

## WAYSIDE

**Property name:** WAYSIDE

**Map number (see Appendix C):** 11

**Mine drainage sample numbers:** LB00-1201 to 1203

**MINFILE number:** 092JNE030

**Date:** September 5, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** overcast and warm

**Regional Office:** Kamloops

**NTS map sheet:** 092J15W

**Location:** 1.5 kilometres north of Gold Bridge, abutting the Gold Bridge Highway. The lower workings are on the west shore of Carpenter Lake.

**Access:** see location

**UTM coordinates:** n/a

**Type of deposit:** Au-quartz veins

**Commodities:** Gold, Silver, Copper, Lead, Zinc, Antimony

**Years mined (open/closed):** 1915-1937

### Mine Workings Inspected:

The infrastructure located and inspected includes the No. 5 portal, 2 waste rock dumps, mill foundations and tailings.

The No. 5 adit is the lowest, most southerly adit of the Wayside workings. The adit was inaccessible as it was gated and locked. The drainage flowing from the adit was sampled.

Situated south of the adit and toward Carpenter Lake is the upper waste rock dump. The waste rock is lithified diorite, argillite and greenstone. The pile is sparsely oxidized. The volume of this dump is in the order of ~2500 m<sup>3</sup>. The face of the dump is naturally revegetated with grasses and some shrubs. The drainage from the No. 5 adit infiltrates the dump.

South of the upper waste rock dump are the remaining foundations of the mill. Some scrap metal is on site.

South of the mill, the sand-sized tailings have been deposited on the shore and in Carpenter Lake. The tailings are subaerially exposed 2m above the lake level. The submerged tailings have eroded into benches. The tailings above the water level are unsaturated. The tailings are oxidized on surface and in the subsurface to a brown-red colour. The depth of the oxidation is unknown. Grass is growing in patches on the tailings. The volume of the tailings is in the order of 10,000 m<sup>3</sup>.

Deposited in a mound on top of the tailings is the lower waste rock dump. The size of the material in the



Photo 15. Wayside adit.

lower waste rock dump ranges from fines to boulders. The fines were sampled. Oxidation of the dump is pervasive and a red-brown colour. Lithologies within the dump include quartz, diorite, argillite and greenstone. A few immature trees growing from the dump and grasses are present around the base. The southern end of the dump toes into the river. The volume of the dump is in the order of  $\sim 2500 \text{ m}^3$ .

### **Mine Drainage:**

The drainage from the No. 5 adit infiltrates the upper waste rock pile. The workings are located on the shore of Carpenter Lake, the receiving watercourse.

### **Observations & Analytical Results:**

The water flow from the No. 5 adit was sparse, about 1 L/min. The field pH = 7.5 and the conductivity = 520  $\mu\text{S}$ . Green moss was growing within the drainage. There was no visible evidence of secondary minerals, precipitates or salts. The drainage was odourless. Samples were taken.

Water quality results are: pH = 8.49,  $[\text{SO}_4] = 94 \text{ ppm}$  and hardness = 194 ppm. Metal concentrations above

the water quality guidelines for aquatic life are As and Fe.

- As is in excess of the water quality guidelines by 1 order of magnitude. There is no dissolved fraction of As in the drainage.
- Fe is only slightly above the water quality guidelines. The Fe in the drainage is purely colloidal/particulate, although Fe precipitation was not observed in the drainage.

See Appendix B for the geochemical data set.

### **Additional Comments:**

Alkaline metal drainage and metal leaching appears to be occurring at Wayside. The concentrations of metals in the drainage are likely attenuated by Carpenter Lake.

There is the potential for localized metal loading into Carpenter Lake from the oxidized tailings and lower waste rock dump.

### **References: See MINFILE**

Property File 092JNE030

## CONGRESS

**Property name:** CONGRESS

**Map number (see Appendix C):** 12

**Mine drainage sample numbers:** LB00-1301 to 1303

**MINFILE number:** 092JNE029

**Date:** September 5, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** sunny and clear

**Regional Office:** Kamloops

**NTS map sheet:** 092J15W

**Location:** at an elevation of approximately 3,000 feet on the north shore of Carpenter Lake

**Access:** 5 km northeast of Gold Bridge

**UTM coordinates:** n/a

**Type of deposit:** Stibnite veins and disseminations; Au-quartz veins

**Commodities:** Gold, Silver, Copper, Antimony, Mercury, Zinc

**Years mined (open/closed):** 1937

### Mine Workings Inspected:

The extent of the mine is greater than the area inspected. The underground workings are about 3 km in total, accessed by 3 adits.

The gated adit is situated at ~2500 feet. The drainage from the adit was diverted to a small pipe and the water was sampled.

The waste rock dump is located down slope of the 2500 ft. portal. The dump is oxidized in patches, primarily within the fines. The oxidized fines comprised ~10% of the dump. Additionally, the waste rock is oxidized a red-brown in the flow path of the drainage. The dump is unvegetated. A series of dumps are

located along the access road to the 2500 ft adit. These dumps were not inspected.

The upper adit was not located.

### Mine Drainage:

The drainage from the lower portal was diverted under the access road and flowed from a pipe on the other side. From the pipe the water drained down the waste rock dump, into the surrounding forest.

### Observations & Analytical Results:

The flow from the lower portal was 1 L/min. Oxidation of rocks in the path of the drainage is moderate and a red-brown colour. The field pH = 7.0-7.5 and conductivity = 830  $\mu$ S. No salts were observed and the water was odourless. Water was sampled directly from the pipe.

Water quality results: pH = 8.53, SO<sub>4</sub> = 279 ppm and hardness = 282 ppm. Arsenic is the only metal above the BC water quality guidelines for aquatic life.

- As is 1 order of magnitude higher than the water quality guidelines and is present as dissolved species.

See Appendix B for the geochemical data set.

### Additional Comments:

Alkaline mine drainage and metal leaching appears to be occurring at Congress.

**References:** See MINFILE



Photo 16. Congress adit (background). The drainage from the adit is draining from a small pipe, located below the tracks.

## BANBURY

**Property name:** BANBURY

**Map number (see Appendix C):** 13

**Mine drainage sample numbers:** n/a

**MINFILE number:** 092HSE046

**Date:** September 6, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** sunny and clear

**Regional Office:** Kamloops

**NTS map sheet:** 092H08E

**Location:** west bank of Henri Creek.

**Access:** access road 3.5 to 4 km west of Hedley

**UTM coordinates:** n/a

**Type of deposit:** Au-quartz veins

**Commodities:** Gold, Silver, Zinc, Copper, Lead

**Years mined (open/closed):** 1937

### Mine Workings Inspected:

Much time was spent exploring the property for the workings. The following components were located:

- 975m backfilled portal with no drainage.
- 800m backfilled portal with no drainage. This portal was located above the main camp.
- main camp with a number of derelict, decaying wood buildings. A large building foundation was

also on site. About a dozen empty cyanide barrels were stacked in one of the buildings. These barrels were from the leach operation conducted at the base of the property in the 1980s.

- water (not mine drainage) is on site. At the camp level a water tank was located.
- decaying mill foundations located on the main access road between the camp and the creek.

At the lowest level of the property, adjacent to the creek, the following was located:

- an accessible old freight train car doubling as storage. In the car were hundreds of bagged samples. A white powder was on the floor, which could potentially be arsenic.
- an old concrete heap leach pad.
- tailings from the leach operation.

Contemporary exploration has been conducted in the area. The heap leach operation was run by Noranda (MINFILE).

**Mine Drainage:** None observed

**References:** See MINFILE

## DIVIDEND-LAKEVIEW

**Property name:** DIVIDEND-LAKEVIEW

**Map number (see Appendix C):** 14

**Mine drainage sample numbers:** n/a

**MINFILE number:** 082ESW001

**Date:** September 6, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** hot and sunny

**Regional Office:** Kamloops

**NTS map sheet:** 082E03W

**Location:** at ~550 m elevation on the eastern slopes of Mount Kruger, 3.75 km southwest of Osoyoos, B.C. Located on Crown Granted claim lots 1589 and 1899.

**Access:** from the town of Osoyoos

**UTM coordinates:** n/a

**Type of deposit:** Au skarn; Polymetallic manto Ag-Pb-Zn; Polymetallic veins Ag-Pb-Zn±Au

**Commodities:** Gold, Silver, Copper, Lead, Zinc, Bismuth, Cobalt

**Years mined (open/closed):** 1907-1949

### Mine Workings Inspected:

The inspection was pre-empted due to health reasons.

At the base of the mountain there is an oxidized waste rock pile. The dump is strongly and pervasively oxidized to a red-orange colour to an approximate depth of 2 cm. The oxidized waste is mostly comprised of fines. The volume of the oxidized dump is in the order of 500 m<sup>3</sup>. The dump was very dry, making the fine

fraction easily transportable by wind. The dump has a very strong sulphur odour.

Located on top of the mountain, is the glory hole. The opening was never inspected. Three unoxidized waste rock dumps cascaded down the slopes from the glory hole. These dumps from a distance appeared unoxidized. At the foot of these dumps were a series of concrete foundations, possibly from the historic mill reported to be on site.

A lot of development and human activity surrounds the mine site. At the foot of the site is a recent housing development. Waste rock from the mine site has been used for terracing the development. To the north of the housing development is a golf course. The tailings are reported to be below the clubhouse. The area around the mine is a popular hiking destination.

### Mine Drainage:

None observed.

### Additional Comments:

Hikers frequent this area. Thus, a principle concern is the hazards to human health and safety related to the mine workings. The use of the heavily oxidized dump material as a fill material in the housing development and the mobility of the oxidized dump fine fraction are environmental concerns.

### References: See MINFILE

Property File 082ESW001



Photo 17. Oxidized waste dump at Dividend-Lakeview.

## SNOWFLAKE (Standard)

**Property name:** SNOWFLAKE (STANDARD)

**Map number** (*see Appendix C*): 15

**Mine drainage sample numbers:** n/a

**MINFILE number:** 082ESW091

**Date:** September 6, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** sunny and hot

**Regional Office:** Kamloops

**NTS map sheet:** 082E04E

**Location:** 2.5 km southeast of Burnell Lake and 3 km northwest of Oliver

**Access:** Fairview-White Lake Road

**UTM coordinates:** n/a

**Type of deposit:** Polymetallic veins Ag-Pb-Zn±Au

**Commodities:** Gold, Silver, Lead, Zinc, Copper

**Years mined (open/closed):** 1961-1962

### Mine Workings Inspected:

Adit No. 2, the lower adit, has decaying boards unsuccessfully barring access. No water was draining from the adit. There were no traces of spring runoff, e.g. salts, precipitates, flow path.

The waste rock dumps are adjacent to Adit No. 2 and are comprised largely of quartz. The volume of the dumps is ~20,000 tonnes. About 10% of the dump is oxidized to a light orange-red colour.

The property has been subject to contemporary exploration.

### Mine Drainage:

None observed

### Additional Comments:

Small scale site with few workings.

**References:** *See* MINFILE



Photo 18. Snowflake adit.

## TWIN LAKES

**Property name:** TWIN LAKES

**Map number (see Appendix C):** 16

**Mine drainage sample numbers:** LB00-1401 to 1403

**MINFILE number:** 082ESW011

**Date:** September 7, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** overcast, cool and windy

**Regional Office:** Kamloops

**NTS map sheet:** 082E05E

**Location:** 2.25 km north of the peak of Orofino Mountain, 14 km northeast of Keremeos.

**Access:** turn off Highway 3A, 20 km south of Penticton and proceed e.6 km south past Twin Lakes.

**UTM coordinates:** n/a

**Type of deposit:** Polymetallic veins Ag-Pb-Zn±Au; Au-quartz veins

**Commodities:** Gold, Silver, Lead, Zinc

**Years mined (open/closed):** 1926-1942

### Mine Workings Inspected:

The workings are extensive and are situated along a network of logging and exploration roads. Exploration activities (trenching and blasting) were evident throughout the entire mine site. The workings south of the old mill site may have been from the neighbouring Grandoro mine site (082ESW010).

Two adits, the Alice adit, located northeast of the mill and an adit east of Summit shaft, were not located.

### 1. Old mill site

Inspected workings around the mill include the tailings, two related waste rock dumps and an adjacent adit.

The old mill is located north of the access road. Remains include old concrete foundations, scrap metal and wood as well as a collapsed wooden structure.

The tailings are deposited south of the road in a heavily forested area. Mature and immature trees grew from the tailings. Plants roots were prolific throughout the subsurface and a healthy layer of topsoil is present. The tailings are coarse (sand sized). A test pit revealed the surface layer of the tailings (~10 cm depth) is light brown and unoxidized. A bright orange-brown oxidized layer persisted until ~ 50 cm depth. The next horizon is a light orange-brown oxidized layer. Intermittent Creek, about 25 m from the road, flows through the tailings. The distance of the stream from the road was ~20-30 m. At the time of the inspection, the creek wasn't flowing but the channel sediments were saturated. The tails near the creek channel progress from a red oxidation colour to a light orange-brown with distance from the creek. At the creek, the depth of oxidation is shallower than the tailings at road. The distribution of the tailings along the roadside is about 1.25 km.

At the east end of the tailings, near the road is a 2 by 2 foot, flooded shaft with a timber frame. The shaft is accessible.

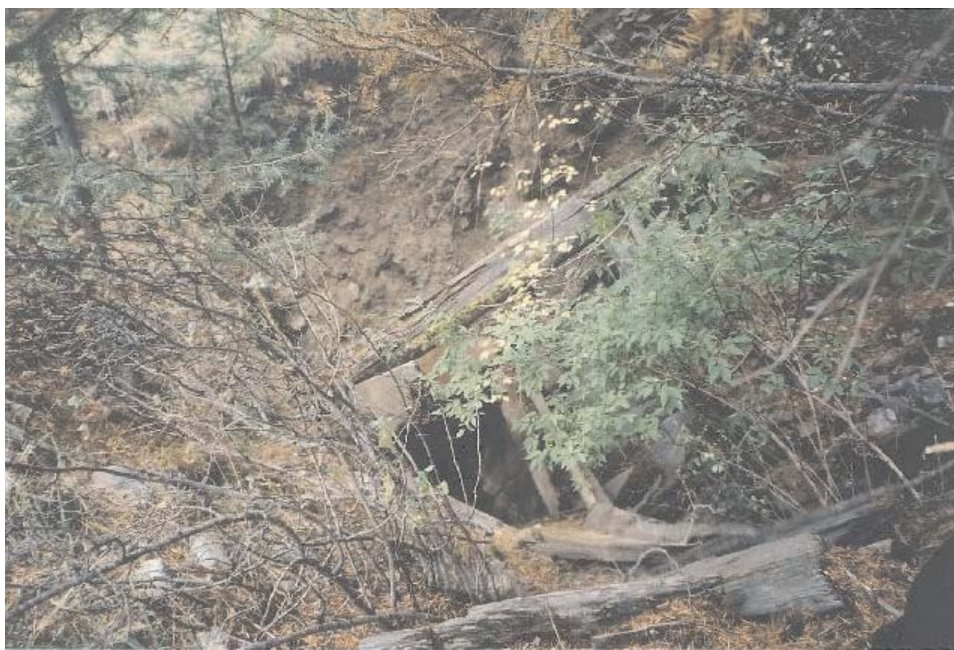


Photo 19. Open, flooded shaft near the glory hole at Twin Lakes.



Photo 20. Twin Lakes mill.

Above the mill to the north is an uncollared adit located in an open cut. The open cut faces are vegetated with grasses but appeared unstable. The portal is fenced off but accessible. Stagnant water was present but not sampled.

The adit has two related waste rock dumps situated immediately down slope. The crest and toe of the dumps are vegetated with grasses and immature trees. The waste rock is gravity sorted: the fines were at the top of the dump and the boulders at the bottom. The dump contained diorite, quartz and greenstone. The waste rock dump is oxidized locally in patches. Other visible dumps were located above but due to time constraints, were not inspected.

## 2. Summit shaft

At this site, the glory hole, a decline shaft, waste rock dump and an old cabin were located. No drainage was observed.

The area surrounding the glory has been roped off. The adit/workings northeast of the glory hole are sunken. The underground workings are accessible.

The waste rock dumps surround the glory hole and other underground workings. The dumps contain minor, patchy oxidation of a red-orange colour. Waste rock lithologies include diorite, greenstone, carbonates and quartz. Visible mineralization includes pyrite. The dumps are relatively unoxidized, likely due to the high carbonate content. Because the workings were caved and the waste rock was scattered, it was difficult to get an estimate of volume.

The decline shaft is partially covered by a caved wooden structure. The shaft was flooded. Access to the shaft is possible.

An old wooden cabin is still standing but its stability is unknown.

## 3. Workings south of the mill (Grandoro mine site?)

These workings located south of the Twin Lakes #4 claim and are possibly part of the historic Grandoro mine site (082ESW010). Two sets of workings were inspected:

### a) Second right after the mill

Workings inspected include 1 adit, 1 waste rock dump and 1 shaft.

The portal is flooded and accessible. About 10 m inside, the adit is caved. The stagnant water inside was not sampled due to the instability of the portal.

The waste rock dump is located east of the adit and contains slightly oxidized disseminated pyrite. The volume of waste is in the order of 5,000 m<sup>3</sup>. The dump lithologies include quartz vein and mafic, fine grain basalts. The size distribution of the waste ranges from fines to 8cm. Numerous mature trees are growing from the top of the dump and dark green moss is prolific. The toe of the dump hosts grasses but the slope is unvegetated.

The open shaft is accessible and not flooded. The depth of the shaft is unknown. White to light green precipitates are visible on the shaft walls.

### b) Third right after the mill

Inspected on site were 3 adits (1 flooded), 1 decline, 1 shaft and waste rock dumps.

The most northeastern adit of the three is located in an open cut and flooded. The portal is partially blocked by slumped material from above but is still accessible. The water was dammed about 5 m beyond the slump, in the open cut. Cattle used this location as a watering hole. The wallrock above the portal is oxidized to a red-orange colour. Water samples were taken at this site near the portal.

A shaft is situated south of the flooded adit. This shaft is probably a source of ventilation for the now-flooded adit.

Southeast of the shaft is an unflooded, accessible decline with a depth of ~40-50 ft. The wall rock is oxidized to a red-brown colour.

West of the decline is an unstable portal with rotting timber supports. The wall rock around the portal is oxidized in patches to a white-green colour.

East of the unstable portal is an uncollared adit. The rock above the portal was ready to fail. There are white-green precipitate/salt on the wall rock, some of which were on the dark green moss growing around the portal. There is also iron oxidation (orange-red)



within these rocks. Internally, the rocks didn't appear to be oxidized.

The waste rock at this site is not in discernible dumps but scattered around. The rocks (quartz, diorite & greenstone) are rich in sulphides but also contain carbonate. The disseminated pyrite in the quartz is weathered to a red colour. The greenstone and diorite are also oxidized in patches. The dump is generally unoxidized, likely due to the high carbonate content.

### **Mine Drainage:**

The mine site was largely devoid of surface drainage.

The 2 flooded adits located south of the mill may have been part of the Grandoro property (082ESW010), not Twin Lakes.

The adit located above the old mill site contained stagnant water, which was not sampled. It is unknown if this drainage flows seasonally.

### **Observations & Analytical Results:**

The flooded adit south of the mill was very turbid. White-green precipitate or salt-like sediment has been deposited in the water. The drainage was sampled.

Water analysis of the flooded adit south of the mill produced the following results: pH = 8.0, [SO<sub>4</sub>] = 81 ppm and hardness = 324 ppm. Metal concentrations above the BC water quality guidelines for aquatic life include Al (total - 0.5 ppm, diss - BDL) and Fe (total - 0.62, diss - BDL).

Al is of the same magnitude as the water quality guidelines; it is only slightly in excess of the 0.1 ppm threshold value. The metal is present in the drainage as colloids/particulate. The white precipitate observed was likely an Al salt or precipitate.

Fe concentration is slightly above the 0.3 ppm water quality threshold. The Fe in the drainage is colloidal/particulate.

See Appendix B for the geochemical data set.

### **Additional Comments:**

Accessible openings throughout property pose human safety hazards.

Mill also processed ore from the neighbouring Grandoro mine.

### **References: See MINFILE**

## WINDPASS/SWEETHOME

**Property name:** WINDPASS/SWEETHOME

**Map number** (see Appendix C): 17

**Mine drainage sample numbers:** LB00-1501 to 1507

**MINFILE number:** 092P 039

**Date:** September 8, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** variable - ranging from sun with clouds, cold and snowy, to cold and foggy. A light dusting of snow was on the ground

**Regional Office:** Kamloops

**NTS map sheet:** 092P08E

**Location:** on a plateau on the southwest slope of Mount Baldie, at the north end of Dunn Lake

**Access:** via a private forestry road on the Cordilleran Ranch

**UTM coordinates:** n/a

**Type of deposit:** Polymetallic veins Ag-Pb-Zn±Au

**Commodities:** Gold, Copper, Bismuth, Silver

**Years mined (open/closed):** 1916-1944

### Mine Workings Inspected:

The inspection of Windpass was cut short as it started to snow, making the access road potentially impassable. Sweethome is at a lower elevation so there was

no threat of snow. In the literature, Sweethome is considered a part of the Windpass mine.

#### 1. Windpass

Windpass is located at an elevation of 5400 ft. An adit, dump and decaying wooden structure (possibly a tram tower) were inspected on site.

The timbered adit is accessible, as the wooden door is no longer attached. The exposed rocks in the open cut leading to the portal are oxidized. The water flowing from the adit was sampled.

The waste rock dump is situated on a slope below the adit. The volume is in the order of 10,000 m<sup>3</sup>. Sparse pyrite and chalcopyrite are hosted in diorite and quartz. 95% of the dump surface is oxidized to an orange-brown colour. The top and slope of the dump are partially vegetated with immature trees and shrubs.

At the toe of the dump is a decaying wooden structure, possibly a tram tower. The tower is unstable. The ore from this site was transported down the mountain to a mill on the lake. The mill was not inspected.

#### 2. Sweethome

The Sweethome workings are located at an elevation of 5000 ft. An adit, corresponding dump and decaying

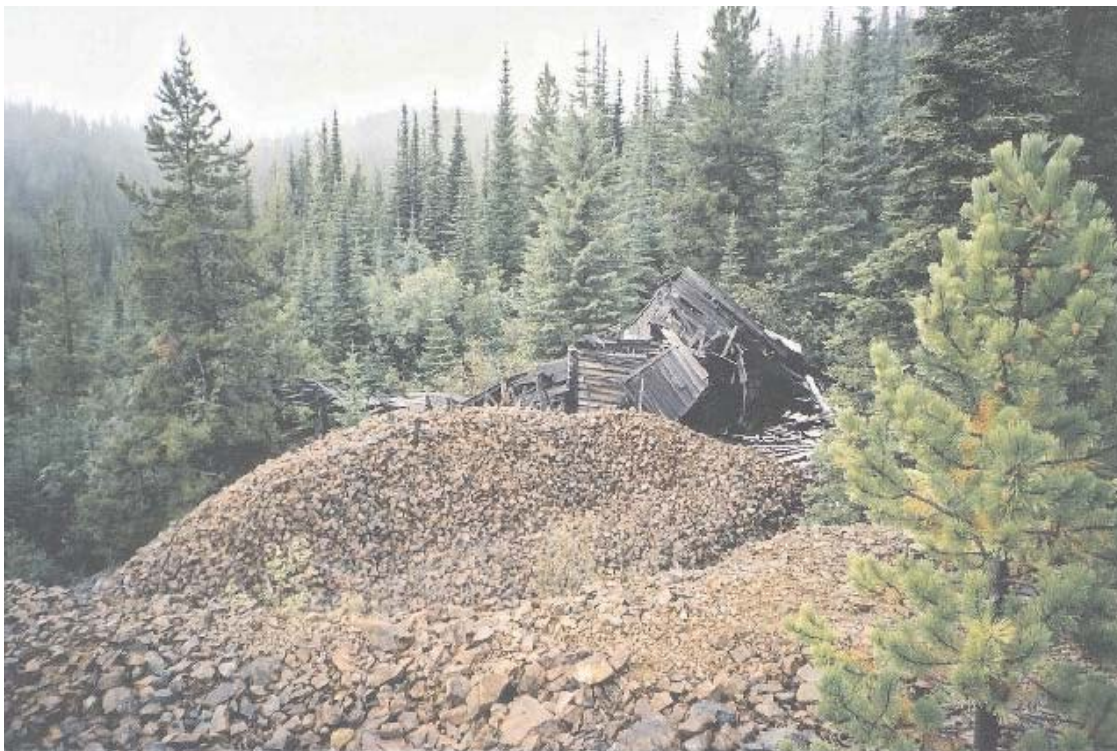


Photo 21. Sweethome dump and decaying wooden structure (tram?).

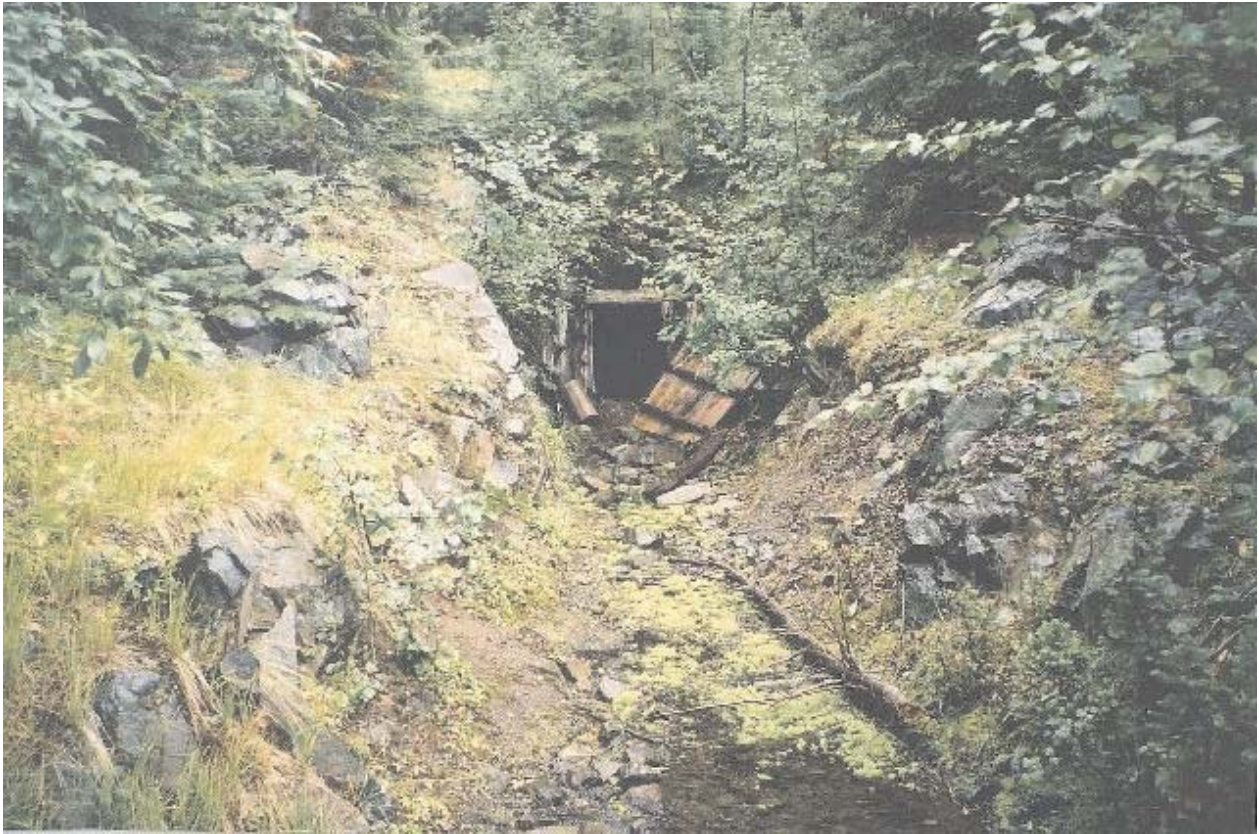


Photo 22. Windpass portal and drainage.

wooden structure, likely a part of the tram, were inspected.

The adit of the Sweethome, situated in an open cut, is accessible. The portal is not timbered. Slumped boulders and timbers partially obstruct the portal. The ground in the adit was dry but there was surface drainage flowing from the portal. Water samples were taken. The wall rock around the portal is oxidized, but less so than at the Windpass portal.

The waste rock dump is situated to the west, down slope from the adit. The volume of material is in the order of  $\sim 10,000 \text{ m}^3$ . The size fraction of the dump ranges from fines to boulders. The dump is oxidized in a few patches to a brown-red colour. Dump material includes milky quartz and diorite.

The mill is reported to be on Dunn Lake. The tailings, according to S. Rothman were placed in a dam/pond and have since been reworked.

## Observations & Analytical Results:

### 1. Windpass

The drainage from the Windpass portal was flowing at a rate of  $\sim 5 \text{ L/min}$ . The  $\text{pH}=5.0\text{-}5.5$  and conductivity =  $300 \text{ s}$ . The water was odourless. A brown-yellow precipitate was present in the water.

Bright green, stringy moss was growing in the flow of the water. Water samples were taken.

Lab results of Windpass adit drainage are:  $\text{pH} = 8.13$ ,  $[\text{SO}_4] = 56 \text{ ppm}$  and hardness =  $123 \text{ ppm}$ . There are no elevated metal concentrations with respect to the BC water quality guidelines for aquatic life.

### 2. Sweethome

The drainage from the Sweethome adit was flowing at a rate of  $15 \text{ L/min}$ . The  $\text{pH} = 5.0\text{-}5.5$  and the conductivity =  $270 \text{ s}$ . Brown and bright green moss were growing in the water.

Water quality results:  $\text{pH} = 8.0$ ,  $[\text{SO}_4] = 88 \text{ ppm}$  and hardness =  $181 \text{ ppm}$ . Elevated metal concentrations above the BC water quality guidelines include Al, Cu, Fe and Mn.

- Al is 1 order of magnitude greater than the water quality guidelines. The Al is colloidal/particulate in the drainage.
- Cu is 1 order of magnitude higher than the water quality guidelines. Both dissolved and colloidal/particulate species are in the drainage.
- Fe is slightly above the water quality guidelines. The Fe is colloidal/particulate.

- Mn is slightly above the water quality guidelines.  
The Mn is dissolved.  
*See* Appendix B for the geochemical data set.

**Additional Comments:**

MINFILE property status is listed as “developed prospect.” This status does not reflect the extent of disturbance on site.

**References:** *See* MINFILE

## HOMESTAKE (Kamad)

**Property name:** HOMESTAKE (L.827)  
(a.k.a. Kamad Silver)

**Map number (see Appendix C):** 18

**Mine drainage sample numbers:** LB00-1601 to 1609  
**MINFILE number:** 082M 025

**Date:** September 8, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** overcast, intermittent rain, cool

**Regional Office:** Kamloops

**NTS map sheet:** 082M04W

**Location:** The workings are on Sinmax and Homestake Creeks.

**Access:** 4.5 km northwest of the head of Skwaam Bay on Adams Lake immediately north of the road.

**UTM coordinates:** n/a

**Type of deposit:** Noranda/Kuroko massive sulphide Cu-Pb-Zn

**Commodities:** Silver, Lead, Zinc, Gold, Copper, Barite, Mica

**Years mined (open/closed):** 1926-1941

### Mine Workings Inspected:

This site was visited in four areas: 1) the lower (west) adit and dump, 2) the Homestake Creek adit and dump, 3) Homestake Creek at the foot of the property and 4) Homestake Creek diversion, located below the Homestake adit.

### 1. Lower (west) portal and dump

The lower portal is located west of the Homestake Creek adit. The phyllitic rocks around the portal are failing. A wooden door blocks access to the adit. The adit is flooded and water is draining from the portal. The water was sampled.

The waste rock dump is about 50 m in length and slopes at ~40 degree angle. The surface weathering of the dump is heterogeneous; the oxidation colours observed include red, yellow and dark red-brown. The degree of weathering also varies along the length of the dump. Disseminated pyrite (0.25 mm) is hosted in phyllite and schistose rocks. Iron weathering in the talc-schist appears to be the primary source of oxidation. A crust 15 cm deep covers the surface of the dump. The depth of oxidation is about 8 cm. Grasses & trees are vegetating the top and the base of the dump. The dump face is too steep to host vegetation. There are silty, saturated orange iron precipitates deposited at the toe of the dump. No direct source of the precipitates was observed.

### 2. East portal and adit on Homestake Creek

Homestake Creek runs through a steep gully. The portal is on the west bank of the creek while the dump is on the east.

The Homestake adit has 2 openings: the main portal, which is timbered with a wooden door, and another small, timbered portal, which is accessible. A rotting, unstable wooden bridge crossing Homestake Creek



Photo 23. Homestake (Kamad) partially flooded upper adit. Homestake Creek flows beneath the bridge leading to the portal.



Photo 24. Homestake (Kamad) lower adit. Note white salts in front of the adit.

to the main portal remains. The adit is dammed and partially flooded with stagnant water. The water was draining from the adit and sampled.

The waste rock dump face slopes at an approximate angle of 35 degrees. The size of the rocks is quite small, ranging from fines to 15 cm. This may be due to the weak and fissile nature of the rocks. The weathering of the dump is differential; some areas are weathered red while others are yellow.

### 3. Homestake Creek at foot of mine property

The creek has been diverted at the foot of the property for irrigation purposes. The creek splits into 2; some of the water continues to flow in the original channel. The pH of the water is 5.5 and the conductivity 380. The rocks within the man made channel are stained red. The natural flow of Homestake Creek is into Siwash Creek, which is a tributary of Adams Lake. Water samples were taken.

The analytical results of the water samples show borderline total concentrations of Fe (0.32 ppm) with respect to the aquatic life WQ concentrations (0.3ppm). The lab pH = 7.9,  $[SO_4] = 36$  ppm and H= 193 ppm.

Stream water should be sampled during freshet. The tailings were not inspected.

## Observations & Analytical Results:

### 1. Lower (west) adit

The water draining from the lower portal was flowing at an approximate rate of 2-3 L/min. At the time of

the visit, the flow from the adit was low as the area of iron precipitate deposition was greater than that of the water flow. A yellow precipitate was also present. The pH of the water was 3.5-4.0 and the conductivity registered as 1,000  $\mu$ S. The water had an iron odour. In the drainage path, black and green mosses and grass were present. The drainage usually runs along the side of the road although this channel was dry during this inspection. Water samples were taken outside of the portal.

The water quality results: pH = 3.35;  $[SO_4] = 7770$  ppm and hardness = 6096 ppm.

- The system is acid generating as indicated by the very high sulphate concentration. Although the buffering capacity is high, the drainage is very acid.

Elevated total metal concentrations with respect to BC water quality guidelines for aquatic life include Al, Co, Cu, Fe, Mn and Zn.

- Al is 2 orders of magnitude greater than the water quality guidelines. The Al is primarily dissolved in the drainage.
- Co is dissolved in the drainage and is 1 order of magnitude greater than the water quality guidelines.
- Cu is 0.02 ppm above the water quality guidelines and is primarily dissolved in the drainage.
- Fe is 2 orders of magnitude higher than the water quality guidelines. The Fe is primarily dissolved although there is a colloidal/particulate component in the drainage.

- Mn is 1-2 orders (variable threshold value) of magnitude higher than the water quality guidelines. The Mn is primarily dissolved.
- Zn is 1 order of magnitude above the water quality guidelines and is primarily dissolved in the drainage.

## 2. Adit on Homestake Creek

The stagnant water dammed in the Homestake adit has a sludge on the surface and is laden with Fe-precipitates. The depth of the water could not be determined. Runoff from the portal is low, about 10 L/min. The water was draining from the downstream corner of the portal only. The downstream rocks were heavily stained red. The pH of the drainage = 3.5. Both above and below the portal, the pH of the stream was 5.5. The drainage smelled strongly of iron.

Water quality results are: pH=3.00, [SO<sub>4</sub>]=1660 ppm and hardness=1132 ppm.

- The system is acid generating, as indicated by the very high sulphate concentration. The buffering capacity is not great enough to neutralize the water, as indicated by the low pH.

Metals in excess of the BC water quality guidelines for aquatic life include Al, Cd, Co, Cu, Fe, Pb, Mn and Zn.

- Al is 2 orders of magnitude greater than the water quality guidelines. The Al in the drainage is dissolved.
- Cd in the drainage is 3 orders of magnitude greater than the water quality guidelines. Cd is dissolved in the drainage.
- Co is primarily dissolved and is one order of magnitude greater than the water quality guidelines.
- Cu is primarily dissolved in the drainage and is 2 orders of magnitude greater than the water quality guidelines.
- Fe is 2 orders of magnitude greater than the water quality guidelines. Fe in the drainage is both dissolved and colloidal/particulate.
- Pb in the drainage is primarily dissolved and is 0.1 ppm above the water quality guidelines.

- Mn is 2 orders of magnitude greater than the water quality guidelines. Mn is dissolved in the drainage.
- Zn is 2 orders of magnitude greater than the water quality guidelines and is primarily dissolved in the drainage.

## 3. Homestake Creek at foot of property

The field pH = 5.5. The rocks had minor iron staining on the surface.

The analytical results of the water samples are: pH=7.9, [SO<sub>4</sub>]=36 ppm and hardness=193 ppm.

- Homestake Creek successfully buffers the acidic drainage from the upper portal.

All metals with the exception of Fe are in compliance with the BC water quality guidelines for aquatic life.

- Fe is 0.02 ppm above the guidelines. The Fe in the drainage is colloidal/particulate.

## 4. Homestake Creek diversion

Downstream from the eastern portal situated on the Homestake Creek, is a stream diversion. The pH of the water is 5.5. Samples were not taken at this site. Red iron precipitates were deposited on the creek bed and the rocks were stained red.

See Appendix B for the geochemical data set.

## Additional Comments:

ML/ARD is evident at this site. Homestake Creek attenuates the drainage from the upper portal. There are freshet concerns for both portals, but especially the upper, flooded portal. The capacity for attenuation of the acid loading from the lower (west) portal is unknown.

Extinguished permit M-094.

## References: See MINFILE

Ministry of Energy, Mines and Petroleum Resources Open Files 1991-1, 1992-9.

## ENTERPRISE

**Property name:** ENTERPRISE (L.651)

**Map number (see Appendix C):** 19

**Mine drainage sample numbers:** LB00-1701 to 1703

**MINFILE number:** 092ISE028

**Date:** September 9, 2000

**Persons present:** Steve Rothman (Mining Division, Kamloops) and L. Barazzuol (Mining Division, Victoria).

**Weather:** overcast, cool and windy

**Regional Office:** Kamloops

**NTS map sheet:** 092I08W

**Location:** eastern shore of Stump Lake, straddling the highway.

**Access:** main road along Stump Lake

**UTM coordinates:** n/a

**Type of deposit:** Polymetallic veins Ag-Pb-Zn±Au

**Commodities:** Silver, Gold, Lead, Zinc, Copper

**Years mined (open/closed):** 1926-1952; 1979-1980 (9 tonnes mined & milled during 1979-1980 - likely exploration)

### Mine Workings Inspected:

The Enterprise mine site straddles a public road. The mill, adit, waste rock and a small volume of tailings are located to the east while the tailings are to the west of the road. At the time of the inspection, the water level of Stump Lake was very high - park picnic tables were underwater. The lake is naturally very alkaline.

The adit is at the most eastern reach of the workings. The portal is 90% backfilled; access is impossible but the inside of the adit is visible. Cold air flows from the adit. Evidence of drainage was not observed. There is minimal oxidation of the backfill material blocking the portal. MINFILE documents the presence of a shaft but this was not located.

Situated below the adit to the east is an extensive waste rock dump. A drainage diversion from the adit(?) has been set up as water drains from a pipe into a barrel buried in the dump. The water overflowed from the barrel and infiltrated the dump. The water was sampled.

The waste rock dump is relatively unoxidized despite the presence of disseminated sulphides (galena, chalcopyrite, pyrite). Surface weathering is patchy. Lithologies in the dump include basalt and quartz vein. The dump slope is ~ 40 degrees. The dimensions of the dump are about 250 m long and 15 m high. The volume of the waste rock material is in the order of 10,000 m<sup>3</sup>. The dumps are gravity sorted; the fines are located at the top of the dump and the boulders at the bottom. Trees and bushes are growing on the top and base of the dump, but not on the slopes.

Concrete mill foundations remain. No equipment was noted. About 15,000 m<sup>3</sup> of processed ore is at the mill site. The ore is strongly oxidized to an orange colour with trace amounts of malachite.



Photo 25. Enterprise mill foundations.





Photo 26. The partially revegetated Enterprise tailings facility (across the road). Dump is in foreground.

The tailings on the west side of the road are located on private property. At the time of the inspection, people were living on the tailings in motor homes and trailers. The tailings extend from the foot of the mill to the waters of Stump Lake. The tailings are oxidized to rust orange-brown, yellow green and blue-green colours. Malachite precipitation is present. The iron weathering of the tailings is inconsistent. The tailings at the foot of the mill and the western extent of the tailings are heavily oxidized on the surface to a bright orange colour. The northeast extent of the tailings is heavily oxidized in the subsurface to a bright orange-brown colour while the surface oxidation is very minor. The area of the tailings is in the order of 2,000 m<sup>2</sup> and the depth of the tailings on land is up to 2.5 m. Grasses and bushes grow on the tailings

### Mine Drainage:

The drainage, likely originating from the adit, flowed to the surface via a pipe buried in the waste rock dump. The water infiltrated the dump.

### Observations & Analytical Results:

The adit drainage was flowing from at a rate of 3.75 L/min. The field = 7.0-7.5 and the conductivity = 1,000  $\mu$ S. The drainage had an iron odour. The water was sampled for analysis. Medium to dark green moss was sparsely growing within the barrel.

The results from the water analysis: pH = 8.2, [SO<sub>4</sub>]=2910 ppm and H=2213 ppm.

- Sulphate is in excess of the BC water quality guidelines for aquatic life.
- The system is generating acid as indicated by the high sulphate concentration. There is enough buffering capacity available as the pH of the drainage is neutral.

The concentration of metals is within compliance with the water quality standards for aquatic life.

See Appendix B for the geochemical data set.

**References:** See MINFILE

