

Very pronounced north-northwest-trending air photo lineaments transect the map-area. There is little if any apparent offset associated with these structures, although layering attitudes are sometimes disrupted across them.

## **MINERALIZATION**

Showings of pyrrhotite, pyrite, and sphalerite occur along a horizon (unit 1), known as the Ledge, for a distance of over 5 kilometres (Assessment Reports 12 and 66). The mapping of the most western part of the Ledge horizon (Fig. 1) indicates that it is in the core of an antiform. Here the Ledge is not a distinct layer, but rather a succession of rocks folded back on itself.

Sulphide mineralization in the Ledge horizon most commonly consists of massive coarse-grained pyrrhotite and sphalerite with minor pyrite, and less commonly, of finer grained disseminated sulphides.

## **SELECTED BIBLIOGRAPHY**

Assessment Reports 12, 66.

Minister of Mines, B.C., Ann. Rept., 1964, p. 130; 1965, p. 196; 1966, p. 218.

Reesor, J. E. and Moore, J. M. (1971): Petrology and Structure of the Thor-Odin Gneiss Dome, Shuswap Metamorphic Complex, British Columbia, *Geol. Surv., Canada*, Bull. 195.

**FX, FC, COLBY (82L/10)**

## **INTRODUCTION**

The Colby Mines Ltd.'s property is located 48 kilometres by road east of Enderby, 15 kilometres north of the Shuswap River and just east of Kingfisher Creek. The property straddles a low northeast-trending hill between Kingfisher Creek and a tributary of Kingfisher Creek to the southeast. Mineralization consists of sphalerite, pyrite, pyrrhotite, and minor galena in marble, quartzite, and calc-silicate gneiss units. These units have been traced 7 kilometres over the length of the property, with mineralization restricted to five zones: (1) the Mile 8 showing, (2) the Dakota zone, (3) the Central zone, (4) the Cominco showing, and (5) the Mile 12 showing (Fig. 3).

Since acquiring the property in 1973, Colby Mines Ltd. has carried out linecutting, trenching, and some stripping; magnetometer, electromagnetic, and geochemical surveys; geological mapping; and approximately 1 830 metres of diamond drilling.

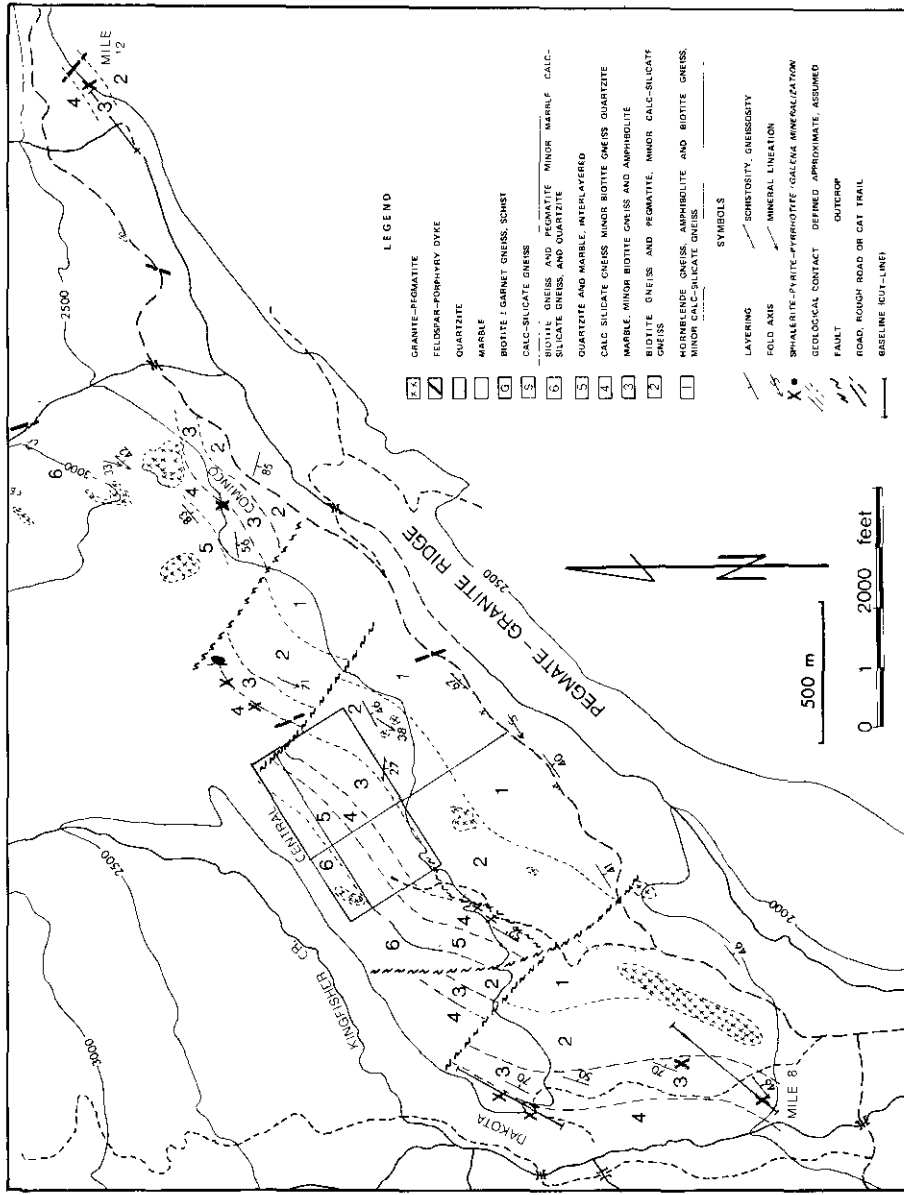


Figure 3. Geology of the Colby Mines area.

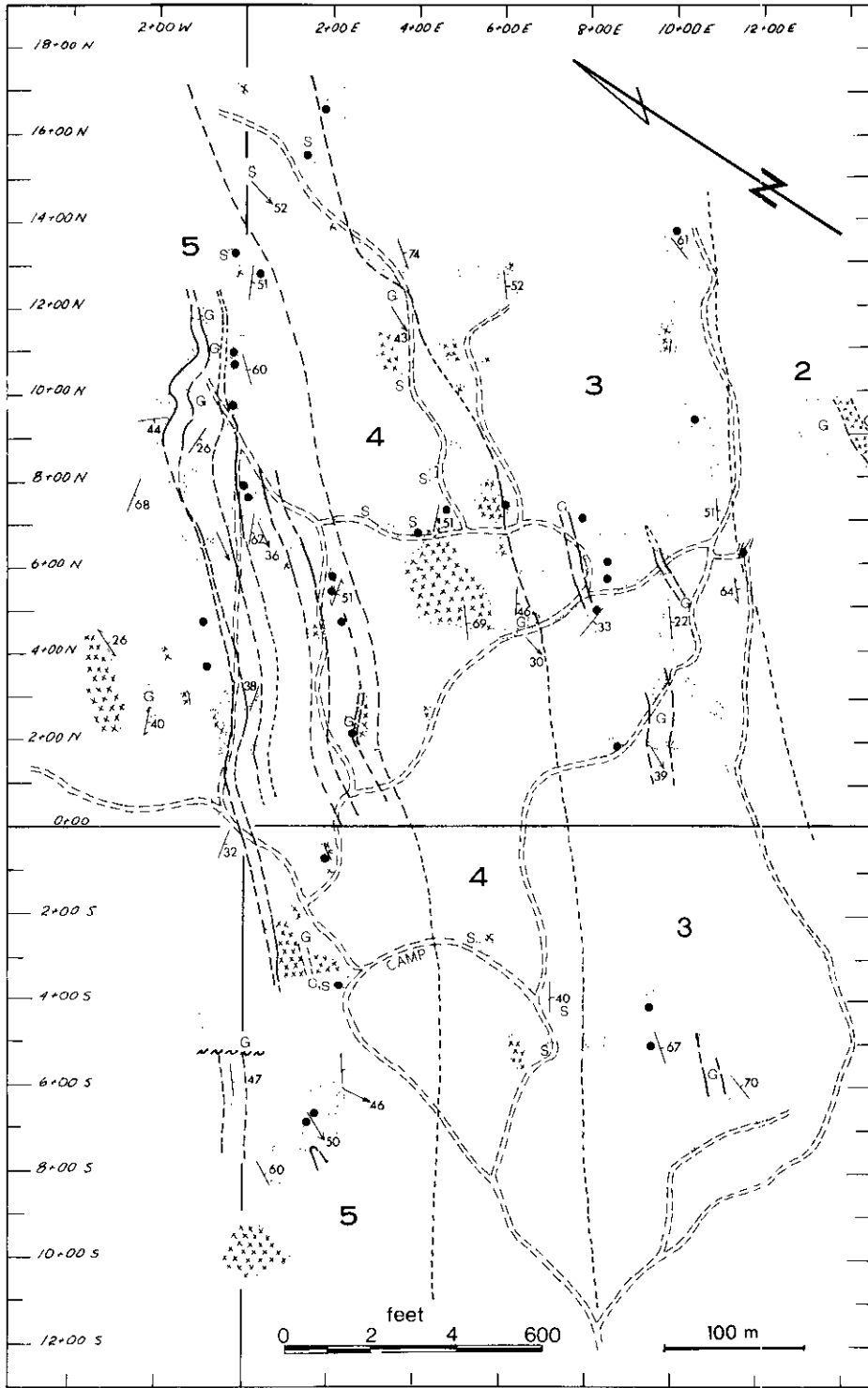


Figure 4. Geology of the Central zone, Colby Mines area (for legend, see Fig. 3).

## GEOLOGY

### Regional Setting

The property is within the Shuswap Complex, a belt of high-grade metamorphic rocks in the Columbian orogen of southeastern British Columbia. The area has been mapped on a regional scale by Jones (1959) and is on the eastern edge of a large area studied by Okulitch (1974). These authors assign rocks in the area to the Monashee Group, a heterogeneous package of probable Proterozoic and Early Paleozoic age comprising granitoid gneiss, augen gneiss, sillimanite-bearing schist, and prominent marble and quartzite layers.

### Local Geology

Rocks within the map-area have been divided into six metamorphic units and two intrusive units. The sequence of metamorphic units may represent an originally conformable package of sedimentary rocks, though it is not known whether unit 1 or unit 6 is the older.

Unit 1, exposed in road cuts along the southeastern edge of the property, consists of hornblende gneiss, garnet-biotite gneiss, and some calc-silicate gneiss. The hornblende gneiss grades to amphibolite with increasing amphibole content. It consists of interbanded dark amphibole-rich layers with lighter feldspar and calc-silicate-rich layers.

Unit 2 consists of rusty weathering garnet-biotite-sillimanite gneiss and minor amounts of calc-silicate gneiss. Granite-pegmatite bodies, up to several hundred metres in diameter, commonly intrude unit 2.

Unit 2 is underlain by unit 3, a massive white marble up to several hundred metres thick. The marble consists of coarse-grained calcite with minor amounts of diopside, dolomite, tremolite, and/or quartz. Included in the marble are a number of discontinuous layers of garnet-biotite gneiss and hornblende gneiss. The most significant mineralization in the Central zone, and all the mineralization in the Mile 12 and Mile 8 showings are hosted by unit 3.

Unit 4 is a heterogeneous unit comprised predominantly of calc-silicate gneiss, but including rusty weathering to clean white marble, garnet-biotite gneiss, minor quartzite, and minor amphibolite. The calc-silicate gneiss is generally fairly coarse grained, light grey-green in colour, and composed of diopside-quartz or diopside-actinolite-quartz with varying amounts of feldspar, calcite, epidote, and/or garnet. The quartzite is commonly calcareous and contains scattered diopside grains throughout. The calc-silicate gneiss, quartzite, and marble of unit 4 host sulphide mineralization in the Central zone as well as in the Dakota and Cominco zones. This unit is not exposed at the Mile 8 or Mile 12 showings.

Unit 5 is well exposed in the Central zone (Fig. 4) and along strike southwest of this zone. It consists of fairly pure white marble interlayered with quartzite. Included in the quartzite are some garnet-biotite gneiss layers, and along the quartzite-marble contacts, coarse-grained calc-silicate gneiss. The more impure quartzite of unit 5 (those containing diopside and/or feldspar) may be mineralized with sulphides; one of the most continuously mineralized sections in the Colby area is a zone in a quartzite which follows the baseline from approximately 7 + 00 N to 11 + 00 N (Fig. 4).

Unit 6 includes all rock units west of unit 5. It is only exposed in the western part of the Central zone, due southwest of the Central zone, and north of the Cominco zone (Fig. 3). This unit consists dominantly of medium to coarse-grained garnet-biotite gneiss which is intruded by many granite-pegmatite sills and dykes. Some white quartzite, marble, and rare calc-silicate gneiss layers occur in unit 6.

Units 1 to 6 are intruded by numerous granite-pegmatite and aplite dykes, sills, and irregular stock-like bodies. These range in size from small discontinuous sills a few metres in length to almost equi-dimensional stock-like intrusions several hundred metres in diameter. The pegmatites are generally massive; only rarely do they have a conspicuous planar fabric (which is defined by a preferred orientation of micas). They are composed of feldspar and quartz with lesser amounts of biotite, muscovite, and garnet.

A number of north-trending quartz feldspar porphyry dykes also cut across the layered rocks. These dykes are generally 5 to 10 metres in width and have dark, finer grained chill margins.

## **Structure**

The structure of the Colby Mines area is dominated by four northwest-trending faults (Fig. 3). These separate the layered rocks into five distinct blocks. The apparent movement of the faults is right lateral strike slip with displacement ranging from approximately 100 metres to 700 metres.

A fifth fault which trends northeast is inferred to cut out unit 3 southwest of the Central zone (Fig. 3). The prominent marble in the Central zone is not recognized to the southwest where biotite-garnet gneiss of unit 2 contacts calc-silicate gneiss of unit 4.

These faults cut across an earlier mineral foliation which strikes north-northeast and dips at varying angles to the southeast. This foliation is everywhere parallel or almost parallel with layering. Mineral lineations contained within the foliation plunge to the southwest.

Macroscopic folds were not recognized in the Colby area, though two types of mesoscopic folds are common. The first type is typically tight to isoclinal and plunges to the southwest, parallel to the mineral lineations. The second type is more open and has a more variable attitude, though generally also plunges to the southwest. It is not always possible to distinguish between these minor fold types.

## **Mineralization**

Mineralization in the Colby area is restricted to five main zones. These are called the Mile 8 showing, the Dakota zone, the Central zone, the Cominco showing, and the Mile 12 showing (Fig. 3). All but the Cominco showing have a clearly marked grid cut and flagged across them.

Mineralization in marbles consists of dark, medium-grained sphalerite, with varying amounts of pyrrhotite and minor pyrite disseminated through a medium to coarse-grained white calcite matrix. Galena is also common, though much finer grained and more widely scattered.

Mineralized quartzites almost invariably contain calcareous minerals as an accessory. Dark sphalerite with pyrrhotite is generally concentrated in thin layers or defines the foliation in the quartzite. Galena is more common than in the marbles, though it is always less concentrated than sphalerite. Very commonly the mineralization in the quartzites has been concentrated in the hinge zones of minor folds, and less commonly in local brecciated zones.

Mineralization in calc-silicate gneiss shows gradational features between that in marble and that in quartzite. Sphalerite, pyrrhotite, pyrite±galena may be evenly distributed through a coarse-grained calcite-diopside rock or may tend to concentrate in layers in a more quartz-rich rock.

In general, mineralized sections in quartzites are of lower grade but are more continuous along strike with the layering than those in marbles. Discontinuous high-grade pods are common in the marbles.

### *Mile 8 Showing*

Sulphide mineralization in marble (unit 3) is exposed intermittently for a distance of 130 metres along layering strike at the Mile 8 showing. The maximum exposed width of the mineralized zone is approximately 2 metres. Two 'grab' samples from a small pit assayed: (1) lead, .04 per cent; zinc, .34 per cent and (2) lead, .70 per cent; zinc, 7.7 per cent.

The next outcrops of marble, approximately 300 metres to the north, contain two small mineralized pods.

### *Dakota Zone*

Mineralization in the Dakota zone is in calcareous quartzite of unit 4. A quartzite intermittently exposed over a length of approximately 400 metres contains spotty sphalerite and galena along its contacts with calc-silicate gneiss and marble. The

mineralized sections are generally of low grade and are narrow with a maximum width of 1 to 2 metres.

### *Central Zone*

Mineralization in the Central zone is in marble of unit 3 and calc-silicate gneiss and quartzite of units 4 and 5.

One of the largest mineralized sections in the marble of the Central zone occurs at approximately 6 + 00 N – 8 + 00 E (Fig. 4) where a zone up to 3 metres wide and 15 metres in length contains coarse-grained sphalerite and pyrrhotite. A .65-metre chip sample from this zone assayed: .31 per cent lead and 7.2 per cent zinc; and a 'grab' sample: .27 per cent lead and 6.3 per cent zinc. Approximately 30 metres to the north a trench exposes siliceous and very rusty marble with minor mineralization, and 15 metres to the south, mineralized blocks of marble are exposed in a blast pit.

Calcareous quartzite grading to siliceous calc-silicate rock of unit 4 is mineralized at 7 + 00 N – 4 + 00 E and 15 + 50 N – 1 + 50 E. Both occurrences appear to be fairly restricted in size.

Three of the quartzite layers of unit 5 are mineralized. Outcroppings of the central of these layers (Fig. 4) indicate that in this layer the mineralization has a strike length of at least 170 metres with widths varying from less than 1 metre to 6 metres. Drill hole data suggest that this zone may be continuous with a zone approximately 400 metres to the south where diamond-drill hole 73-3 intersected a 40-metre thick mineralized section grading approximately 3.5 per cent zinc and 1.5 per cent lead. A 20-metre section in this zone averaged 4 per cent zinc and 1.8 per cent lead.

### *Cominco Showing*

A trenched area 1,300 metres east of the Central zone exposes three mineralized zones which have been called the Cominco showings. These zones are less than 1 to 2.5 metres in width and a maximum of 8 metres in length. Mineralization consists of dark sphalerite, pyrite, pyrrhotite, and minor galena in a diopside-rich, rusty weathering marble. This marble is believed to be within unit 4, just to the north of the contact with the marble of unit 3.

### *Mile 12 Showing*

A small outcrop of marble of unit 3 is well mineralized through its entire exposed width (2 metres). The length of the mineralized zone is unknown. Two 'grab' samples from this zone assayed: (1) .98 per cent lead and 11.3 per cent zinc; (2) .49 per cent lead and 5.3 per cent zinc.

## SUMMARY

Mineralization on the Colby property consists of sphalerite, pyrrhotite, minor pyrite, and minor galena in three distinct lithologic units. These include a massive white marble (unit 3), calc-silicate gneiss (unit 4), and calcareous quartzite (units 4 and 5). These units extend the length of the map-area, but are offset by four northwest-trending strike slip faults. Large areas underlain by units 3, 4, and 5 are covered by overburden and have not been adequately tested.

## BIBLIOGRAPHY

Assessment Reports 578, 579, 2169, 4933, 4934, 4945.

*B.C. Dept. of Mines & Pet. Res.*, GEM, 1969, p. 298.

Höy, T. (1974): Zinc Deposits, Southeastern British Columbia, *B.C. Dept. of Mines & Pet. Res.*, Geological Fieldwork, 1974, pp. 7, 8.

..... (1975): Kingfisher, Bright Star, *B.C. Dept. of Mines & Pet. Res.*, GEM, 1974, pp. 91-94.

Jones, A. G. (1959): Vernon Map-Area, British Columbia, *Geol. Surv., Canada*, Mem. 296.

*Minister of Mines, B.C.*, Ann. Rept., 1964, p. 105; 1965, p. 165; 1968, p. 222.

Okulitch, A. V. (1974): Stratigraphy and Structure of the Mount Ida Group, Vernon (82L), Seymour Arm (82M), Bonaparte Lake (92P) and Kettle River (82E) Map-Areas, British Columbia, *Geol. Surv., Canada*, Paper 74-1, Pt. A, pp. 25-30.