

***ABBREVIATED PRELIMINARY ASSESMENT***

***RUTH #1 MINE***



Willamette National Forest  
Marion County, OR

Revised  
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## **EXECUTIVE SUMMARY**

The Forest Service performed an Abbreviated Preliminary Assessment for the Ruth Mine (Site) to determine the need for further site characterization. The Site is located approximately 8 aerial miles northeast of the town of Elkhorn, Oregon. The Site is situated on steep side slopes. The site consists of two adits at the 4<sup>th</sup> and one adit at the 5<sup>th</sup> Level. Small waste rock dumps occur at the 4<sup>th</sup> Level.

A Niton XRF unit was used for In Situ field screening of material from the waste rock dumps. Water and sediment samples were not collected as part of this investigation.

Numerous chemical elements exceeded either State or Federal regulations or guidelines (Appendix A). However, the most notable elements of concern are arsenic (598 mg/kg), lead (6490 mg/kg), chromium (4339 mg/kg), iron (211,968 mg/kg), manganese (22,797 mg/kg), and nickel (113,971 mg/kg, although this seems like an anomaly, considering most values averaged about 25,000 mg/kg), which exceed EPA Region IX Preliminary Remediation Goals (PRG) as to acceptable industrial levels in soil.

It is recommended that a Site Inspection (SI) be performed because of the concentrations of various elements as noted; the proximity of the waste rock dump on level 4 to an unnamed tributary; and the adit drainage from Level 5, which discharges into Battle Axe Creek. Estimated volume of waste rock material at Level 4 is 4500cy and estimated volume for Level 5 is 945cy.

## **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 Site is located approximately 8 aerial miles northeast of Elkhorn, OR at an elevation of 2600 feet above mean sea level (MSL). The Site is 2 miles east of Jaw Bone Flats, along Forest Road 2209. The Site is on National Forest System lands within the Opal Creek Scenic and Recreation Area and is administered and managed by the Willamette National Forest. The area was withdrawn from mineral entry when incorporated into the Scenic Recreation Area, subject to valid existing rights (P.L. 104-333). The Site is within the North Santiam Mining District.

Location information:

Lat./Long.:	44° 51' 11"N 122° 11' 23"W
Legal:	Willamette Meridian, T8S, R5E, S27
USGS quadrangle:	Battle Ax

The Site consists of three adits and several small waste-rock dumps. The 4<sup>th</sup> Level consists of one adit with a steel door on the portal and a second adit with a partially collapsed portal (see photos 5 and 7, respectively in Appendix C). The second adit connects to the main adit 20 feet inside the side drift. The 5<sup>th</sup> Level adit has a wooden door on the portal.

The Ruth Mine was formerly known as the Amalgamated Mine and was operated by the Lewis & Clark Mining & Milling Co. This company located five claims south of Battle Ax Creek, a tributary of the Little North Santiam River, sometime before 1902. By that date, they had opened several hundred feet of adits on two levels. In 1920 the Amalgamated Mining & Milling Co. took over the original claims and located 18 more. During 1929 – 1934 a combined effort of Amalgamated and Columbia Mines Development Co. constructed a road to the mine, erected several buildings and a mill, and shipped nine carloads of crude ore and mill concentrates during 1931 and 1932. In 1939 the mine was purchased by the Pacific Smelting & Refining Co. Total production and ore values were not reported.

A total development of more than 4000 feet is reported, mostly on the No. 4 (Ruth #1) and No. 5 levels. About 200,000 tons of ore reserves, containing about 6 percent zinc, are reported to have been blocked out. Various engineer reports on the property estimate reserves of from 200,000 to 800,000 tons that will average from 4.33 to 11 percent zinc and one percent lead in blocks of ore with an average thickness of about 10 feet. Gold, silver and copper values are usually low. (Webber, 1995)

The primary ore mineral is sphalerite, which occurs in fault zones from one to sixty feet thick. Andesite is cut by a rhyolite dike, which was reported in the No. 4 Level. (Brooks & Ramp, 1968) The ore was processed at two mill sites, one known as the Amalgamated mill, which was adjacent to Battle Axe Creek. The second mill, Starvation Mill, was located at Jaw Bone Flats, a private land in-holding at the confluence of Battle Axe and Opal Creeks. Ore from the Ruth #1 Mine was transported to the Amalgamated mill by rail/tram along corridors, which are partially overgrown.

The Amalgamated Mill Site came under a CERCLA removal action in 1991.

The waste rock pile for Level 5 was used to construct the haul roads. Approximate depth of this material is 3 feet and approximately 16 feet wide. It is unclear as to the exact length of road that was built from waste rock material. However, based on visual observations of the area, an approximate volume of material in the roadway, ore car rails, and miscellaneous piles is 945cy. Battle Axe Creek is approximately 30 to 40 feet below the road and the adit drainage discharges into the river. There are signs of material leaving the site and migrating down to the river.

The waste material for Level 4 is directly in the drainage of a small tributary. Water was seen disappearing in the rubble and then reappearing further down gradient. A culvert, approximately 36 inches in diameter, has been washed out, indicating this tributary does carry some good flows during spring runoff. The waste rock material in this area is hard to quantify because of it being scattered down gradient. An estimate would be 4500cy.

Currently, the Site is inactive.

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

A Niton XRF, XL-722S was used to assess the material from the waste rock dumps 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.

Refer to Appendix A for a listing of elements that were detected as well as those that exceeded regulatory requirements.

### **4.0 SUMMARY**

The constituents of concern that exceeded EPA Region IX industrial levels in soil were arsenic, chromium, iron, lead, nickel, and manganese. Appendix A shows all Niton testing results along with associated State and Federal regulations and guidelines for all elements detected.

The Site poses a physical hazard to the general public recreating at the Site in that the wooden door on the portal at the 5<sup>th</sup> Level is not secured with a lock and one of the portals on the 4<sup>th</sup> Level is unsecured.

### **5.0 RECOMMENDATION**

Based on the In Situ screening of the waste rock dumps with the Niton XRF unit, physical hazards associated with the Site, and EPA's APA Checklist (Appendix B), it is recommended that a Site

Inspection (SI) be completed. A more thorough search of the area is required over that done during the site reconnaissance performed for the APA. As part of this inspection, a thorough study of the area to determine the extent of contamination is warranted. The area should be sampled to determine the presence of all waste material and tailings, and if present, the potential waste dumps and tailings should be sampled at depth and a 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. Drainage from both adits need to be sampled as well as sediment, surface and pore water from the streams, as well as benthic organisms.

Appendix C contains additional photos of the Site.

## **6.0 DISCLAIMER**

This abandoned mine/mill site was created under the General Mining Law of 1872 and is located solely on National Forest System (NFS) lands administered by the USDA Forest Service. The United States has taken the position and courts have held that the United States is not liable as an “owner” under CERCLA Section 107 for mine contamination left behind on NFS lands by miners operating under the 1872 Mining Law. Therefore, USDA Forest Service believes that this site should not be considered a “federal facility” within the meaning of CERCLA Section 120 and should not be listed on the Federal Agency Hazardous Waste Compliance Docket. Instead, this site should be included on EPA’s CERCLIS database. Consistent with the June 24, 2003 OECA/FFEO “Policy on Listing Mixed Ownership Mine or Mill Sites Created as a Result of the General Mining Law of 1872 on the Federal Agency Hazardous Waste Compliance Docket,” we respectfully request that the EPA Regional Docket Coordinator consult with the Forest Service and EPA Headquarters before making a determination to include this site on the Federal Agency Hazardous Waste Compliance Docket.

## **REFERENCES**

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## **Appendix A**

### **NITON ANALYTICAL RESULTS**



SAMPLE LOCATION	TEST RESULTS		STATE GUIDELINES		EPA	
	Element	mg/kg	Receptor	mg/kg	Standard	mg/kg
Waste Pile. Level 5	Arsenic	372	Plants	8.0	Industrial	1.6
10/2002	Cadmium	148	Plants	4.0	Industrial	450
	Chromium	4339	Plants	5.0	Industrial	450
	Iron	118,988	Plants	10.0	Industrial	100,000
	Lead	6490	Birds	16.0	Industrial	750
	Manganese	19,290	Invertebrates	100.0	Industrial	19,000
	Zinc	43,878	Plants	50.0	Industrial	100,000
Waste Pile. Level 5	Chromium	2099	Plants	5.0	Industrial	450
10/2002	Iron	52,275	Plants	10.0	Industrial	100,000
	Nickel	21,094	Plants	30.0	Industrial	20,000
Waste Material, Level 5	Iron	78,592	Plants	10.0	Industrial	100,000
River side of collapsed	Lead	106	Birds	16.0	Industrial	750
building. Niton Sample	Manganese	11,296	Invertebrates	100.0	Industrial	19,000
ID 27. <b>08/03/04</b>	Nickel	14,989	Plants	30.0	Industrial	20,000
	Zinc	733	Plants	50.0	Industrial	100,000
Ballast Material for Ore	Iron	160,973	Plants	10.0	Industrial	100,000
Car Tracks, Level 5.	Lead	4810	Birds	16.0	Industrial	750
Niton Sample ID 28.	Manganese	28,288	Invertebrates	100.0	Industrial	19,000
<b>08/30/04</b>	Nickel	26,394	Plants	30.0	Industrial	20,000
	Zinc	38,886	Plants	50.0	Industrial	100,000
Waste Material used for	Iron	175,923	Plants	10.0	Industrial	100,000
road construction by pipes,	Lead	2939	Birds	16.0	Industrial	750
Level 5. Niton Sample ID	Manganese	26,099	Invertebrates	100.0	Industrial	19,000
29. <b>08/03/04</b>	Nickel	30,976	Plants	30.0	Industrial	20,000
	Zinc	48,077	Plants	50.0	Industrial	100,000
Material in Pipeline	Chromium	3360	Plants	5.0	Industrial	450
10/2002	Iron	211,968	Plants	10.0	Industrial	100,000
	Lead	4547	Birds	16.0	Industrial	750
	Manganese	22,797	Invertebrates	100.0	Industrial	19,000
	Nickel	29,594	Plants	30.0	Industrial	20,000
	Zinc	34,099	Plants	50.0	Industrial	100,000
Road Surface. Level 5	Copper	2450	Invertebrates	50.0	Industrial	41,000
Niton Sample ID 31	Iron	104,960	Plants	10.0	Industrial	100,000
<b>08/03/04</b>	Lead	3667	Birds	16.0	Industrial	750
	Manganese	12,896	Invertebrates	100.0	Industrial	19,000
	Nickel	31,898	Plants	30.0	Industrial	20,000
	Zinc	35,891	Plants	50.0	Industrial	100,000



SAMPLE LOCATION	TEST RESULTS		STATE GUIDELINES		EPA	
	Element	mg/L	Receptor	ug/L**	Standard	ug/L
<b>4th Level Adit (02/26/01)</b>					Same as for ODEQ	
pH		7.34 units				
Alkalinity, total: CaCO <sub>3</sub>		97.0				
Suspended Solids		2.3				
Total Solids		236.0				
Arsenic*	Was not tested		Aquatic Life	150.0		
Cadmium		0.023	Aquatic Life	0.27		
Copper		ND@0.01	Aquatic Life	9.09		
Lead		ND@0.002	Aquatic Life	3.2		
Nickel		ND@0.01	Aquatic Life	50.8		
Silver		ND@0.005	Aquatic Life	0.12		
Zinc		3.51	Aquatic Life	111.8		
Turbidity		0.929 NTU				
<b>5th Level Adit (02/26/01)</b>						
pH		7.07 units				
Alkalinity, total: CaCO <sub>3</sub>		78.0				
Suspended Solids		ND@1.0				
Total Solids		196.0				
Arsenic*	Was not tested		Aquatic Life	150.0		
Cadmium		0.004	Aquatic Life	0.23		
Copper		ND@0.01	Aquatic Life	7.54		
Lead		ND@0.002	Aquatic Life	3.2		
Nickel		ND@0.01	Aquatic Life	42.3		
Silver		ND@0.005	Aquatic Life	0.12		
Zinc		1.27	Aquatic Life	97.1		
Turbidity		0.138 NTU				

\*Arsenic – this is a data gap and needs to be tested in the adit drainage. Arsenic speciation needs to be determined.

\*\* State Guidelines – criteria shown are adjusted for hardness where appropriate.

Note: Main elements that would be of concern at a neutral pH are arsenic and cadmium.

**Appendix B**

**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:**

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(Date)

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**Site Name:** Ruth #1 Mine

**Previous Names (if any):**

**Site Location:** The Site is located approximately 8 aerial miles northeast of Elkhorn, OR.

**Legal Description:** Willamette Meridian, T8S, R5E, S27

Latitude: N44° 51' 11"

Longitude: W122° 11' 23"

**Describe the release (or potential release) and its probable nature:** Highest levels of contamination are located in the waste rock material. Arsenic (598 mg/kg), chromium (4339 mg/kg), iron (211, 968), lead (6490 mg/kg), manganese (22,797 mg/kg), and nickel (113,971 mg/kg), exceed EPA Region IX PRGs for industrial soils.

**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?		<b>X</b>
2. Is the site being addressed by some other remedial program (Federal, State, or Tribal)?		<b>X</b>
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)?		<b>X</b>
4. Are the hazardous substances potentially released at the site excluded by policy considerations (i.e., deferred to RCRA corrective action)?		<b>X</b>
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)?		<b>X</b>

**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	<b>No</b>
2. No uncontained sources with CERCLA-eligible substances are present on site.		Yes	No	No	<b>No</b>
3. There are no on-site, adjacent, or nearby targets		Yes	No	No	<b>No</b>
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	<b>No</b>
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	<b>Yes</b>
	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	<b>No</b>
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	<b>No</b>

**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:

## **Appendix C**

### **SITE PHOTOS**





Photo 1. Access to Level 5 of Ruth Mine (photo by R. Seeger).



Photo 2. Level 5: Ore Car Track and Possible Loading Site. Niton Sample ID 28. Lead 4810 mg/kg. (photo by D. Boles)



Photo 3. Level 5: Side of Access Road. Niton sample ID 29  
Lead – 2939 mg/kg. (photo by D. Boles)



Photo 4. Level 5: Lower Road Segment by Washed out Bridge.  
Niton Sample ID 33. Lead 4568 mg/kg. Material Approximately 3' Deep.  
(photo by D. Boles)



Photo 5. Level 4: Main Adit (photo by D. Boles)



Photo 6. Level 4: Adit Discharge (photo by D. Boles)



Photo 7. Level 4: Taken Inside of Second Open Portal  
(photo by D. Boles)



Photo 8. Level 4: Waste Rock and Ore Car Rails  
(photo by D. Boles)