicators of Contamination *(Enter as many as exist)*: NO= None, VEG= Absence of vegetation, PATH= Visible sediment path, COLOR= Different color of soil than surrounding soil, SALT= Salt crystals
9. HAZARDOUS WASTES/MATERIALS

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

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

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

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

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

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

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

For structures on or partially on National forest lands.

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

Comments:

Codes Applicable for all entries: NA=Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none
Type: CABIN=Cabin or community service (store, church, etc.); MILL=mill building; MINE=building related to mine operation; STOR=storage shed; FLUME=Ore Chute/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):

______________________________

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12. SITE MAP

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

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

Claimant(s)
Name: __________________________________________
Address: _________________________________________
Telephone Number: ________________________________

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

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

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

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

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

Other sources of information (MILs #, MRDS #, other sampling data, etc):
________________________________________________________________________
Appendix B
Database Fields
NEWLOC       WA  1
ORANGENUM    451
MAPLOC       1
DEPOSIT      Eagle Creek Mine

MRDSREC      
MILSREF      0160790528
PERIODPROD   

ORE          Au
COMMOD       

LATITUDE     474325
LONGITUDE    1154916
HARDFILE     N
MLA          
NAME         EAGLE CREEK MINE
SEC          33
SUBSEC       NESE
TWN          051 N
RNG          005 E
DDMMSS       474325
DDDMMSS      1154904
OPTYP        SURFAC
STATUS       PAST PRO
COMMOD1      GOLD
COMMOD2      
COMMOD3      
COMMOD4      
COMMOD5      
MAPNAME      BURKE
QUAD         WALLACE
POP          1KM
TOE          M
YFC          
MPF          
SITENAME     
DISTRICT     
COUNTY       
SECCQUAD     
SECCUADSCCL  
UTMNORTH     
UTMEAST      
UTMZONE      
COMMODIT     
LAT          
LON          
TOWN         
SECTION     
RANGE       

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Appendix C
Geochemical Data
GEOCHEMICAL DATA

ACCURACY OF GEOCHEMICAL DATA

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

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

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

Good Luck
Kim,

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

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

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

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

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

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

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

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

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

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

FOLDER:

Geochem_data

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

Field_forms

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


1998 Reports


1999 Reports


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

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

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

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


2000 Reports


2001 Reports


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Appendix F
GPS Readings for Properties in the
Dixie Area
of the Nez Perce National Forest
Table A-1. Global Positioning System (GPS) readings for properties in the Dixie area of the Nez Perce National Forest.

<table>
<thead>
<tr>
<th>Site No</th>
<th>Site Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Comments</th>
</tr>
</thead>
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<tr>
<td>B7139901a</td>
<td>Unnamed Prospect</td>
<td>45° 34.140'</td>
<td>115° 28.096'</td>
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<td>B7139904</td>
<td>Four Deuces Mine</td>
<td>45° 33.453'</td>
<td>115° 27.799'</td>
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<tr>
<td>B8010002</td>
<td>Gold Bug Mine</td>
<td>45° 36.17'</td>
<td>115° 32' 08&quot;</td>
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</tr>
<tr>
<td>EC-157</td>
<td>Burpee Mine</td>
<td>45° 35.465'</td>
<td>115° 28.746'</td>
<td></td>
</tr>
<tr>
<td>EC-159</td>
<td>64 Mine</td>
<td>45° 34.799'</td>
<td>115° 27.641'</td>
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<tr>
<td>EC-166</td>
<td>L &amp; L Mine</td>
<td>45° 34.415'</td>
<td>115° 27.727'</td>
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<td>EC-169</td>
<td>Slip Easy Mine</td>
<td>45° 34.199'</td>
<td>115° 27.619</td>
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<tr>
<td>EC-174</td>
<td>Unnamed Mine</td>
<td>45° 33.8019'</td>
<td>115° 28.300'</td>
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<td>EC-175</td>
<td>Ajax Mine</td>
<td>45° 33.773'</td>
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<td>EC-176</td>
<td>American Mine</td>
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<td>EC-178</td>
<td>Skylark Mine</td>
<td>45° 33.286'</td>
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<td>EC-180</td>
<td>Prichard Mine</td>
<td>45° 33.458'</td>
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<tr>
<td>EC-185</td>
<td>Dixie Queen Mine</td>
<td>45° 32.835'</td>
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<td>EC-190</td>
<td>Ontario Mine</td>
<td>45° 32.654'</td>
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<td>EC-191</td>
<td>Juanita Mine</td>
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<td>EC-192</td>
<td>Bonanza Mine</td>
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<td>115° 28.226'</td>
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<td>EC-193</td>
<td>Penn-Dixie Mine</td>
<td>45° 32.333'</td>
<td>115° 27.397'</td>
<td>Y-shaped adit</td>
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<tr>
<td>EC-193</td>
<td>Penn-Dixie Mine</td>
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<td>115° 27.667'</td>
<td>main dump and adit</td>
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<td>EC-196</td>
<td>Dixie Royal Mine</td>
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<td>Black Diamond Mine</td>
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</tr>
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<td>EC-202</td>
<td>Robinson Dike Mine</td>
<td>45° 31.308'</td>
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<td>Comstock Mine</td>
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<td>EC-207</td>
<td>Swastika Mine</td>
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<td>115° 27.915'</td>
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<tr>
<td>EC-601</td>
<td>Hematite Mine</td>
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<td>millsite</td>
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<td>Gold Master Mine</td>
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<td>EC-603</td>
<td>Euphoria Mine</td>
<td>45° 36.08'</td>
<td>115° 32' 56&quot;</td>
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<td>EC-609</td>
<td>Union Group</td>
<td>45° 33.42'</td>
<td>115° 32' 07&quot;</td>
<td>main pit</td>
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<td>EC-783</td>
<td>Mammoth Mine</td>
<td>45° 27.35'</td>
<td>115° 29' 49&quot;</td>
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</tbody>
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