ABBREVIATED PRELIMINARY ASSESMENT

NISBET

Mt. Hood National Forest
Clackamas County, Oregon

May 2003

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EXECUTIVE SUMMARY

The Forest Service performed an Abbreviated Preliminary Assessment for the Nisbet Mine (Site) to determine the need for further site characterization. The Site waste rock is placed on steep side slopes. A Niton XRF unit was used for In Situ field screening of the waste piles for any potential contaminants. Water and sediment samples were not collected.

One element, Arsenic, exceeded EPA Region IX Preliminary Remediation Goals (PRG) as to acceptable industrial levels in soil.

Based on the proximity of the Site to the Oak Grove Fork of the Clackamas River, it is recommended a Site Inspection (SI) be performed. Oregon Department of Environmental Quality also scored this site as “High”.

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 on October 3, 2002.

2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

The Nisbet Mine (Site) is located approximately 31 miles southeast of Estacada, OR, on Forest Service Road 4630025. The legal description for the Site is: Sec 5, T6S, R7E WBM. Site location is Latitude: 45° 04' 49"N, Longitude: 121° 58' 29"W, USGS Quadrangle Map – Mt. Mitchell. The Site is situated on steep hillsides and within 100 feet to the Oak Grove Fork of the Clackamas River. The Site is located within the Oak Grove Mining District of the Clackamas River Ranger District.

The Site consists of remains from tramways, a wooden water tank and numerous other structures. Only one adit, adjacent to the river, was observed. The other adits are collapsed.

Cinnabar was first discovered in the Oak Grove Fork area by George Nisbet, who located the Vermillion group of claims in 1923-24, and the Oak Ridge Group two years later. In 1927 D. E. Kiggins was given a one-eighth interest in the claims and both men worked as partners until 1938, when Nisbet gave his interest in the Vermilion group to Kiggins and took ownership of the Oak group for himself.

The early processing of the ore consisted of a continuous shaft-type furnace constructed by Nisbet in 1925 or 1926. In 1939 a cylindrical shaft-type furnace with a capacity of about 15 tons per day was erected on the Oak Grove group of claims.

In 1940 an option was given on the Kiggins Claims to Horse Heaven Mines, Inc., and the Nisbet claims were leased to Oregon Quicksilver, Inc., headed by George S. Barton of Eugene.

The Nisbet group of claims is owned jointly by the estate of George Nisbet, deceased, and A. O. Bartell.

From 1937 to 1943, 102 flasks were produced. However, information obtained from Nisbet by Mr. Bartell indicates that the total production, both Kiggins and Nisbet Mines, may be around 300 flasks.

The deposits are in basalt or basaltic andesite flows, probably Columbia River Basalt of Miocene age. The rock is dark gray to black. In the mineralized area, the basalt is cut by numerous calcite veinlets of random orientation.

Cinnabar occurs chiefly in fissure veins constituted mainly of banded calcite. Cinnabar is said to occur also as narrow fracture fillings in the basalt adjacent to the veins.

The cinnabar-bearing calcite veins explored by the workings range from about 6 inches to 6 feet in width. Locally the individual veins converge to form mineralized zones 10 to 15 feet wide. The calcite veins appear to have been introduced into open fractures in the basalt.

The Nisbet mine was developed by about 500 feet of underground workings distributed among 5 adits and an inclined shaft and several open cuts. The Oak Grove vein was developed by two adits and a surface trench; the Sluice vein by an adit and a surface trench; the Ben vein by one adit and a small stope; and the Zeolite vein by an adit and inclined shaft, and by a stope. Most of the production of the mine has come from the Zeolite vein.

The Oak Grove vein was explored for a horizontal distance of 100 feet and for a vertical distance of 100 feet by two adits and a surface trench. It ranged from 6 inches to 6 feet thick. This vein produced about 5 flasks of quicksilver. The average grade of vein material is about 9 pounds of quicksilver per ton.

The Sluice vein ranged from 6 inches to 2.5 feet in thickness and probably joins the Oak Grove vein about 20 feet below the upper Oak Grove Adit. The vein was probably stoped for 50 feet along the strike of the vein and 20 feet up the dip from the drift. Production was probably about 10 flasks.

The Ben vein has an irregular ore body about 1 to 3 feet thick, which follows the trace of the intersection of two faults. Production from the stope is estimated at about 20 flasks.

The Zeolite vein averaged 2 feet thick. The enclosing basalt has been altered by hydrothermal solutions to a mealy, soft, limonite-stained clay, which was mineralized a short distance from the vein so that the ore body averaged 3 to 4 feet thick. The stope is about 40 feet on the strike and 60 feet long on the dip of the vein. It was stoped nearly to the surface. The Zeolite vein consists of principally of zeolite mineral stilbite, with smaller amounts of calcite and silica. Cinnabar occurs in the zeolite and calcite stringers, seams, interbanded streaks, and small pockets, and is disseminated in the basalt near the vein. Production was probably 100 flasks of quicksilver.

Cinnabar was also found and mined in the open cuts on the West vein, the Top Hole vein, and an unnamed vein. About 175 tons of ore were mined from the large open cut and 10 to 15 flasks of quicksilver were probably produced. The structure in these cuts is obscure, but the mineralization follows shear zones, which may be the surface characteristics of calcite veins at greater depth. The basalt is highly weathered and altered to a structureless, soft, limonite-stained clay.

A large part of Nisbet's production is said to have been made by hydraulicking rich residual material overlying the Sluice and the Oak Grove veins and recovering it on sluice boxes and a homemade shaking table. Because sloughed material and vegetation cover parts of the sluiced area, and because reject from the concentrators went into the creek and was carried away, there is little evidence of the amount of ore treated in this manner.

Currently, the Site is abandoned.

3.0 SITE SAMPLING AND TEST RESULTS

A Niton XRF, XL-722S was used to assess the waste piles for potential contamination. In Situ testing was performed on the Site per EPA Method 6200. Surface materials 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 waste material was worked to gain a flat surface area on which to set the Niton. The results from this effort are provided below.

No surface water or sediment samples were collected and analyzed during the October 3, 2002 visit.

The following constituents exceeded EPA Region IX PRG industrial levels:

Location	Constituent	Result (mg/kg)	PRG (mg/kg)
Waste Rock	Arsenic*	832	1.6

*Arsenic – for noncancer endpoint, the PRG is 260 mg/kg. For cancer endpoints, the PRG is 1.6 mg/kg.

4.0 SUMMARY

The site consists of considerable workings because of the formation of the mineralization zones of the area. The location of the adits could not be determined other than one located adjacent to the river. Arsenic seems to be the prevalent element of concern as it was the only element detected that exceeded EPA Region 9 PRGs. Based on a literature search, it appears much of the waste rock and processed ore were dumped into the stream. Considering the ore material assayed at 9 pounds of quicksilver per ton and it appears 150 flasks were produced and each flask weighs 43 pounds, it is conceivable that a good majority of the 720 tons of ore material was placed in the river.

5.0 RECOMMENDATION

Based on the In Situ screening of the waste rock pile with the Niton XRF unit, the proximity of the Site to the Oak Grove Fork of the Clackamas River, and EPA's APA Checklist (Appendix A), it is recommended that a Site Inspection (SI) be completed. Also, based on the ODEQ preliminary scoring, this Site ranks high for potential impacts on the environment (Appendix B).

There are no photos of this Site.

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 (Name/Title) October 3, 2002 (Date)

Winema NF, 2819 Dahlia St, Klamath Falls, OR 97601 (Address) 541-219-1201 (Phone)

djboles@fs.fed.us (E-Mail Address)

Site Name: Nisbet Mine

Previous Names (if any): None

Site Location: The Site is located approximately 31 miles southeast of Estacada, OR on FS Road 4630025. The Site is situated adjacent to the Oak Grove Fork of the Clackamas River.

Location Description: Latitude: 45°04'49"N Longitude: 121°58'29"W

Describe the release (or potential release) and its probable nature: There is potential of a release from the Site into the river. The following element exceeded industrial levels of the PRGs, and the results and relevant PRG industrial levels are listed in parentheses:

Arsenic – 832 (1.6 cancer and 260 mg/kg noncancer endpoints)

Part 1 - Superfund Eligibility Evaluation

If All answers are "no" go on to Part 2, otherwise proceed to Part 3	YES	NO
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.

If the answer is "no" to any questions 1, 2, or 3, proceed directly to Part 3.	**YES**	**NO**
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	

If the answers to questions 1, 2, and 3 above were all "yes" then answer the questions below before proceeding to Part 3.	**YES**	**NO**
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.

Suspected/Documented Site Conditions		**APA**	**FULL PA**	**PA/SI**	**SI**
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.

Check the box that applies based on the conclusions of the APA:

( ) NFRAP	( ) Refer to Removal Program – further site assessment needed
(X) Higher Priority SI	( ) Refer to Removal Program – NFRAP
( ) Lower Priority SI	( ) Site is being addressed as part of another CERCLIS site
( ) Defer to RCRA Subtitle C	( ) Other: _____
( ) Defer to NRC	

Regional EPA Reviewer: __N/A_____ _____
Print Name/Signature Date

PLEASE EXPLAIN THE RATIONALE FOR YOUR DECISION:

This Site was given a high priority to perform additional work primarily because impacts to the Oak Grove Fork of the Clackamas River. Refer to Appendix B for additional scoring information provided by ODEQ as to the necessity for additional site characterization. It would also appear based on a literature search, that most of the 720 tons of ore material had been discarded into the river during mining operations

NOTES:

There is no access to the Site since the bridge has failed. Hand tools would be required for soil sampling. A portion of the road is in accessible along the river from mass land movement. It is believed this may have been triggered by the mining operations in the area. Kiggins is located approximately a 1/3 of a mile upstream from Nisbet.

Appendix B

ODEQ
SITE ASSESSMENT PRIORITIZATION SYSTEM

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

SITE ASSESSMENT PRIORITIZATION SYSTEM (SAPS) GUIDANCE & WORKSHEET

Introduction

The Site Assessment Prioritization System (SAPS) is a tool that DEQ's Cleanup Program uses to determine the priority associated with further investigative or cleanup actions needed at a site. A SAPS evaluation results in a numerical ranking that translates into either a low, medium, or high priority for further action(s). SAPS includes 15 site characteristics, grouped into the following general categories:

1. Environmental information about the site and surrounding area;
2. Nature and quantity of hazardous substances at the site;
3. Potential human and environmental receptors; and
4. Evaluator assessment of the site's threat.

Adding scores from each of the 15 individually ranked items results in the total SAPS score. Because a generic scoring process like SAPS can overlook or overstate site-specific factors, the total score may not reflect the evaluator's appraisal of a site's priority. In such cases, the evaluator should justify and document his/her final priority assignment in the narrative portion of the 2-page SAPS scoresheet.

The following is the guidance and worksheet for completing the SAPS scoresheet. For each relevant factor below, determine the appropriate threat category and mark the accompanying numerical value on the SAPS scoresheet. At the same time, fill in the confidence value for that factor. Confidence values provide the site evaluator and other persons reviewing the SAPS scoresheet with information about the quality of the score derived for each factor. When there is little information available to rank a particular factor, use whatever information you do have, as well as your best professional judgment, in assigning a priority.

1. CONTAMINANT ROUTE CHARACTERISTICS AND POTENTIAL TO RELEASE

a. Hazardous Substance Containment

Assess all known mechanisms to contain hazardous substances at the site, including any mitigating measures already implemented. Assign an overall threat value using the highest score among items a(1) to a(5) below. Data sources: file information, interviews with owners/operators, hazardous waste manifests, or permits.

Special Considerations

- *Evaluate intact below-ground containers or tanks as a landfill.*
- *If contaminated materials/soil have been excavated or disturbed and are stored above grade, the contaminated material is to be evaluated as a waste pile.*
- *Evaluate dry wells, drainfields, or leaking underground storage tanks as contaminated soil.*
- *Evaluate a dry surface impoundment as a waste pile.*

a(1): Containers (includes drums, above-ground tanks, non-drum containers, etc.)

Drums are portable containers designed to hold a standard volume (e.g., 55 gallons) of hazardous substances. Tanks and non-drum containers are any stationary vessels for containing

accumulated wastes, which are constructed primarily of fabricated materials (such as concrete, steel, or plastic) and provide structural support; or any portable or mobile vessel in which the hazardous substance is stored or otherwise handled.

HIGH: Evidence of hazardous substance migration from containers (e.g., ruptured, bulging or leaking drums) and secondary containment is not present or is inadequate.

MEDIUM: Evidence of hazardous substance migration from containers but secondary containment is adequate. **OR** No evidence of migration, but containers are in fair to poor condition and secondary containment is not present or is inadequate.

LOW: No evidence of migration; containers in fair to poor condition, but secondary containment is adequate. **OR** Containers properly sealed and in good condition but secondary containment is not present or is inadequate.

NO THREAT: Containers properly sealed and in good condition, with an adequate secondary containment system.

a(2): Landfills

A landfill is an engineered hole in the ground into which hazardous substances have been disposed by backfilling. For this evaluation, secondary containment of intact below-ground containers or tanks (e.g., double-walled tanks or single-walled tanks with external containment) is considered a single liner. Double liners are tanks with corrosion protection AND secondary containment. Tanks retrofitted with an interior lining should be treated as single liners.

HIGH: No liner present or installed liners are defective or failing. Leachate collection system is not present or is not functioning. Run-on/runoff control or cover is not present, or ponded water has been observed on top of landfill. Free/bulk liquids are documented to have been disposed of in the landfill (such as from a tank truck).

MEDIUM: Possible disposal of free liquids in landfill. Unmaintained run-on/runoff control system or cover. **OR** Presence of liner, cover, or leachate collection system unknown.

LOW: Single liner with no evidence of improper installations or failures. Compacted soil or low-permeability cover installed, but with poor or unknown maintenance performed. Leachate collection system present but unmaintained or in unknown condition. Possible disposal of free liquids in the landfill.

NO THREAT: Double liner system with no evidence of improper installation or failure. Maintained, engineered cover without ponding. Engineered, maintained run-on/runoff control system. Maintained, functioning leachate collection system. Free liquids were not disposed of in the landfill.

a(3): Surface impoundments

A surface impoundment is a topographic depression, excavation, or diked area, primarily formed from earthen materials (lined or unlined) and designed to hold accumulated liquid wastes, wastes

containing free liquids, or sludges that were not backfilled or otherwise covered during periods of deposition.

HIGH: Unsound diking with evidence of failure or leakage. Non-engineered, low permeability liner, or liner is defective or failing. Insufficient freeboard (liquid level within 2 feet of top of diking). Observed changes in fluid levels. No cover, but mixing or agitation processes (aeration, spraying, or other circulation process) are present.

MEDIUM: Unsound diking with no evidence of failure or leakage. Presence of liner unknown. Insufficient freeboard (liquid within 2 ft. of top of diking). Observed changes in fluid levels.

LOW: Unmaintained diking but apparently sound. Single liner with no evidence of improper installations or failures. Sufficient freeboard (>2 feet) manually maintained. No evidence of loss of fluid contents. No cover, but no mixing or agitation processes are present.

NO THREAT: Double liner system with no evidence of improper installation or failure. Regularly inspected and maintained diking. Sufficient freeboard (> 2 feet) automatically maintained. No evidence of loss of fluid contents. Maintained cover, which may include enclosure on top of impoundment, floating objects used to decrease surface area, or a floating additive (such as a non-volatile floating liquid) to control evaporation.

a(4): Spills, discharges, and contaminated soil

HIGH: Contamination from liquid hazardous substances; no groundwater and/or product recovery system in place (including leaking underground storage tanks, dry wells, septic drainfields). **OR** Contamination at the surface with no run-on/runoff control or unknown controls at a location where surface slope allows off-site migration.

MEDIUM: Contamination from liquid hazardous substances; a functioning groundwater or product recovery system is in place. **OR** Contamination from solid materials extending to a depth greater than 1 foot. **OR** Surface contamination with no run-on/runoff controls or unknown or unmaintained controls in an area where topography prevents/inhibits off-site migration.

LOW: Contamination in uncovered surficial soils (less than 1-foot depth). **OR** Contamination is present at the surface in an area with maintained run-on/runoff controls. (Note: storm drains that discharge to surface water without treatment are not runoff controls).

NO THREAT: Release has been cleaned up to background levels, based on adequate sampling.

a(5): Waste piles

*A waste pile is any **above-ground**, non-containerized accumulation of solid (non-flowing) wastes, including open dumps.*

HIGH: Outdoor, uncovered waste pile without a liner or base. No run-on/runoff control.

MEDIUM: Outdoor, uncovered waste pile with a liner or base and run-on/runoff control. **OR** Outdoor waste pile with partial or unmaintained cover, and the presence of a liner or run-on/runoff controls unknown. **OR** Outdoor waste pile with intact maintained cover, but no liner/base.

LOW: Liner is present as a single geomembrane or clay layer. **OR** Outdoor waste pile with intact maintained cover **OR** Waste pile is in a non-intact building (roofed with no walls) or in a three-sided, roofed structure.

NO THREAT: Waste pile is located in fully enclosed, intact building or structure. Double liner or impervious base present. Maintained engineered run-on/runoff control.

b. Depth to Aquifer

The depth to groundwater can affect how quickly a hazardous substance reaches the water table. Depth to groundwater is measured from the bottom of a known hazardous source area or from the deepest extent of known soil contamination to the water table. ***Automatically assign a HIGH priority to verified releases to groundwater that are attributable to the site.*** *Data source: well logs (available over the Internet via GRID) or regional geological reports.*

HIGH: Depth to groundwater 0 - 25 feet

MEDIUM: Depth to groundwater 26 - 100 feet

LOW: Depth to groundwater 101 - 300 feet

With distance to river and probable fractured basalt, presume site groundwater is shallow.

Site lies very near a geologic fault. Presume that local basalt is fractured.

NO THREAT: Depth to groundwater greater than 300 feet, or a regional hydraulic barrier (confining layer) prevents vertical migration of contaminants to groundwater.

c. Distance to Nearest Drinking Water (DW) Well

This distance should be from actual hazardous substance source areas to the nearest drinking water well, not from the center of the site or the property boundary. Do not consider wells that are documented to have been abandoned. ***If the nearest well is located within the contaminated area or is contaminated with a hazardous substance attributed to the site, assign an automatic HIGH priority.***

HIGH: < 0.5 mile to nearest DW well

MEDIUM: > 0.5 - 1 mile to nearest DW well

LOW: > 1 - 2 miles to nearest DW well

NO THREAT: > 2 miles to nearest DW well

Nearest wells appear to be a PGE well at Lake Harriet Campground (presumed Public Supply), about 1.3 miles upstream, and US Forest Service well (presumed Public Supply), about 2.4 miles downstream, but at about 2,100 foot higher elevation than the river.

d. Soil Permeability

Surface soil permeability is a measure of how quickly a liquid can penetrate into the ground. Subsurface soil permeability is a measure of how easily a liquid can move to the water table. Where there is information on multiple subsurface layers, evaluate the least permeable layer if it appears to be continuous under the site, is free of fractures/faults, and is at least 15 feet thick. If this layer is not thought to be continuous or free of fractures/faults, use information on the most

Locally fractured basalt likely associated with nearby geologic fault

prevalent geologic layers influencing transport at the site. ***Use subsurface soil as the evaluation criteria when groundwater is the pathway of concern, and surface soil when surface water is the pathway of concern.*** *When both pathways are of concern, use the criteria generating the highest priority. Where site-specific soil data is not available, use descriptions from the appropriate U.S. Soil Conservation Service soil survey.*

HIGH: **Subsurface soil:** Well-sorted sand, sand and gravel, gravel, highly fractured rock, lava tubes, slightly silty sand, poorly lithified sandstone. **OR Surface soil:** Clay (organic and inorganic), clay loam, rock outcrop, peat, peaty clay.

MEDIUM: **Subsurface soil:** Sandy silt, silty sand, permeable till, clayey sand, cemented sandstone, fractured rock, shale, porous volcanic rock. **OR Surface soil:** Clayey sands, clay/sand mixtures, clayey gravels, clay/sand/gravel mixtures, inorganic silts, clayey silt loam, silty clay loam, porous rock outcrop, sandy silty clay, sandy clay, sandy clay loam.

LOW: **Subsurface soil:** Clayey silt, silty clay, moderately permeable till, silty shale, siltstone, slightly fractured igneous or metamorphic rock, welded/lignified volcanic rock. **OR Surface soil:** Poorly-graded sands with fines, silt/sand mixtures, loam, silt loam, sandy silt loam, clayey sand, sandy clay loam.

NO THREAT: **Subsurface soil:** Unfractured igneous or metamorphic rock (including dense, competent basalt) unfractured shales, claystones, mudstones, clay, slightly silty clay, low permeability till. **OR Surface soil:** Sand, gravel, sandy gravel, well-graded sand, well-graded gravel, gravelly sand, gravelly sandy loam, sandy loam, silty sandy loam.

e. Distance to Surface Water

Distance to the nearest fresh or marine surface water downslope of the area of contamination. Man-made lakes, irrigation canals, or ditches are considered surface waters if they connect to natural surface water bodies. Intermittent streams and playa lakes are also considered surface water. Include the overland flow path when determining the distance to surface water. If surface water discharges to a storm drain, include the distance within the storm drain in evaluating the distance to surface water.

HIGH: < 1,000 feet to surface water

MEDIUM: 1,000 - 5,000 feet to surface water

LOW: 5,000 - 10,000 feet to surface water

NO THREAT: > 10,000 feet to surface water

Site on Clackamas River Oak Grove Fork

Mining wastes in river.

2. HAZARDOUS SUBSTANCE CHARACTERISTICS

a. Source Quantity

The source quantity is the total quantity of materials containing hazardous substances where a release has occurred or could occur. Scoring should be based on the quantity that has been released or could be released, and not the quantity stored. If there is no information on source

quantity, use your best professional judgment in determining whether to assign a low, medium, or high ranking to this item.

***Special Considerations**:*

- *For tanks or impoundments that are periodically filled and emptied, calculate the volumes based on their usage or filled volumes.*

- *For landfills, do not use the actual volume of the landfill when surface water, direct contact, or air are the pathways of concern. Instead, determine the areal extent of the landfill, and multiply by a 0.5-foot depth. When groundwater is the pathway of concern, use the actual volume of the landfill (or estimate volume by multiplying the estimated areal extent by the estimated average landfill depth). If average depth information is unavailable, use a 3-foot depth as the default. If groundwater-to-surface-water discharge is possible, evaluate the site using groundwater pathway conditions.*

- *Estimate areal extent of soil contamination when surface water, direct contact, or air are the pathways of concern. If contaminated soil quantity must be added to other waste quantities on-site, convert to cubic yards by assuming a 0.5-foot depth. Estimate the volume of soil contamination (assume a depth of 3 feet if depth is unknown) when groundwater is the pathway of concern. Consider the following factors when estimating the area of contaminated soil:*

    -- *Areal extent of visible contamination (such as discolored soil or stressed vegetation).*
    -- *Practice that resulted in soil contamination and distribution of site features. (For example, drums of hazardous substances would probably have been emptied onto an open area with easy access rather than an area with physical barriers or overgrown vegetation.)*
    -- *Extent of contamination inferred from site sampling.*

Use these conversions to determine source quantity: 1.5 tons = 1 cubic yard = 4 drums = 200 gallons.

	Cubic Yards	Square Feet
HIGH:	> 625	> 400,000
MEDIUM:	6 - 625	5,000 - 400,000
LOW:	1 - 5	< 5,000
NO THREAT:	No hazardous substances present	

Site mining operations may have processed about 822 tons of ore (based on DOGAMI Bulletin 55 data and inferred assays).

822 tons / 2.32 tons per cu yd = 354 cu yd

b. Toxicity/Persistence

The information needed to complete this section is contained in an internal DEQ hazardous substance database, which is available as a Microsoft Access query.

Human toxicity data are used to evaluate toxicological effects of hazardous substances, through three exposure routes: oral (ingestion), inhalation, and dermal contact. The surface water and groundwater pathways consider oral toxicity. The surface water pathway also considers environmental toxicity. The air pathway considers inhalation toxicity. The direct-contact pathway

considers both oral toxicity and skin absorption effects. Data compiled in the Access database comes from five types of toxicity measurements: acute, chronic, carcinogenicity, developmental/reproductive, and dermal contact. For each hazardous substance, the database gives a score between 1 and 14, based on these measurements. From the database, obtain a toxicity score for the pathway of concern and match it to the appropriate priority below. If more than one pathway is of concern, assign the highest priority.

HIGH:	Toxicity score is 10 or above
MEDIUM:	Toxicity score is between 5 and 9
LOW:	Toxicity score is less than 4
NO THREAT:	No hazardous substances present

	Inhal.	Oral	Contact	Surf. Water
Hg	10	10	10	12
As	11	13	13	9

c. Water Solubility

Use Table 1 below to determine the priority associated with the water solubility (in mg/L) for organic and inorganic substances (other than those shown in Table 2 below). Use Table 2 to determine the priority associated with select inorganic substances (cations and anions). Use the contaminant mobility that gives the highest priority.

***Special Considerations**:*

- ***Assign a HIGH priority, regardless of the compound's solubility, if the substance is present as a free liquid or separate layer in groundwater.***

- *When evaluating petroleum contamination, use the components that are of greatest concern (e.g., BTEX). If constituent-specific analytical data indicate that these substances (one or more) are not present, then evaluate for petroleum components that are present.*

- *If the concentration of a substance in a mixture is known and indicates a higher concentration than the solubility in water, substitute the substance concentration (mg/L) for the solubility (use Table 1).*

- *For chromium, nickel, lead, cobalt, and copper,* ***increase the mobility priority to the next level (e.g., low to medium) if acid leachate (pH <3) is present or the metals are present in solution in liquid hazardous substances (e.g., plating wastes).***

- ***Decrease the mobility priority to the next level (e.g., medium to low) for a metal in areas with alkaline soils (pH >8), if it can be determined that the metal is present in a solid form.*** *This does not apply to selenium and arsenic, which are more mobile under alkaline conditions.*

TABLE 1 - Water Solubility

HIGH:	> 1,000 mg/L unknown	LOW:	1 – 100 mg/L or solubility
MEDIUM:	101 – 1,000 mg/L present	NO THREAT:	No hazardous substances

TABLE 2 - Mobility Priority for Cations and Anions

HIGH:	Aluminum, chromium, thallium, thorium, tin

MEDIUM: Barium, beryllium, cobalt, copper, lead, manganese, nickel, phosphorus

LOW: Antimony, arsenic, boron, bromine, cadmium, fluorine, iodine, magnesium, mercury, molybdenum, radium, radon, selenium, silver, uranium, vanadium, zinc

NO THREAT: No hazardous substances present.

3. EXPOSURE POTENTIAL

a. Groundwater Use

Determine the predominant groundwater use within 2 miles of the site. Data sources: USGS Topographic Maps, DWR's GRID (on-line well logs), Oregon Water Rights Database, OHD's Drinking Water Database.

HIGH: Federally designated sole-source aquifer. **OR** Public supply (greater than 3 connections or 10 users) with no alternate, unthreatened sources available with minimal hookups. **OR** Private supply with no alternate, unthreatened sources available.

MEDIUM: Public supply, but alternate sources are available with minimal hook-up requirements. **OR** Private supply, but alternate sources are available with minimal hook-up requirements. **OR** Groundwater used solely to irrigate food crops or water livestock.

LOW: Groundwater used solely to irrigate non-food vegetation (parks, golf courses, tree farms and nurseries). **OR** Groundwater not used but usable.

NO THREAT: Groundwater not usable (due, for example, to high dissolved solids or brackishness). This does not include groundwater made unusable due to contamination – in such a case, evaluate pre-contamination use(s) of groundwater.

However, wells are unlikely to be affected by site-generated contaminants. Upstream well could be affected by local background mercury levels further upstream.

b. Land Use/Population

Determine the predominant land use within 0.5 miles of the site. Data sources: USGS topographic maps, aerial photographs, site visit/drive-by, city/county zoning maps, Oregon Natural Heritage database, U.S. Fish & Wildlife Service.

Oak Grove Fork is historic bull trout (threatened) habitat. Unclear if mining wastes extend to within 1,000 feet of downstream waterfall.

HIGH: Residential. **OR** Parks, schools, day-care facilities, playgrounds, fairgrounds, public facilities that draw people to the area, or listed threatened/endangered species or critical habitat for threatened/endangered species are present within 1,000 feet of contamination.

Townsend's big ear bats (threatened species) hibernate within adits. Contaminants could affect food

MEDIUM: Rural residential **OR** industrial **OR** commercial. **OR** Presence of *ecologically important* species other than listed threatened/endangered species [see DEQ's "Guidance for Ecological Risk Assessment," Level I, Scoping, Task (4)(b) for definition].

Downstream habitat for threatened (and state-listed endangered) steelhead and salmonids, northern spotted owl (threatened), cold-water corydalis (T&E listing Candidate), tall agoseris (rare; possibly extinct).

LOW: Agricultural and/or minimal working transient population and no residential population. **OR** Presence of ecological receptors other than those listed as threatened/endangered or deemed *ecologically important*.

NO THREAT: Isolated areas with no residential or working transient population, and no ecological receptors.

c. Surface Water Use

Determine the predominant surface water use within 2 miles of the site. Data sources: USGS Topographic maps, Water Rights Database, Oregon Rivers Database, Oregon Natural Heritage database, U.S. Fish & Wildlife Service.

Bull trout (threatened), Chinook salmon (threatened), steelhead (threatened), coho salmon (Oregon-listed as endangered)

HIGH: Surface water used for drinking, or by threatened/endangered species, or as critical habitat for threatened/endangered species within 2 miles downstream of probable point of release.

MEDIUM: Surface water used for significant fishing, food crop irrigation, livestock watering, contact recreation, or by *ecologically important* species other than listed threatened/endangered species [see DEQ's "Guidance for Ecological Risk Assessment," Level I, Scoping, Task (4)(b) for definition] within 2 miles downstream of probable point of release.

LOW: Surface water used for non-food-crop irrigation, industrial, non-contact recreation, or by ecological receptors other than those listed as threatened/endangered or deemed *ecologically important* within 2 miles downstream of the probable point of release.

NO THREAT: Surface water within 2 miles downstream is not used for any purpose, human or ecological. For surface water made unusable due to contamination, evaluate its use prior to being contaminated.

d. Sensitive Environments

Determine the distance to the nearest sensitive environments, which consist of:

- *National Park/Monument, National Marine Sanctuary, National Recreation Area, National Wildlife Refuge, National Forest (campgrounds, recreation area, game management areas, wildlife management areas)*
- *Designated Federal Wilderness Area*
- *Wetlands (freshwater, estuarine, or coastal-5-acre minimum)*
- *Wild and scenic rivers*
- *State Parks*
- *State Wildlife Refuges*
- *Fisheries resources (area necessary for the maintenance of spawning or migratory pathways for anadromous or resident fish species)*
- *State-designated natural areas*
- *County or municipal parks*
- *Habitat for bird species protected under the Migratory Bird Treaty Act*
- *Vulnerable Areas designated for site discovery purposes in DEQ's Cleanup Program*

Within National Forest.

Historic bull trout habitat.

HIGH: A sensitive environment closer than 1,000 feet.

MEDIUM: A sensitive environment between 1,000 and 5,000 feet.

LOW: A sensitive environment between 5,000 and 10,000 feet.

NO THREAT: No sensitive environment within 10,000 feet.

e. Threatened/Endangered Species and Critical Habitats

Determine the distance to the documented or reasonably likely presence of any of the following:

- *Federally listed threatened or endangered species*
- *State-listed threatened or endangered species*
- *Designated critical habitat for a federally listed threatened or endangered species*
- *Designated critical habitat for a state-listed threatened or endangered species*

HIGH: Listed species or habitat within 1,000 feet.

MEDIUM: Listed species or habitat between 1,000 and 5,000 feet.

LOW: Listed species or habitat between 5,000 and 10,000 feet.

NO THREAT: No listed species or habitat within 10,000 feet.

Townsend's big-eared bat (threatened hibernation in adits.

Historic bull trout habitat

f. Direct Contact

Assess the likelihood of outside persons coming into contact with hazardous substances at the site. Direct contact need not be limited to hazardous substances at the surface, but can also include, for example, contact with contaminated drinking water or subsurface soil accessed by utility workers. Data sources: Site files, photographs, site visit/drive-by.

HIGH: Direct contact with hazardous substances is likely (or has been documented).

MEDIUM: Direct contact with hazardous substances is possible.

LOW: Direct contact with hazardous substances is unlikely.

NO THREAT: Direct contact with hazardous substances is not possible.

Photos on internet of individuals handling cinnabar at site

4. EVALUATOR ASSESSMENT OF THREAT

Identify your personal assessment of the threat the site may pose to human health or the environment.

HIGH: Site may pose a great threat, and either has affected, or is affecting, human health, specific environmental targets, or the environment in general.

Mercury in fish tissue at North Fork Reservoir. Possible contributor to reduced salmonid productivity in Oak Grove

MEDIUM: Site may pose a moderate threat by degrading soil, groundwater, surface water, sediments, or air through hazardous substance releases. Minor impacts possible to humans or to environmental targets.

LOW: Site is likely to pose little threat, because no targets are present and contamination is limited to localized degradation of soil and has not caused significant degradation of groundwater, surface water, sediments, or air.

NO THREAT: Site has had no impact on the environment, and poses no threat to the surrounding population or environment.

GENERAL SCORING GUIDELINES

The following are the recommended guidelines for determining a course of action for a site based on the total SAPS score. These priority-assignment numbers are guidelines, and the final decision on a site's further-action priority should take all relevant factors into account, including those documented in SAPS.

SAPS SCORE	RECOMMENDED ACTION
86 – 110	Further Action - High Priority
48 – 85	Further Action - Medium Priority
21 – 47	Further Action - Low Priority
0 – 20	No Further Action*

* Determinations of No Further Action must be approved by the Regional Site Assessment Manager.

USE OF CONFIDENCE VALUES

Assign confidence values of A, B, or C for each of the factors on the scoresheet, according to the criteria listed below. These confidence values provide persons who might later review the scoresheet with information about the levels of certainty with which the evaluator completed it. Whenever possible, use "A" and "B" values; scores based largely on questionable information or conjecture are of little value.

CONFIDENCE VALUE	DESCRIPTION
A	**Information is known**, either from sampling results, research, or because it is accepted knowledge.
B	**A best estimate**, based on at least some knowledge of information relevant to the factor being considered.
C	**An educated guess**, based on little or no information.

SITE ASSESSMENT PRIORITIZATION SYSTEM (SAPS) - SCORESHEET

(To be used with SAPS Guidance & Worksheet Version #5, September 2000)

Site Name: **Nisbet Mine**

Site Address: **T6S/R7E-S5Acdab (Clackamas River Oak Grove Fork – River Mile 4.40)**

ECSI Number: **3811**

EPA ID Number:

Site Evaluator: **Steve Fortuna : NWR : SAS**

Date: **March 3, 2003**

	HIGH THREAT	MEDIUM THREAT	LOW THREAT	NO THREAT	CONF. THREAT
1. Contaminant Route Characteristics and Potential to Release					
a. Hazardous Substance Containment	(9)	5	3	0	A
b. Depth To Aquifer	(7)	4	2	0	B
c. Distance to DW Well	7	4	(2)*	0	B
d. Soil Permeability	(3)	2	1	0	A
e. Distance to Surface Water	(7)	4	2	0	A
2. Hazardous Substance Characteristics					
a. Source Quantity	9	(5)	3	0	B
b. Toxicity/Persistence	(9)	5	3	0	A
c. Water Solubility	3	2	(1)	0	A
3. Exposure Potential					

a. Groundwater Use	(9) **	5	3	0	A
b. Land Use/Population	(7)	4	2	0	A
c. Surface Water Use	(9)	5	3	0	A
d. Sensitive Environments	(7)	4	2	0	A
e. T&E Species and Critical Habitats	(7)	4	2	0	A
f. Direct Contact	(7)	4	2	0	A
4. Evaluator Assessment of Threat	(10)	5	1	0	A

B – 13 of 15

Add the circled numbers to get the total SAPS score.

Total SAPS score = **99** (out of 110 possible points)

Raw priority associated with score = **H** ((H), M, L)

HIGH: 86 – 110
MED: 48 – 85
LOW: 47 or less (where further site action is needed)

DISCUSSION:

Discuss your overall impression of the threat posed by the site. Include brief discussion of major factors such as potential or known releases, waste quantity, human and environmental targets, and beneficial use(s) of nearby groundwater or surface water. Also discuss relevant factors or considerations not addressed in the SAPS scoresheet. If applicable, explain why the total SAPS score does not reflect the threats the site may pose to human health or the environment.

*** Very unlikely that site contaminants would directly affect nearby wells.**

**** Very unlikely that wells (Public Supplies) would be affected.**

The most significant concern with this site is that field analyses indicated toxic metals concentrations (As, Hg) that were up to three orders of magnitude greater than DEQ Level II Soil Ecological Risk Assessment Screening Benchmark Values for plants, invertebrates, birds, or mammals. Townsend's big eared bats are known to hibernate in the site's mine adits. Site contaminants could contaminate the bats' food source. The Oak Grove Fork is also historic habitat for bull trout (a threatened species); approximately 0.6 mile downstream, the river provides critical spawning and rearing habitat for threatened Chinook salmon and steelhead trout, and for state-listed endangered coho salmon. The Oak Grove Fork is recognized to have reduced salmonid productivity. There is concern that metals contamination could be contributing to this reduced productivity.

The lower stretch of the Oak Grove Fork also has habitat for the northern spotted owl (threatened), cold-water corydalis (candidate for T&E listing), and tall agoseris (rare; possibly extinct in Oregon). Chinook, steelhead, and coho cannot swim further upstream than a waterfall located about 0.6 mile downstream from the site. However, the full habitat ranges of these other sensitive species have not been defined.

Although as much as 355 cubic yards of ore may have been processed at this site, very little remains at the site. There is concern that mining spoils may have discharged directly to the

FINAL PRIORITY ASSIGNMENT:

☒ Further Action - High Priority

☐ Further Action - Medium Priority

river and washed downstream. The proposed removal of PGE's dam at Lake Harriet could also increase stream flows sufficiently to exacerbate a potential pre-existing sediment contamination problem.

Preliminary fish tissue data gathered by a PGE consultant from North Fork Reservoir indicate that fish within the reservoir are accumulating mercury. Oak Grove Fork discharge to North Fork Reservoir approximately 4.4 miles downstream from the site.

There is concern that site contaminants could be contributing to the observed accumulation of mercury in fish tissue.

Although the Oak Grove Fork has scoured a channel through one of the mercury formations, any potential contribution of mining spoils to pre-existing metals concentrations within the river has yet to be defined. A high priority is assigned to conducting further investigations of metals concentrations in soils around the mine and in surface water and sediments in the Oak Grove Fork upstream and downstream from the site.

☐ Further Action - Low Priority

☐ No Further Action

☐ Refer to _____ for further consideration

☐ Other: _____

LISTING RECOMMENDATION:

☒ Recommend proposal on Confirmed Release List

☒ Recommend proposal on Inventory

☐ Insufficient information to list on the Confirmed Release List

☐ Insufficient information to list on the Inventory

☐ Excluded from listing