

**Preliminary Assessment  
For  
McCrae Mine  
Big Creek, Idaho**

**Submitted By:  
Pat Trainor for  
USDA-Forest Service  
Payette National Forest**

**MCCRAE MINE PRELIMINARY ASSESSMENT  
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## 1.0 INTRODUCTION

This post-removal action Preliminary Assessment (PA) is for the McCrae Mine. The USDA-Forest Service (FS) prepared this report. The purpose of the PA is to collect information, concerning conditions at the McCrae Mine, sufficient to assess the threat posed to human health and environment and to determine the need for additional CERCLA actions.

The report is based on information in the files and previous reports that are cited throughout the report. The report consists of five sections Introduction; Background; Pathways, Summary and Recommendations; and References.

## 2.0 BACKGROUND

### 2.1 Site Location and Description

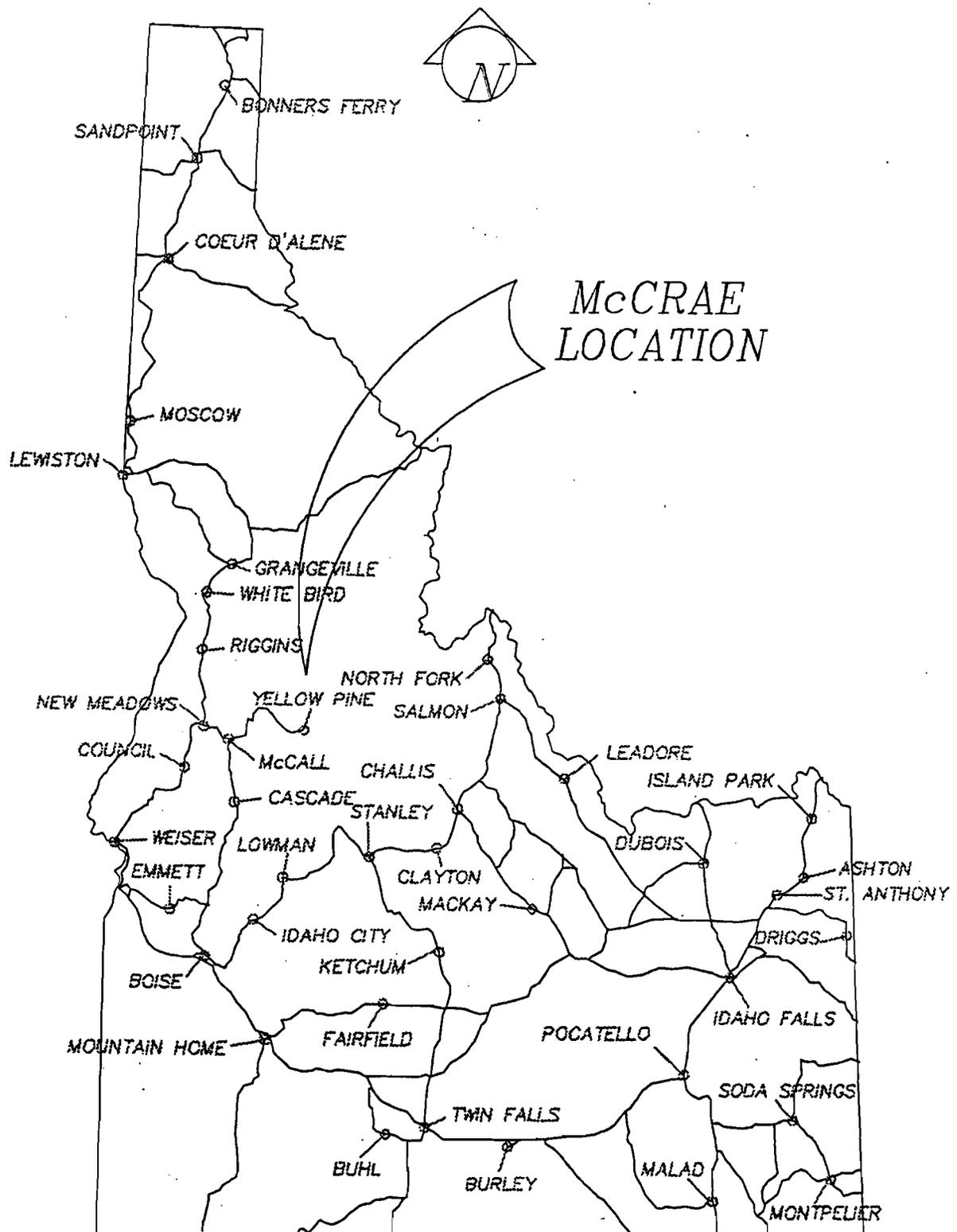
The McCrae Mine Site (Figure 1) can be reached by driving east from McCall, Idaho, on Forest road 50412 (Forest Highway 48) until Yellow Pine, Idaho, then four miles on Forest Service (FS) road 50412 and then by taking FS road 50340 for about 25 miles. The term "site" describes the area consisting of the aggregation of sources, the area between the sources, and areas that may have been contaminated because of migration of sources. The Latitude-Longitude coordinates are 45° 09' 55" and 115° 24' 2" respectively. It is situated in the Smith Creek Drainage with the Frank Church River of No Return Wilderness (FCRNR) about 1.5 miles away. The site is located in Township 21 North, Range 9 East, NW section 18, Boise Meridian, Idaho County (Figure 2). The site (Figure 3) is entirely on public lands administered by the USDA-Forest Service, Payette National Forest.

The site can be characterized as having harsh, long winters and cool, dry summers. The mean annual rainfall for the area is 18 inches for two years 24 hour events.(NOAA 1973)

In 1998, the FS performed a removal action at the Site. The major objectives were to place an engineered cap over the exposed tailings. Secondly, all the barrels were inspected and barrels containing product were hauled to a disposal off site. The empty barrels were flattened and buried on site. (FS Trainor 1998)

#### 2.1.1 Site Operations and History

The McCrae Tungsten Corp, mined the site from 1954 through 1957. At that time, it was called the New Snowbird deposit. The operation produced high-grade along with low-grade huebnerite-scheelite (tungsten) concentrates. Ore was crushed to 1-inch and then ground to -200 mesh (0.833 mm). The operation was abandoned when the removal of the subsidy for domestic tungsten concentrates caused the price to be halved (USGS 1968). No other significant operations occurred on site.



VICINITY MAP - IDAHO

FIGURE 1

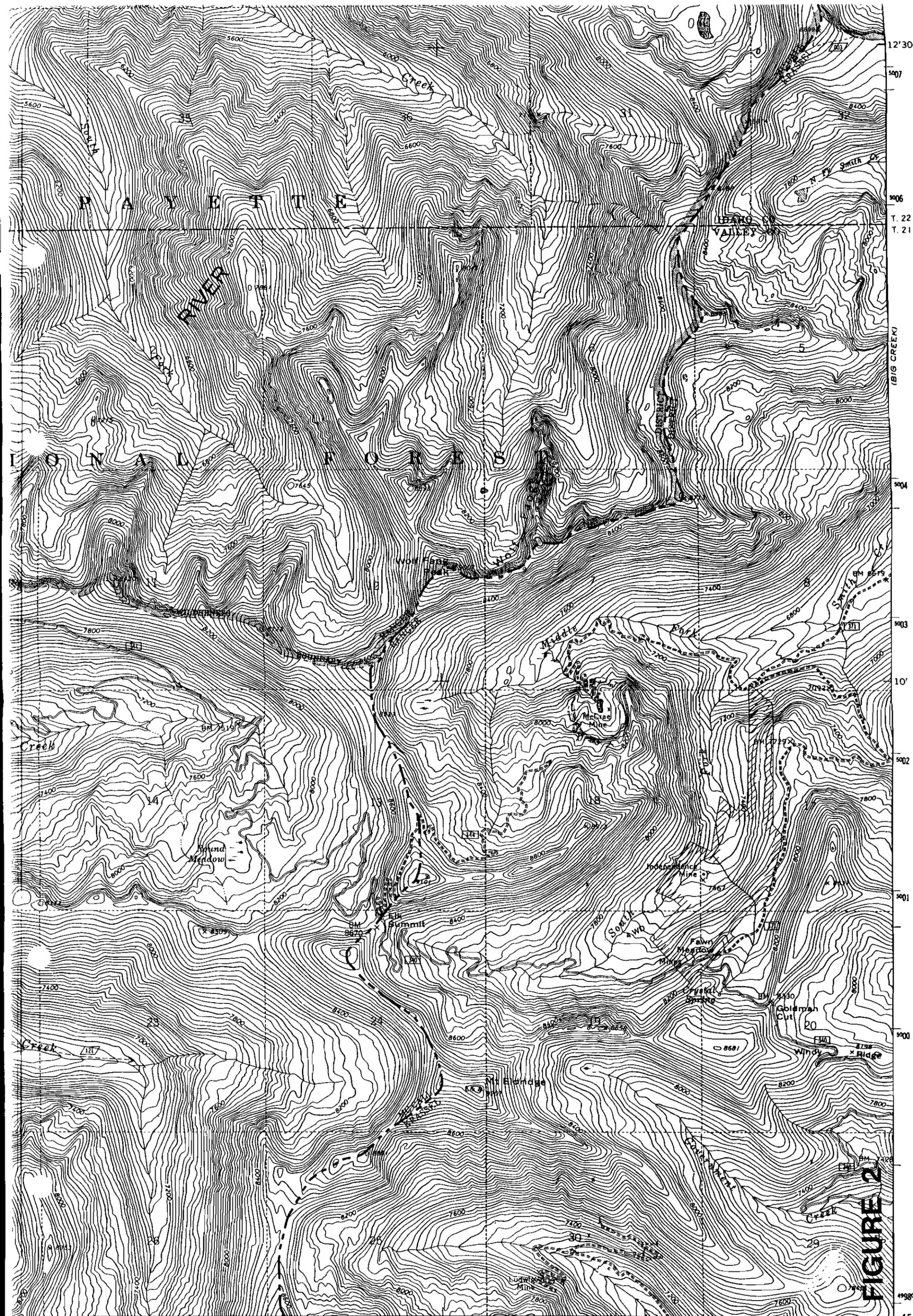


FIGURE 2

SCALE 1:24 000



122

124

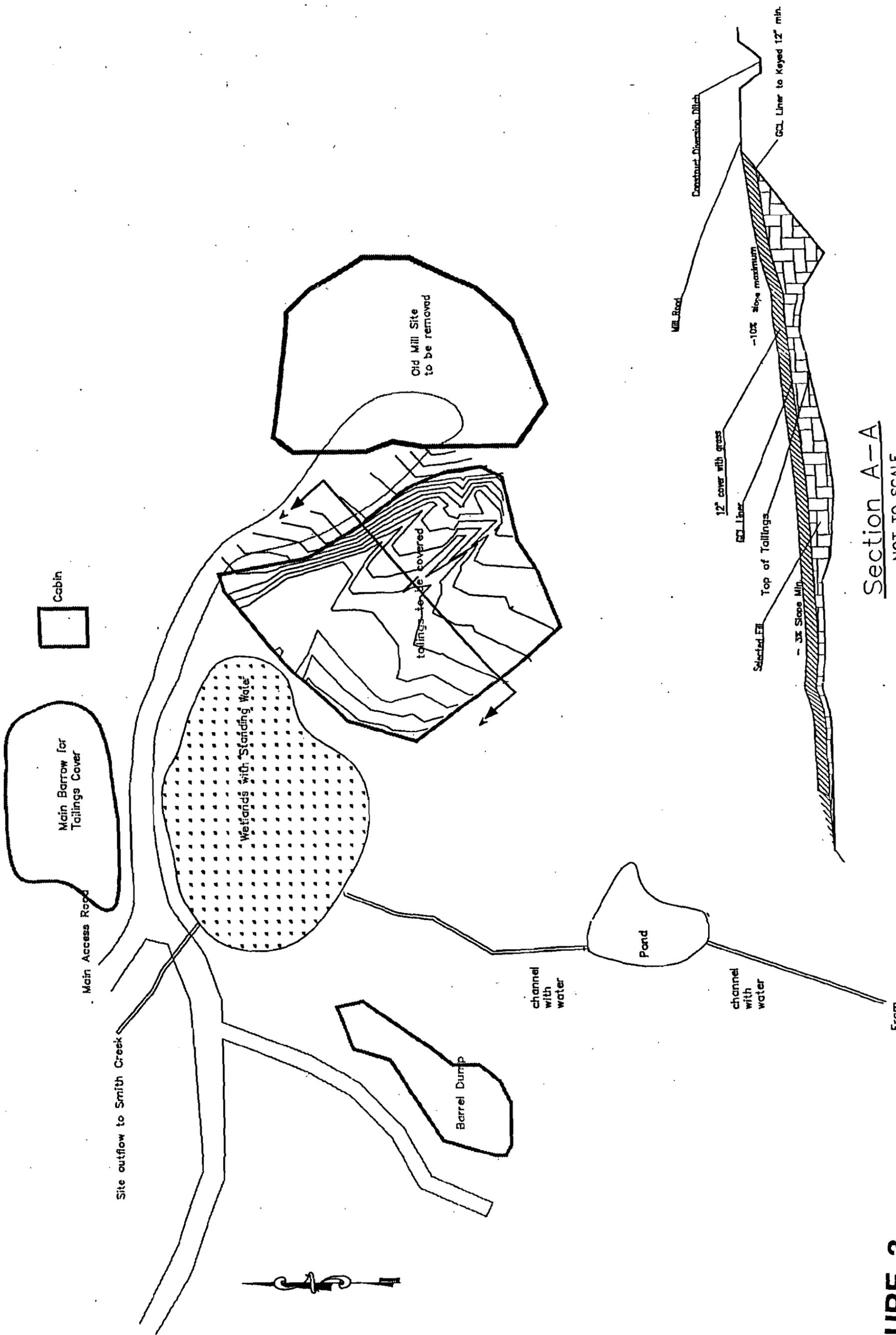
25° R. 25° E.

R. 9° E.

126

5027000m. E.

115° 22' 30"



Section A-A  
NOT TO SCALE

FIGURE 3

In 1989, FREEPORT-McMoRan and Great Basin Exploration and Mining Co. Inc, did some exploratory drilling around the McCrae Mine, but not within the boundaries of the historic operations.

## **2.2 Waste Characteristics**

According to Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sections 101 (4) and 101 (33), a source is defined as an area where a Hazardous Substance may have been deposited, stored, disposed of, or placed. Soil that may have been become contaminated as a result of hazardous substance migration is also a source. There were several sources present on the site as discussed below that were covered by the removal action.

### **2.2.1 Tailings Impoundment**

The tailings piles consisted of processed tailings of a minus 200-particle size. The pile contained about 2,200 cy. A removal action in 1998 constructed an engineered cap over the entire pile. There are still some tailings deposited within the site that are covered with vegetation. These uncovered tailings were placed by wind erosion and by mechanical means during the very early mill operation.

### **2.2.2 Mill Building**

The mill building was collapsed and debris was spread out. A small (1cy.) pile of smelter slag was also near the building timbers. The 1998 removal action included the covering of the building site, including all debris, with about five feet of soil. After covering, the soil was planted with grass.

### **2.2.3 Unknown Barrels**

There were about 25 barrels on site. The removal action of 1998 checked all barrels for unknown liquid substances. Eight were found to have liquid. Of the eight only one had a hazardous substance. The others contained small amounts of water. The barrel with petroleum was removed from site and sent to McCall, Idaho for later disposal in accordance with requirements under the Resource Conservation and Recovery Act (RCRA). The barrels containing water were poured onto the ground. Soils from this location were excavated to a depth of 12 inches and placed on the tailing pile before the engineered cover was completed. All empty barrels were crushed and buried under two feet of topsoil and the area was re-vegetated.

## 2.3 Previous Investigations

The FS sampled the tailings in 1995 and again in 1997. The background sample was taken in 1998. The background soil samples were collected during the removal action investigation, in 1998, by Pat Trainor.

The results from the soil samples, collected at the tailings area contained metal concentrations exceeding three times the background levels. The metals which exceeded background were Lead (147 ppm), Silver (16 ppm), and Copper (128 ppm) See Table 1.

**TABLE 1**  
**Summary of sampling locations and results on site**

Element	Tailings-01 (mg/kg) 9/12/95	Tailings-02 (mg/kg) 9/12/95	Tailings(mg/kg) 9/10/97	Background (mg/kg) 9/01/98
Arsenic	0.38	0.80	1.01	2.24
Barium	9.18	60.5	N/A	68.6
Cadmium	0.415	0.198	0.35	0.13
Chromium	0.68	9.11	N/A	4.08
Copper	Not Analyzed	Not Analyzed	128	9.34
Lead	147	110	93.7	17.9
Mercury	<0.2	<0.2	0.0580	0.020
Selenium	0.40	0.23	<0.50	<1.0
Sliver	16.0	2.51	Not Analyzed	0.65

## 3.0 PATHWAYS

### 3.1 Ground Water Pathway

#### 3.1.1 Hydrogeology

There is specific information available on the hydrogeology of the McCrae Mine site. There is a spring out flow about 75 vertical feet about the tailing impoundment. It can be assumed that with the existence of quartz veins ground water would be present in some of the alluvial valley fill. No wells in the area have been drilled.

### 3.1.2 Targets

There are no wells within a four-mile radius from the site. The nearest well for a single summer residence is about eight miles away in Big Creek. There is no one living within a four miles radius and the nearest population is eight miles away at Big Creek which has been an estimated year round population of about 0 and the summer population is about 15.(Pope 1999).

## **3.2 Surface Water Pathway**

### 3.2.1 Geology and Hydrology

The site is located in a perched confined small valley at an elevation of 2408-m (7900-ft.).

The drainage is characterized by granitic rock of the Idaho Batholith. The soils developed from the Batholith have little cohesion because of the low silt and clay content. Commonly, the soils are loamy sand or sandy loam textures over granular sands and gravels.

About 400 tons of tungsten was mined from the site in 1954. The deposit consists of steeply dipping quartz vein and several smaller but similar veins. The vein is located in quartz-feldspar gneiss, which also contains lenses of biotite schist. (Kirkpatrick 1974)

The surface hydrologic system begins at the site and extends about  $\frac{3}{4}$  miles downstream to the Middle Fork of Smith Creek and reaches the Smith Creek in about four miles and then flows for 12 miles where it enters Big Creek. The flow through the site is estimated at less than 1 cubic feet per second (cfs) mean average flow. The mean average flow for the Middle Fork of Smith Creek is 13.6 cfs. This was calculated using existing stream gauges in the area and adjusting for site-specific criteria (Zuniga 1999). The main flow at 12 miles down stream is 29.9 cfs (Zuniga 1999).

The mean annual average rainfall for a 24-hour, two-year event is 18 inches. (NOAA 1973)

### 3.2.2 Targets

#### 3.2.2.1 Drinking Water

There are no drinking water intakes along the 15 miles target limit. There is no resident population downstream. Visitors to this drainage are limited to about one per week.

### 3.2.2.2 Human Food Chain

Although some fishing is occurring along Smith Creek the amount of fish caught is limited to about 1-2 per year. Visitors to the area tend to fish Big Creek and not Smith Creek (Pope 1999).

### 3.2.2.3 Environmental

The FCRNR is located about one mile east of the site. A wetland area of about one-acre is situated on site adjacent to the capped tailings. Smith Creek is on a steep gradient and soils conducive to wetland habitat are limited. It is estimated that there are two to three miles of wetlands based on aerial photos of the drainage.

## 3.3 Soil Exposure and Air Pathways

### 3.3.1 Physical Setting

The drainage is characterized by granitic rock of the Idaho Batholith. The soils developed from the Batholith have little cohesion because of the low silt and clay content. Commonly, the soils are loamy sand or sandy loam textures over granular sands and gravels. The tailings if exposed are 200 minus particle size. However, the 1998 removal has buried all fine grand particles and tailings are no longer air borne.

### 3.3.2 Targets

#### 3.3.2.1 Resident Population

There is no resident population within eight miles of the site. An occasional recreational visitor about once a month visits the site.

#### 3.3.2.2 Sensitive Environments

The FCRNR is about 1.5 miles away. About one acre area around the capped tailings is considered wetlands.

#### **4.0 SUMMARY AND RECOMMENDATIONS**

The 1998 removal has stopped any observed or likely releases to the air, soil, and surface water pathways. The environmental targets are significant but the waste stream has been removed. Although a potential for ground contamination water exists there are no human health targets within the reporting area. This site should be considered very low risk. No further removal actions are warranted. However, some water-sampling monitoring should continue to determine the effectiveness of the removal and determine differing site conditions as they occur.

## 5.0 REFERENCES

Department of Interior, National Oceanic and Atmospheric Administration, Weather Atlas2 – 1973. Western U.S. precipitation Frequency Maps.

U.S. Department of Agriculture, Forest Service, 1998 Final Removal Report, prepared by Trainor P.V. McCrae On-Scene Coordinator.

U.S. Geological Survey, Silver-rich Disseminated sulfides From Tungsten-bearing Quartz Lode Big Creek District central Idaho, by B.F. Leonard, Cynthia W. Mead, and Nancy Conklin, U.S. Geological Survey Professional Paper 594-C

U.S. Department of Agriculture, Forest Service, Payette National Forest, Krassel Ranger District. 1999 Telecommunication between Mr. Clem Pope and Mr. Pat Trainor, regarding fishing and Big Creek populations

Kirkpatrick, G.E., Geology of Ore Deposits of the Big Creek Area, Idaho and Valley Counties, Idaho, Thesis University of Idaho, 1974.

U.S. Department of Agriculture, Forest Service, Payette National Forest, McCall Ranger District. 1999, Mean Annual Flows, Smith Creek, prepared by Zuniga, R.J. Zone Hydrologist 3/22/99 using Quillian and Harenberg, 1982: An Evaluation of Idaho Stream-Gage Networks; U.S. Geological Survey Open file report 82-865.

**APPENDIX A**  
**Photo Logs**



Tailings as they existed in 1995.



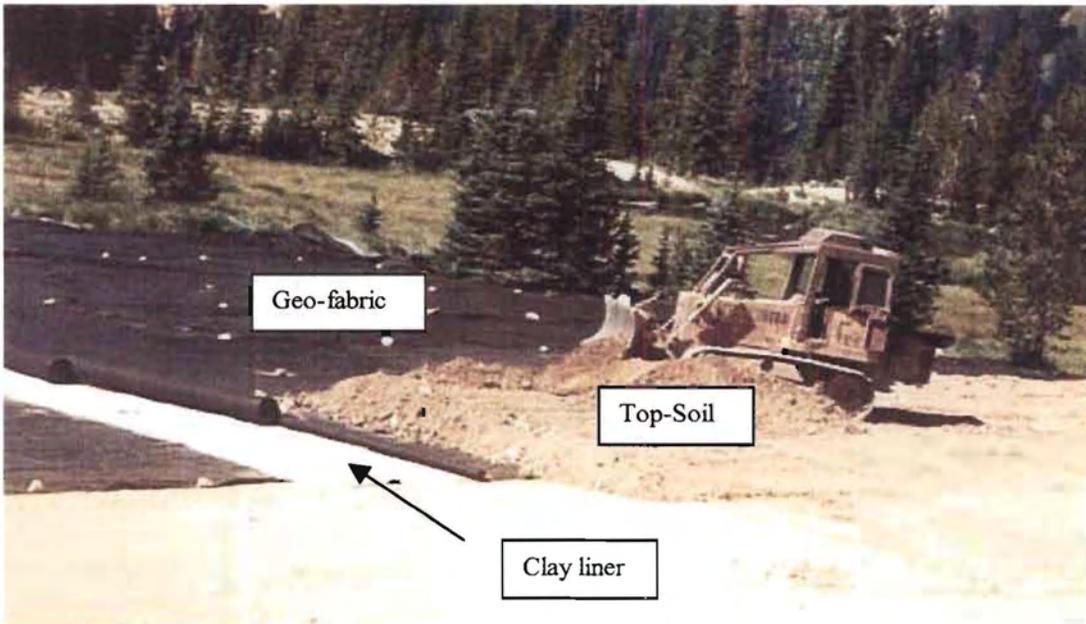
Mill Debris



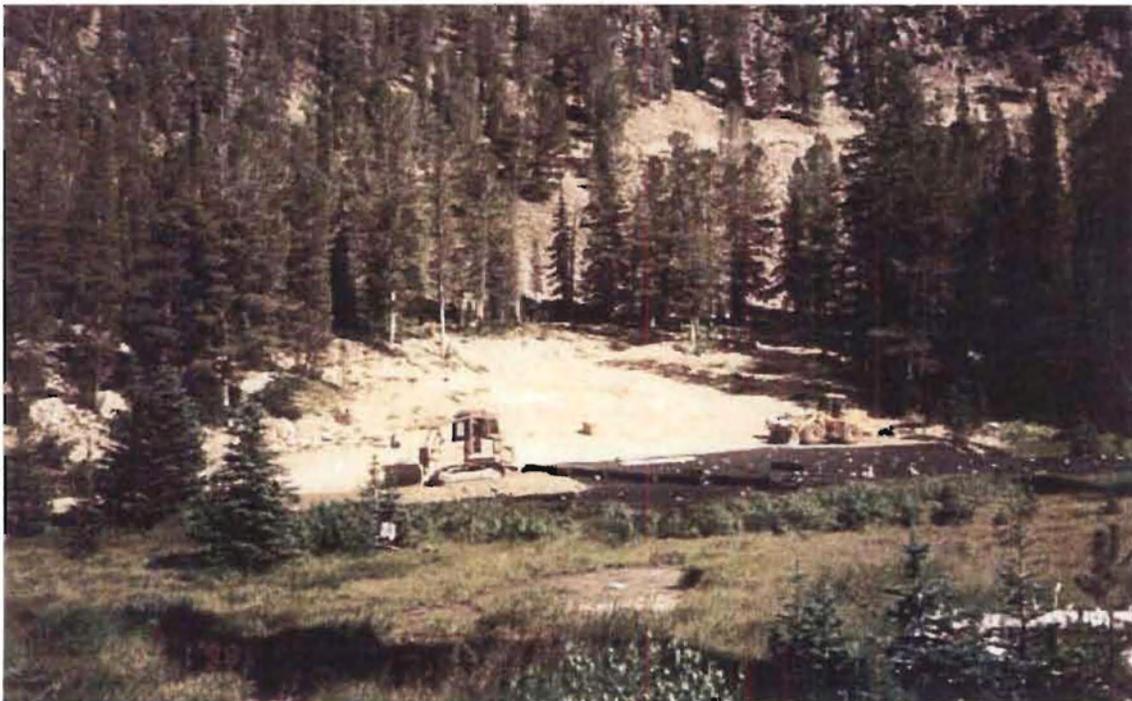
Unknown barrels prior to crushing and removal



Tailings with geo-fabric and liner shown. Last 2 foot of covers being placed



Cap placement at the tailing pile



Cap placement at the tailing pile



Unknown barrels prior to crushing and removal



Tailings with geo-fabric and liner shown. Last 2 foot of covers being placed



Finished Mill and tailings



Finished Taings Pile

**APPENDIX B**  
**Sampling Results**

-HIBBS-  
**ANALYTICAL LABORATORIES, INC.**  
 1804 N. 33rd Street, Boise  
 Boise, Idaho 83703  
 Phone # (208) 342-5515

**LABORATORY ANALYSIS REPORT**  
**SAMPLE NUMBER - 9520149**

Attn. PAT TRAINOR/WAYNE HERSEL

P.O.# R4-12-126

**PAYETTE NATIONAL FOREST**  
**498 MISSION ST.**  
**PO BOX 1026**  
**MCCALL, ID 83638**

Time of Collection: 14:00  
 Date of Collection: 09/12/95

Date Received: 09/13/95  
 Date Reported: 10/11/95

Submitted by:

Source of Sample: SOIL MCRAE-02

Test Requested	FROS # MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
ARSENIC		0.80 mg/L	0.005	EPA 200.7	10/10/95	DDB
BARIUM		60.5 mg/kg	0.05	EPA 200.7	09/26/95	DDB
MERCURY		<0.2 mg/kg	0.0005	EPA 245.1	09/25/95	HMM
SELENIUM		0.23 mg/L	0.005	EPA 200.7	10/10/95	DDB
SILVER ✓		2.51 mg/kg	0.005	EPA 272.1	09/26/95	CMC
CADMIUM FLAME		0.198 mg/kg	0.005	EPA 200.7	09/26/95	DDB
CHROMIUM FLAME		9.11 mg/kg	0.05	EPA 200.7	09/26/95	DDB
LEAD FLAME ✓		110 mg/kg	0.05	EPA 200.7	09/28/95	DDB
DIGESTION				SW 846 3050	09/21/95	HMM

*9/22/95*

-HIBBS-  
**ANALYTICAL LABORATORIES, INC.**  
 1804 N. 33rd Street, Boise  
 Boise, Idaho 83703  
 Phone # (208) 342-5515

**LABORATORY ANALYSIS REPORT**  
**SAMPLE NUMBER - 9520148**

Attn. PAT TRAINOR/WAYNE HERSEL

P.O.# R4-12-126

**PAYETTE NATIONAL FOREST**  
**498 MISSION ST.**  
**PO BOX 1026**  
**MCCALL, ID 83638**

Time of Collection: 12:30  
 Date of Collection: 09/12/95

Date Received: 09/13/95  
 Date Reported: 10/11/95

Submitted by:

Source of Sample: SOIL MCRAE-01

Test Requested	FRDS #	MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
ARSENIC			0.38 mg/l	0.005	EPA 200.7	10/10/95	DD8
BARIUM			9.18 mg/kg	0.05	EPA 200.7	09/26/95	DD8
MERCURY			<0.2 mg/kg	0.0005	EPA 245.1	09/25/95	HMM
SELENIUM			0.40 mg/l	0.005	EPA 200.7	10/10/95	DD8
SILVER ✓			16.0 mg/kg	0.005	EPA 272.1	09/26/95	CMC
CADMIUM FLAME			0.415 mg/kg	0.005	EPA 200.7	09/26/95	DD8
CHROMIUM FLAME			0.68 mg/kg	0.05	EPA 200.7	09/26/95	DD8
LEAD FLAME ✓			147 mg/kg	0.05	EPA 200.7	09/28/95	DD8
DIGESTION					SW 846 3050	09/21/95	HMM

*Michael D. Young*

**ANALYTICAL LABORATORIES, INC.**

1804 N. 33rd Street  
Boise, Idaho 83703  
Phone # (208) 342-5515

LABORATORY ANALYSIS REPORT  
SAMPLE NUMBER - 9722334

Attn. WAYNE HERSEL

P.O.# R4-12-126

PAYETTE NATIONAL FOREST  
498 MISSION ST  
PO BOX 1026  
MCCALL, ID 83638

Time of Collection: 11:00  
Date of Collection: 09/10/97

Date Received: 09/16/97  
Date Reported: 10/20/97

Submitted by:

Source of Sample: MCCRAE MINE

Test Requested	FRDS #	MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
ARSENIC			1.01 mg/kg	0.50	EPA 200.7	10/08/97	JH
CADMIUM FLAME			0.35 mg/kg	0.025	EPA 200.7	10/03/97	JH
COPPER ✓			128 mg/kg	0.05	EPA 200.7	10/17/97	JH
DIGESTION			*		SW 840 3050	09/19/97	KDT
LEAD FLAME ✓			93.7 mg/kg	2.5	EPA 200.7	10/03/97	JH
MERCURY			0.0580 mg/kg	0.0005	EPA 245.1	10/03/97	SWS
SELENIUM			<0.50 mg/kg	0.50	EPA 200.7	10/08/97	JH



**ANALYTICAL LABORATORIES, INC.**

1804 N. 33rd Street  
Boise, Idaho 83703  
Phone # (208) 342-5515

**LABORATORY ANALYSIS REPORT  
SAMPLE NUMBER - 9822289**

Attn. WAYNE HERSEL

P.O.# R4-12-126

**PAYETTE NATIONAL FOREST  
498 MISSION ST  
PO BOX 1026  
MCCALL, ID 83638**

Time of Collection: 12:00  
Date of Collection: 09/01/98

Date Received: 09/03/98  
Date Reported: 09/16/98

Submitted by: PAT TRAINOR

Source of Sample: MCCRAE-03 (BACKGROUND)

Test Requested	FRDS #	MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
ARSENIC			2.24 mg/kg	1.0	EPA 200.7	09/12/98	JH
BARIUM			68.6 mg/kg	0.5	EPA 200.7	09/15/98	JH
CADMIUM FLAME			0.13 mg/kg	0.05	EPA 200.7	09/10/98	JH
CHROMIUM FLAME			4.08 mg/kg	0.50	EPA 200.7	09/10/98	JH
COPPER			9.34 mg/kg	0.01	EPA 200.7	09/11/98	JH
DIGESTION			*		EPA 3050	09/08/98	LB
LEAD FLAME			17.9 mg/kg	0.50	EPA 200.7	09/10/98	JH
MERCURY			0.020 mg/kg	0.020	EPA 245.1	09/15/98	DMB
SELENIUM			<1.0 mg/kg	1.0	EPA 200.7	09/12/98	JH
SILVER			0.65 mg/kg	0.05	EPA 272.1	09/15/98	JH



**APPENDIX C**  
**Copies of References**

# Western U.S. Precipitation Frequency Maps

**Source:** NOAA Atlas 2 published in 1973. ([HDSC/NWS Office of Hydrology](#))

**Note:** To maintain image integrity and detail each image is almost 1 MB in size.

To obtain more information or the text material that accompanies these maps contact the Western Regional Climate Center at 702-677-3106

([wrcc@dri.edu](mailto:wrcc@dri.edu))

	2 Yr, 6 Hr	5 Yr, 6 Hr	10 Yr, 6 Hr	25 Yr, 6 Hr	50 Yr, 6 Hr	100 Yr, 6 Hr	2 Yr, 24 Hr	5 Yr, 24 Hr	10 Yr, 24 Hr	25 Yr, 24 Hr	50 Yr, 24 Hr	100 Yr, 24 Hr
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Northern California	<input checked="" type="checkbox"/>											
Southern California	<input checked="" type="checkbox"/>											
Colorado	<input checked="" type="checkbox"/>											
Idaho	<input checked="" type="checkbox"/>											
Montana	<input checked="" type="checkbox"/>											
Nevada	<input checked="" type="checkbox"/>											
New Mexico	<input checked="" type="checkbox"/>											
Oregon	<input checked="" type="checkbox"/>											
Utah	<input checked="" type="checkbox"/>											
Washington	<input checked="" type="checkbox"/>											
Wyoming	<input checked="" type="checkbox"/>											

Western Regional Climate Center, [wrcc@dri.edu](mailto:wrcc@dri.edu)

