

LENORA

Property name: LENORA (L.35G)

Map number (see Appendix C): 62

Mine drainage sample numbers: LB00-4501 to 4506

MINFILE number: 092B001, see also 092B002 and 092B003

Date: June 30, 2000 / November 23, 2000

Persons present: Gregg Stewart, Diane Howe and L. Barazzuol (Mining Division, Victoria) / G. Stewart and L. Barazzuol (Mining Division, Victoria) and Greg Carriere (Mining Division, Nanaimo).

Weather: sunny and warm / sunny and warm, raining in morning before inspection

Regional Office: Nanaimo

NTS map sheet: 092B13W

Location: Mount Sicker

UTM coordinates: 442014, 5412923; elevation ~450 m.

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

Commodities: Copper, Gold, Silver, Lead, Zinc, Cadmium, Barite

Years mined (open/closed): intermittently between 1898-1964

Mine Workings Inspected:

1. June 30, 2000

The waste rock dump trends SW-NE and is located on on the foot of a hill. It is primarily composed of fines and is heavily oxidized in patches to orange, red and brown. The volume of the dump is approximately 3,000 m³. The dump is used as a playground for motor bikes and mountain bikes(?). The seepage from the toe of the dump was sampled.

Above the dump was a small adit. It was driven directly into the rock without a collar. The adit appears stable and is not gated.

2. November 23, 2000

It was the first time it had rained recently as winter 2000/01 has been very dry. The purpose for our return trip was to recollect the water samples of the creek and seep at the main waste dump and inspect workings that weren't located in June.

A 1,000 m³ prismatic ore stockpile is located on the road northwest of the waste rock dump. The waste rock is primarily fines and is oxidizing to an orange colour. At the toe along the road is a sluice box/water diversion channel in disrepair. The pH=6.0. The source of this water is unknown.

West of the ore pile along the road are the remnants of a pump station which supplied water to the mine. On site are some large tanks and a concrete foundation and retaining walls.

On the western extent of the road is the tailings pond. The area is ~240 m² with an estimated volume of 500 m³. The tailings are flanked by a clear cut forest block to the west. The tailings are very oxidized in patches to a bright orange colour. The tailings were sampled. A channel has been cut through the tailings by water, exposing the strata. The fate of the eroded tailings is likely out the spillway to lower elevations in the forest. The spillway is located on the western end and is clogged with wooden debris.

Mine Drainage:

Main waste dump contains seeps at the toe. The seep was sampled.

A creek runs alongside of the dump. The creek was sampled although the source of this water is unknown. The mine is in the Nugget Creek watershed, which flows into the Chemainus River (Copper Canyon).

No water was present at the time of the inspection.

Observations & Analytical Results:

1. Stream flanking waste dump

June 30, 2000 - A stream flows along the southwest edge of the dump. The flow rate was ~30 L/min, pH=5.6, conductivity=90 µs and sulphate = <50 ppm.

November 23, 2000 - The stream running along the southwest side of the dump was flowing at a rate of ~20 L/min, slower than in June. The pH=5.0. The water was clear and odourless. No vegetation was growing within the water. Samples were taken for further geochemical analyses. The approximate coordinates for the sample sites is 442014, 5412923, elevation ~450 m.

The geochemical results from the stream water are: pH=7.52, [SO₄]=9 ppm and H= 29 ppm. Elevated metals above the BC water quality guidelines for aquatic life include Cu (primarily dissolved) and Zn (primarily dissolved).

- Cu is 1 order of magnitude greater than the water quality guidelines. The Cu in the drainage is dissolved.

- Zn is 1 order of magnitude higher than the water quality guidelines. The Zn is dissolved in the drainage.

2. Waste dump seep

June 30, 2000 - The dump was seeping at the southwest toe. The field pH = 5.1, the conductivity = 800 μ s and the sulphate = >200 ppm. The seep was sampled but not analyzed. Lichen was growing in the area of the seep. White precipitates/salts were also noted.

November 23, 2000 - A test pit was dug in at the southwest toe of the waste rock dump to collect seepage. Although seepage was present, water was flowing through the dump at a slower rate than in the summer (it took a few minutes to fill the pit). The pH=4.0. Green, red and brown lichen was growing in the seepage areas. The seep water was very turbid and odourless. The seep was sampled for further geochemical analyses.

The geochemical results are as follows: pH=4.75, $[SO_4]=470$ ppm and H=372 ppm.

- dump is acid generating as indicated by the pH and sulphate concentration, although there are carbonates buffering the system.

Metals in excess of the BC water quality guidelines for aquatic life are Al (both dissolved and colloidal fractions), Cd (primarily dissolved), Cr (colloidal) Co (dissolved), Cu (dissolved), Fe (colloidal), Pb (primarily total), Mn (primarily dissolved), Ag (colloidal) and Zn (primarily dissolved).

- Dissolved Al and colloidal/particulate Al are 2 and 3 orders of magnitude above the water quality guidelines respectively.
- Cd is 4 orders of magnitude above the water quality threshold concentration. Cd is dissolved in the seep.
- Cr is 1 order of magnitude above the water quality guidelines. Cr is colloidal/particulate in the seep.
- Co is 1 order of magnitude above the water quality guidelines. Co is dissolved in the seep.
- Cu is 3 orders of magnitude above the water quality guidelines. The Cu is of dissolved species in the seep.
- Fe is 2 orders of magnitude above the water quality guidelines. Fe is colloidal/particulate in the seep.
- Pb is 1 order of magnitude greater than the guidelines. The Pb in the seep is primarily colloidal/particulate.
- Mn is dissolved in the seep and is slightly above water quality guidelines.
- Ag is 2 orders of magnitude above the guidelines. Ag in the seep is colloidal/particulate.
- Zn is 2 orders of magnitude above the guidelines. The Zn in the seep are dissolved species.

The dump is ML/ARD. The high concentrations of metals may reflect the first fall rainfall event of the season, which may flush salts from the dump.



Photo 74. Lenora waste rock dump. The drainage flowing over the dump and seeps was sampled.



Photo 75. Oxidized subsurface of the Lenora tailings.

See Appendix B for the geochemical data set.

Additional Comments:

ML/ARD is a concern for the waste dump. The drainage flowing over the dump is high in dissolved Cu and Zn. The dump is seeping dissolved Al, Cd, Co, Cu, Mn and Zn. The drainage was sampled on the first heavy rainfall of the season.

Further studies warranted.

The Tye workings are directly east of the Lenora workings on Mount Sicker.

References: See MINFILE

TYEE

Property name: TYEE (L.36G)

Map number (see Appendix C): 63

Mine drainage sample numbers: n/a

MINFILE number: 092B002, see also 092B001 and 092B003

Date: June 30, 2000

Persons present: Gregg Stewart, Diane Howe and L. Barazzuol (Mining Division, Victoria).

Weather: sunny and warm

Regional Office: Nanaimo

NTS map sheet: 92B13W

Location: Mount Sicker, centred on Crown Granted Lot 36G

Access: Mount Prevost road from Hwy. 18

UTM coordinates: n/a

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

Commodities: Copper, Gold, Silver, Zinc, Lead, Cadmium, Barite

Years mined (open/closed): 1901-1909



Photo 76. Tyee waste rock dump.

Mine Workings Inspected:

The two waste rock dumps are composed of waste rock and fines. The dump comprised of barite; schist containing disseminated chalcopyrite and calcite; and quartz with disseminate chalcopyrite. Secondary malachite and rusty red-brown oxidation are present. Immature trees are growing on the top and on the lower reaches of the slope. Scrap metal embedded in the dump.

Remnants of building, including bricks and wooden debris are littered on site.

A fenced off shaft with collapsed headframe was on site.

Mine Drainage:

No surface drainage observed.

Additional Comments:

The Tyee workings are directly east of the Lenora workings on Mount Sicker.

References: See MINFILE

RICHARD III

Property name: RICHARD III (L.39G)

Map number (see Appendix C): 64

Mine drainage sample numbers: n/a

MINFILE number: 092B003, see also 092B001 and 092B002

Date: June 30, 2001

Persons present: Gregg Stewart, Diane Howe and L. Barazzuol (Mining Division, Victoria).

Weather: sunny and warm

Regional Office: Nanaimo

NTS map sheet: 092B13W

Location: Mount Sicker, centred on Crown Granted Lot 39G

UTM coordinates: n/a

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

Commodities: Copper, Gold, Silver, Lead, Zinc, Cadmium, Barite

Years mined (open/closed): 1903-1904, 1907



Photo 77. Richard III open shaft.

Mine Workings Inspected:

One collapsed and camouflaged shaft was located at the junction of 2 rough roads. The opening was partially fenced off but still accessible. Exploration drill holes are present in the vicinity. It could not be determined whether the shaft was flooded.

Mine Drainage:

None observed.

Additional Comments:

Small scale site - only 4,903 tonnes of ore mined.

References: See MINFILE

BLUE GROUSE

Property name: BLUE GROUSE (L.32,L.33)

Map number (see Appendix C): 65

Mine drainage sample numbers: n/a

MINFILE number: 092C017

Date: November 23, 2000

Persons present: Gregg Stewart and L. Barazzuol (Mining Division, Victoria), Gregg Carriere (Mining Division, Nanaimo) and two representatives from Timberwest

Weather: pouring rain and cool

Regional Office: Nanaimo

NTS map sheet: 092C16E

Location: south side of Cowichan Lake, 4.8 kilometres northeast of Honeymoon Bay

Access: Access roads from the south or north (mill) side

UTM coordinates: n/a

Type of deposit: Cu skarn

Commodities: Copper, Silver, Gold, Zinc

Years mined (open/closed): 1917-60

Mine Workings Inspected:

Numerous surface opening onsite, including the "Amphitheatre" (caved stope) and the "G" stope. Two portals were on site, of which the 1100 level was accessible. G. Carriere was collaborating with Timberwest, the surface owners and permittees of the E&N Land Grant, to address health and safety issues.

The old mill site contains garbage, scrap wood and metal. Concrete foundations and a small amount of

ore are on site. Water of field pH=5.5 is running under and through the mill site. The source of this water is unknown, and therefore was not sampled.

The waste rock dump is located beneath the 1100 level opening, which served as the ore haulage level. The dump did not exhibit visible oxidation. It is comprised of silicified volcanics containing epidote and no sulphide mineralization. No vegetation is growing on the face of the dump although juvenile and mature trees, lichen and moss are vegetating the top. The estimated volume of the two tiered dump is approximately 2,000 m³. At the foot of the dump is garbage.

The tailings are distributed into 3 separate ponds: the upper, middle and lower. The upper pond contains the original tailings impoundment. Successive erosion has created the bottom two tailing impoundments.

In the upper pond, preferential layering of the tailings causes drainage to flow toward the centre, the location of erosion and the source area for the lower ponds. The eroded gulley is approximately 1.5 m deep and is supporting juvenile trees in the vicinity. The tailings are pervasively oxidized to a red-brown colour containing minor malachite. Where water is pooling on the tailings, it is red. The area is used as a BMX bike course, particularly on the outside edges and in the eroded gulley. A sample of the tailings was taken. UTM coordinates of the upper tailings are: 410972, 5410778, elev'n: 349 m. The area of the tailings is approximately 100 m by 300 m.



Photo 78. Blue Grouse upper tailings facility.



Photo 79. Blue Grouse upper tailings test pit.

The middle tailings are sand sized and are slightly oxidized in a localized area (2 m²) at the upper end, proximal to the upper pond. The depth profile of oxidation was: 0-15 cm oxidized, 15-25 cm unoxidized, 25-32 cm oxidized, >32 cm unoxidized. Overall, the tailings appear unoxidized, likely due to the washing and rinsing during transport. The middle pond has also undergone erosion, leaving a series of mound shaped structures. The area and volume of the tailings is approximately 200 m² and 300 m³ respectively.

The lower tailings are located along the road and have been deposited in a channel. The tailings appear unoxidized.

Mine Drainage:

Surface drainage entrains and transports tailings.

Surface drainage was observed at mill although the source of this water is unknown.

Additional Comments:

The site has a number of health and safety issues related to openings. Tailings pose potential environmental problems.

References: See MINFILE

- of Fisheries and Oceans. WLAP and MABC have viewed the Historic Mine Sites project presentation.
- Another field season of site inspections will better position the Ministry to develop an accurate list of high priority historic sites.

