

***ABBREVIATED PRELIMINARY ASSESMENT***

***MYSTERY MINE***



Mt. Baker-Snoqualmie National Forest  
Snohomish County, WA

February 2003

## TABLE OF CONTENTS

	page
EXECUTIVE SUMMARY.....	i
1.0 INTRODUCTION.....	1
2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS.....	1
3.0 SITE SAMPLING AND TEST RESULTS.....	2
4.0 SUMMARY.....	3
5.0 RECOMMENDATION.....	3

## APPENDICES

Appendix A	Abbreviated Preliminary Assessment Checklist
Appendix B	Site Photos

## **EXECUTIVE SUMMARY**

The Forest Service performed an Abbreviated Preliminary Assessment for the Mystery Mine (Site) to determine the need for further site characterization. The Site is situated on steep side slopes in rugged terrain adjacent to the Henry M. Jackson Wilderness on the Mount Baker-Snoqualmie National Forest. A Niton XRF unit was used for In Situ field screening and bench testing of the samples collected from the waste rock material for any potential contaminants. Water and sediment samples were not collected. However, data collected by the State of Washington has been added to this document.

Concentrations of iron, arsenic, and lead in the waste dump exceeded EPA Region IX Preliminary Remediation Goals (PRG) as to acceptable industrial levels in soil. Concentrations of arsenic, copper, lead, and zinc in the mine effluent exceeded State of Washington chronic standards for surface waters (Washington Administrative Code, Chapter 173-201). A Discharge from the Mystery #3 adit flows into a channel developed on a steep talus slope. It was apparent from staining within the channel that water and/or materials from the site may be entering Granite Creek 1000 feet below the mine site. The drainage was essentially dry during the site visit in October 2002 but the staining suggests seasonal flows into Granite Creek during the spring. Subsurface flow through the unconsolidated, talus material to Glacier Creek throughout the year cannot be ruled out.

Based on the proximity of the Site to Glacier Creek, the heavy tourist foot traffic in the area, and the presence of Bull Trout in Glacier Creek, it is recommended a Site Inspection (SI) be performed.

## **1.0 INTRODUCTION**

An Abbreviated Preliminary Assessment (APA) was performed by the US Forest Service in accordance with the EPA “Guidance for Performing Preliminary Assessments Under CERCLA”, EPA “Improving Site Assessment: Abbreviated Preliminary Assessments” of 1999, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Contingency Plan as outlined in 40 CFR Parts 300.410(c)(1)(i-v).

The purpose of this assessment was to determine whether or not there is a potential for a release of contaminants to the environment and/or to human health. The purpose of an APA is to determine whether further site characterization is warranted. A Niton XRF 700 Series was utilized to help in the preliminary screening of this Site.

## **2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS**

The Mystery Mine #3 Adit (Site) is located approximately 40 miles east of Everett, WA. Access to the site is along Forest Service road 4710, which leads to the town site of Monte Cristo. From there the site is accessed by an old mine road, that is now a trail, that runs along Glacier Creek. The legal description for the Site is; Latitude: 47° 58’ 67”N, Longitude: 121° 22’ 05”W, Sec 22, T 29 N, R 11 E, USGS Quadrangle Map – Monte Cristo. The Site is situated on extremely steep side slopes approximately 1000 feet above Glacier Creek. The Site is located in the historic mining district of Monte Cristo.

The Site consists of waste rock, an open portal, and open stope, which is easily accessible by the public. There are no other structures in the area save the collapsed, wooden remains of the upper tram terminal on the dump below the adit. Access to the Site is by means of a difficult climb approximately 1000 feet in elevation. See the photo in Appendix B. Access to the area can be accomplished by way of the old Forest Service road but the road and bridge have been washed out by Glacier Creek at Monte Cristo. Approximately 5 acres are disturbed on the Site.

The Mystery Mine claims were staked on August 30, 1889, and recorded with the Snohomish County auditor on September 25, 1889.

Aerial trams from the Mystery Mines were first built by the Monte Cristo Mining Company in 1892 and proved to be dismal failures. By November 1894, the Trenton Iron Company had constructed a stout Bleichert Patent aerial tramway from Mystery #3 adit to a collector station near the concentrator. This tram used long spans to cross the many avalanche paths along the mountainside.

The mines were bored using hand drilling and blasting until 1896. when an electric air compressor was installed at the Mystery #3 adit. The power lines were strung along the tram towers from a dynamo at the concentrator. These mines produced most of the ore that was shipped from Monte Cristo. They shut down following the railroad washout in 1897, reopened in 1900, and then closed for good in 1903. They still contain a sizable amount of ore, but present-day costs and environmental laws make it unprofitable to pursue the ore.

Based on literature, the Site consists of the Mystery #3 adit, which bores 3500 feet beneath Mystery Hill, under Glacier Basin and into Cadet Peak. The Mystery #3 adit was eventually used as a haulage tunnel to transport ore from other mines in Glacier Basin to the concentrator via the tram terminal at the Mystery #3 portal. The Mystery #2 adit is partially collapsed and is approximately 70 feet in elevation above Mystery #3. Mystery #1 is an open stope and drops 100 vertical feet and is considered very dangerous (photo). (*Discovering Washington Historic Mines by Ina Chang, Vol 1, 1997*)

Commodities mined were gold, silver, copper, arsenic, lead, and zinc. The ore material consisted of galena, chalcopyrite, arsenopyrite, pyrite, and sphalerite.

Currently, the Site is inactive and unclaimed.

### **3.0 SITE SAMPLING AND TEST RESULTS**

A Niton XRF, XL-722S was used to assess the material from around the waste pile for potential contamination. In Situ testing was performed on the Site per EPA Method 6200. Surface soils were removed to approximately 4 to 6 inches below grade in order to get below highly oxidized surface layers. Rocks, debris and other deleterious materials were removed. The soil was worked to gain a flat surface area on which to set the Niton. In addition to In Situ sampling, samples were collected, dried, and prepared for bench top sampling. The results from this effort are provided below.

No surface water, or sediment samples were collected and analyzed as part of this analysis. However, sampling results for waste rock and mine effluent acquired by the Washington Department of Natural Resources (DNR) are included in this APA.

The following constituents exceeded EPA Region IX PRG industrial levels:

<u>Location</u>	<u>Constituent</u>	<u>Result (mg/kg)</u>	<u>PRG (mg/kg)</u>
Waste rock material	Iron	143,000 – 160,000	100,000
	Arsenic*	32,000 – 35,900	2.7
	Lead	15,200 – 15,800	750
	Antimony	4860 – 5060	820

\*Arsenic – for noncancer endpoint, the PRG is 440 mg/kg. For cancer endpoints, the PRG is 2.7 mg/kg.

Results From Washington DNR:

<u>Location</u>	<u>Constituent</u>	<u>Result (mg/kg)</u>	<u>State (mg/kg)</u>
Waste Rock material	Iron	230,000	---
	Arsenic **	14,000	20
	Lead	1700	220
	Copper	500	100



determination of volumes should be calculated. Acid base accounting (ABA) is required if waste material is present besides what had been observed during this assessment. Sediment samples are to be collected from transects of the stream and preferably at depth and analyzed for total as well as for available metals. Surface water samples are also required for analyses of both total and dissolved metal concentrations in Glacier Creek as well as in any other seeps and/or tributaries that may be present in the concentrator area.

## **Appendix A**

### **ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST**



## ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST

This checklist can be used to help the site investigator determine if an Abbreviated Preliminary Assessment (APA) is warranted. This checklist should document the rationale for the decision on whether further steps in the site assessment process are required under CERCLA. Use additional sheets, if necessary.

**Checklist Preparer:** Dennis Boles, Environmental Engineer October 10, 2002  
 (Name/Title) (Date)

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**Site Name:** Mystery Mine

**Previous Names (if any):** None

**Site Location:** The Site is located approximately 40 miles east of Everett, WA on FS Road 4710.

**Legal Description:** Latitude: 47°58'67"N Longitude: 121°22'05"W

**Describe the release (or potential release) and its probable nature:** Waste Rock and AMD from the adit. The following elements exceeded industrial levels of the PRGs, and the results and relevant PRG industrial levels are listed in parentheses:

Waste Rock: Iron – 143,000 to 230,000 (100,000 mg/kg), Arsenic – 14,000 to 35,900 (1.6 cancer and 260 mg/kg for noncancer endpoints), Lead – 1700 to 15,800 (750 mg/kg), Antimony – 4860 to 5060 (820 mg/kg)

AMD: Arsenic 1100 to 3300 ppb, Copper 700 ppb, Lead 110 ppb, Zinc 6000 ppb

### **Part 1 - Superfund Eligibility Evaluation**

<b>If All answers are "no" go on to Part 2, otherwise proceed to Part 3</b>	<b>YES</b>	<b>NO</b>
1. Is the site currently in CERCLIS or an "alias" of another site?		X
2. Is the site being addressed by some other remedial program (Federal, State, or Tribal)?		X
3. Are the hazardous substances potentially released at the site regulated under a statutory exclusion (i.e., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?		X
4. Are the hazardous substances potentially released at the site excluded by policy considerations (i.e., deferred to RCRA corrective action)?		X
5. Is there sufficient documentation to demonstrate that no potential for a release that could cause adverse environmental or human health impacts exist (i.e., comprehensive remedial investigation equivalent data showing no release above ARAR's, completed removal action, documentation showing that no hazardous substance release have occurred, or an EPA approved risk assessment completed)?		X

Please explain all “yes” answer(s). \_\_\_\_\_

**Part 2 - Initial Site Evaluation**

For Part 2, if information is not available to make a “yes” or “no” response, further investigation may be needed. In these cases, determine whether an APA is appropriate. Exhibit 1 parallels the questions in Part 2. Use Exhibit 1 to make decisions in Part 3.

<b>If the answer is “no” to any questions 1, 2, or 3, proceed directly to Part 3.</b>	<b>YES</b>	<b>NO</b>
1. Does the site have a release or a potential to release?	X	
2. Does the site have uncontained sources containing CERCLA eligible substances?	X	
3. Does the site have documented on-site, adjacent, or nearby targets?	X	

<b>If the answers to questions 1, 2, and 3 above were all “yes” then answer the questions below before proceeding to Part 3.</b>	<b>YES</b>	<b>NO</b>
4. Does documentation indicate that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site?		X
5. Is there an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site?	X	
6. Is there an apparent release and no documented on-site targets or targets immediately adjacent to the site, but there are nearby targets (i.e., targets within 1 mile)?	X	
7. Is there no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site?	X	

**Notes:**

**EXHIBIT 1**  
**SITE ASSESSMENT DECISION GUIDELINES FOR A SITE**

Exhibit 1 identifies different types of site information and provides some possible recommendations for further site assessment activities based on that information. You will use Exhibit 1 in determining the need for further action at the site, based on the answers to the questions in Part 2. Please use your professional judgment when evaluating a site. Your judgment may be different from the general recommendations for a site given below.

<b>Suspected/Documented Site Conditions</b>		<b>APA</b>	<b>FULL PA</b>	<b>PA/SI</b>	<b>SI</b>
1. There are no releases or potential to release.		Yes	No	No	No
2. No uncontained sources with CERCLA-eligible substances are present on site.		Yes	No	No	No
3. There are no on-site, adjacent, or nearby targets		Yes	No	No	No
4. There is documentation indicating that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site.	Option 1: APA    SI	Yes	No	No	Yes
	Option 2: PA/SI	No	No	Yes	No
5. There is an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site.	Option 1: APA    SI	Yes	No	No	Yes
	Option 2: PA/SI	No	No	Yes	N/A
6. There is an apparent release and no documented on-site targets and no documented immediately adjacent to the site, but there are nearby targets. Nearby targets are those targets that are located within 1 mile of the site and have a relatively high likelihood of exposure to a hazardous substance migrating from the site.		No	Yes	No	No
7. There is no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site.		No	Yes	No	No

**Part 3 - EPA Site Assessment Decision**

When completing Part 3, use Part 2 and Exhibit 1 to select the appropriate decision. For example, if the answer to question 1 in Part 2 was “no,” then an APA may be performed and the “NFRAP” box below should be checked. Additionally, if the answer to question 4 in Part 2 is “yes,” then you have two options (as indicated in Exhibit 1): Option 1 -- conduct an APA and check the “Lower Priority SI” or “Higher Priority SI” box below; or Option 2 -- proceed with a combined PA/SI assessment.

<b>Check the box that applies based on the conclusions of the APA:</b>	
<input type="checkbox"/> NFRAP	<input type="checkbox"/> Refer to Removal Program – further site assessment needed
<input checked="" type="checkbox"/> Higher Priority SI	<input type="checkbox"/> Refer to Removal Program – NFRAP
<input type="checkbox"/> Lower Priority SI	<input type="checkbox"/> Site is being addressed as part of another CERCLIS site
<input type="checkbox"/> Defer to RCRA Subtitle C	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Defer to NRC	
Regional EPA Reviewer: <u>  N/A  </u>	
Print Name/Signature	Date

**PLEASE EXPLAIN THE RATIONALE FOR YOUR DECISION:**

The area is heavily impacted with tourists. In many areas, it was obvious that tourists are looking for rock specimens. Rock hounding is promoted in *Discovering Washington's Historical Mines*. At this time, it is not known if the AMD impacts Glacier Creek as the AMD becomes dissipated into the rocky talus slopes of the area. Staining from iron was observed closer to Glacier Creek and this may occur during snowmelt. Because of the proximity of the site to Glacier Creek and the fact that Bull Trout are present in the area, it is recommended that an SI be implemented.

**NOTES:**

The Site sits on extremely steep side slopes and getting drilling equipment on the waste piles is not possible. Hand auguring methods to sample the waste rock material would be required.

## **Appendix B**

### **SITE PHOTOS**



*Stope*



*Waste Rock Pile*



*AMD From Adit*