820089

ANYOX DEPOSITS

103P5

LOCATION:

90 miles north northeast of Prince Rupert.
60 miles SSE of Granduc Mine
Discovered in late 1800's. Production 1914-1935

OWNERSHIP:

GEOLOGY:

The Anyox deposits consist of twelve massive sulphide lenses, formed over a distance of 10Km in a roof pendant of volcanic and sedimentary rocks near the eastern margin of the Coast Plutonic Complex. The main deposits were the Hidden Creek mine where eight massive sulphide lenses were mined, the largest being approximately 500 X 300 X 100m in size; and the Bonanza mine.

Host rocks for mineralization are "greenstones" of Middle Jurassic age that were derived from a thick succession of pillow lavas, pillow breccias, and possibly dykes with intercalated, thinly bedded marine siltstone units.

The deposits are pipe-to sheet-like lenses of massive pyrite, pyrrhotite, chalcopyrite with minor sphalerite, galena, magnetite, and arsenopyrite in a gangue of quartz, calcite, sericite and minor epidote and garnet. Sulphide bodies have been formed along the contact of pillow lavas and overlying siltstones.

The Anyox may be similar to the Windy-Craggy deposit.

RESERVES:

Pre-production - Hidden Creek Mine et al
25,000,000 1.60% Cu, 0.30oz/T Ag, 0.005oz/T Au.

REFERENCES:

1) Handbook of Strata-bound and Stratiform Ore Deposits 1976 Pg. 89,90.

2) Structural Geology of Canadian Ore Deposits 1948 pp. 125-128.

3) CIM Transactions, Vol. LXIII, 1960 pg. 95.

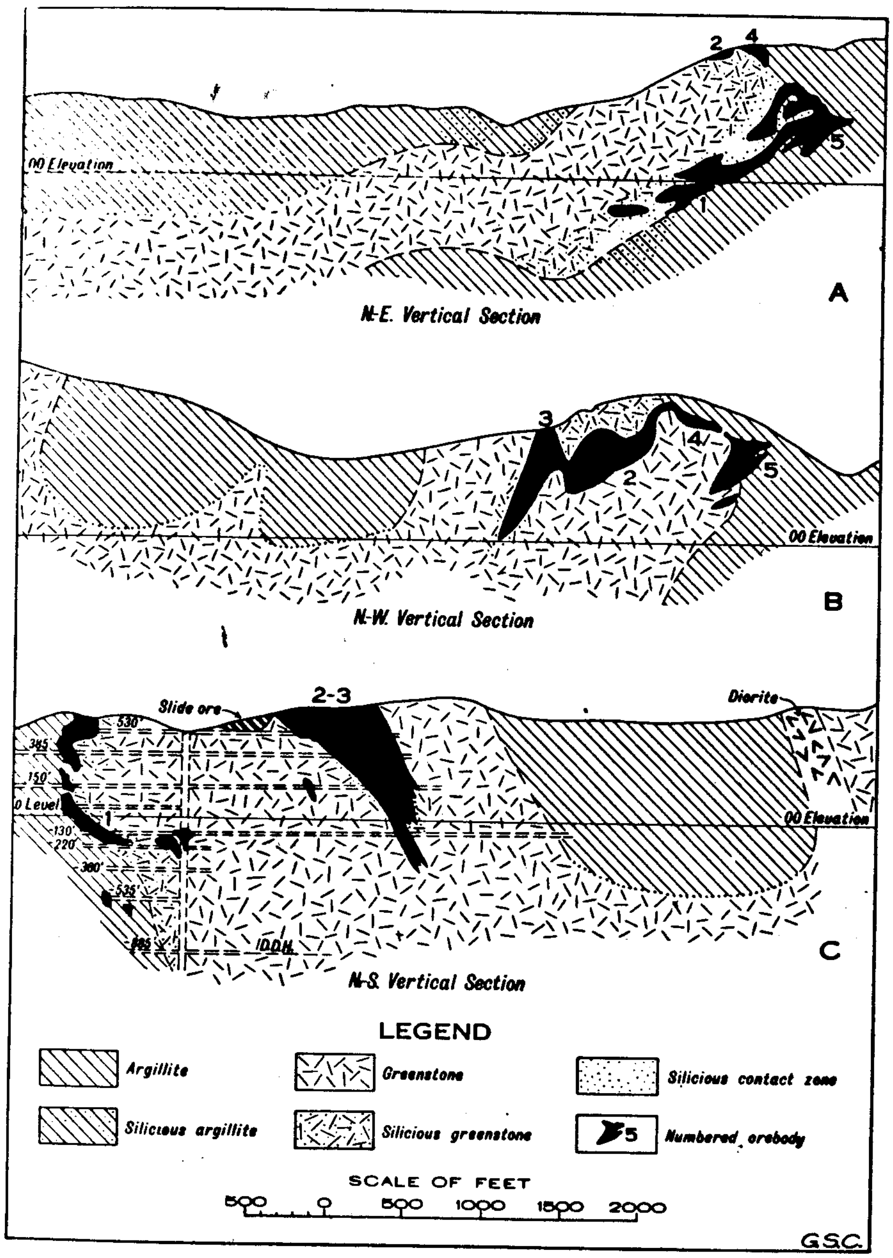

Fig. —Vertical sections, Hidden Creek mine.

It appears that both types of shear-
ebodies along the northeast zone,
The persistent southwest rake of
bly controlled by structure rather
:s. In many stopes there is a pro-
.y due to northwest shearing inter-
zone.

ebodies

the Premier mine extend for 6,700
: zone to the end of the northeast
ı average depth of approximately
;ure. The great length of the ore
persist over a considerably greater
the case. On the other hand, the
d the purple tuff horizon, as sum-
orebodies of any consequence will

has penetrated as far as 400 feet
;h in other places the fine-grained
as 100 feet below the base. In
:pths of 380 feet. Where such a
vall of the purple tuff horizon, the
ld be 480 feet below the footwall
a general rule that the favourable
footwall of the lowest local purple

stope, the purple tuff dips slightly
ıillside. The effect is that, going
odies lie progressively deeper until
ntrusives outcrop on the surface.
ave extended well above the foot-
ient surface, and would have been

odies

t conditions at the east end of the
ıe favourable porphyry is present,
zon. Northeast shearing is known
dicated by the presence of lampro-
ld lie at the top of one of the por-
ntrolled, within the limits given

HIDDEN CREEK MINE

BY N. E. NELSON*

The Hidden Creek mine is about 1½ miles north of the north end of Granby bay, a nearly landlocked body of water on the west side of Observatory inlet, 90 miles north of Prince Rupert, British Columbia.

The main haulage way of the mine at 385 feet above sea-level has been driven north into the somewhat precipitous end of a north-south ridge that rises from the tide flats between the east and west forks of Hidden creek.

The outcrops of the principal orebodies, two prominent bluffs of stained rocks and sulphides, were higher on the face of the ridge and extended from about 530 to 850 feet elevation. North from the bluff tops, the ridge comb rose gradually to about 1,200 feet elevation.

The name of the discoverer and the date of discovery of the Hidden Creek orebodies are probably unknown, but the discoverer is believed to have been an Indian from one of the reservations along Observatory inlet. The deposit was brought to the attention of John Flewin, Government Agent at Post Simpson, near the beginning of the present century. Mr. M. K. Rodgers, developer of the Nickel Plate mine at Hedley, did the first organized work on the deposits. Next the Hidden Creek Copper Company prospected the property. Rodgers acquired the prospect a second time, did more work, and finally in 1910 optioned the property to the Granby Consolidated Mining, Smelting and Power Company, Limited, at that time operating at Phoenix and Grand Forks in the Boundary district of British Columbia. The optionees stepped up the development work and brought the property to production in 1914. The ores were direct smelted until 1924. In that year a mill was built. From 1930 until the end of the productive life of the properties in 1935, all of the ore was milled and the concentrate smelted.

From March 17, 1914, until July 31, 1935, the production from the Hidden Creek mine was, in round numbers, 18,000,000 tons of 1.70 per cent copper ore and 6,000,000 tons of low grade dilution rock.

The Hidden Creek mine "died with its boots on". During 1934 the average monthly production was 146,377 tons of 1.06 per cent copper ore. For 7 months of 1935 the average was 161,750 tons of 1.03 per cent ore, and for the final month, July 1935, the production was 156,950 tons.

The average gold and silver content for some 18,000,000 tons of ore was 0.005 oz. gold and 0.30 oz. silver a ton.

---

*Formerly Geologist, Hidden Creek mine.

Compiled analyses of the ore are as follows:

Type of ore sampled	Tonnage sampled	Cu. Per cent	Insol. Per cent	SiO_2 Per cent	Iron Per cent	Lime Per cent	Sulphur Per cent	Alumina Per cent	Magnesia Per cent
Heavy sulphide.........	6,510,129	2.16	24.6	21.8	30.3	5.6	31.2	3.3	1.3
Siliceous	440,577	0.87	58.8	52.0	15.6	4.7	13.5	6.7	2.6
No. 2..................	2,065,288	2.28	41.1	33.1	30.4	4.4	23.0	9.0	4.8
Mill-ore................	9,386,203	1.27	47.3	38.4	21.9	3.7	16.1	9.0	3.3
Mill-ore 1933...........	1,404,519	1.19	50.2	40.2	20.6	3.9	14.5	9.1	4.4

GEOLOGY

The Hidden Creek orebodies consisted of copper-bearing pyrite-pyrrhotite lenses with siliceous roots, in and around the blunt salient of a prong or spur of altered andesite of McConnell's Bear River formation. The spur, a part of a mountainous mass, invaded a complex series of folds in 'argillite' of Lower Jurassic age. In the upper parts the argillites, or, as locally called, 'the slates', made a cover and footwall for the andesite and the ore lenses. In the lower levels the ore lenses dipped away from the footwall slates and rooted in the andesite or greenstone. The upper parts of the orebodies consisted of heavy, in places almost pure, sulphides, the lower parts or roots of highly siliceous, low-grade, pyritic material. The greenstone-slate mass, 11 miles from east to west and 18 miles long, is surrounded by 'granite' of the Coast Range batholith. The slates in the mine area lie to the east of the greenstone. The contact is very irregular, but has a general north-south trend. The granite outcrops about 3½ miles south of the Hidden Creek mine and about 4 miles east.

FOLDING

In a large way the argillites have a north-south strike with irregular dips. In the mine vicinity the general dip is to the west, but, due to the complex folding, the dips and strikes vary greatly. In an earlier paper (3) the writer explained the structural conditions at Hidden Creek by imagining the original, more or less horizontal, argillite beds as having been compressed from east to west, with the formation of major north-south folds. Later pressure from the north and south tended to bend the folded rocks into a crescent, and in the mine area transverse folds were developed on the westerly limb of an arch whose axis has an east of north and west of south trend. Some of the transverse folds are 'gentle', some are sharp and overturned. Where sharp there is a tendency to over-riding and the structures are complicated. As indicated by the truncation of the slate beds, the ollows:

SiO2 Per cent	Iron Per cent	Lime Per cent	Sul-phur Per cent	Alu-mina Per cent	Mag-nesia Per cent
21.8	30.3	5.6	31.2	3.3	1.3
52.0	15.6	4.7	13.5	6.7	2.6
33.1	30.4	4.4	23.0	9.0	4.8
38.4	21.9	3.7	16.1	9.0	3.3
40.2	20.6	3.9	14.5	9.1	4.4

of copper-bearing pyrite-pyrrho- ›und the blunt salient of a prong Bear River formation. The spur, complex series of folds in 'argil- parts the argillites, or, as locally otwall for the andesite and the :s dipped away from the footwall ıstone. The upper parts of the most pure, sulphides, the lower le, pyritic material. The green- and 18 miles long, is surrounded ı. The slates in the mine area ıtact is very irregular, but has a ıtcrops about 3½ miles south of east.

ɔrth-south strike with irregular ı is to the west, but, due to the greatly. In an earlier paper (3) ıs at Hidden Creek by imagining llite beds as having been com- ion of major north-south folds. h tended to bend the folded transverse folds were developed has an east of north and west of ıre 'gentle', some are sharp and :y to ovėr-riding and the struc- runcation of the slate beds, the

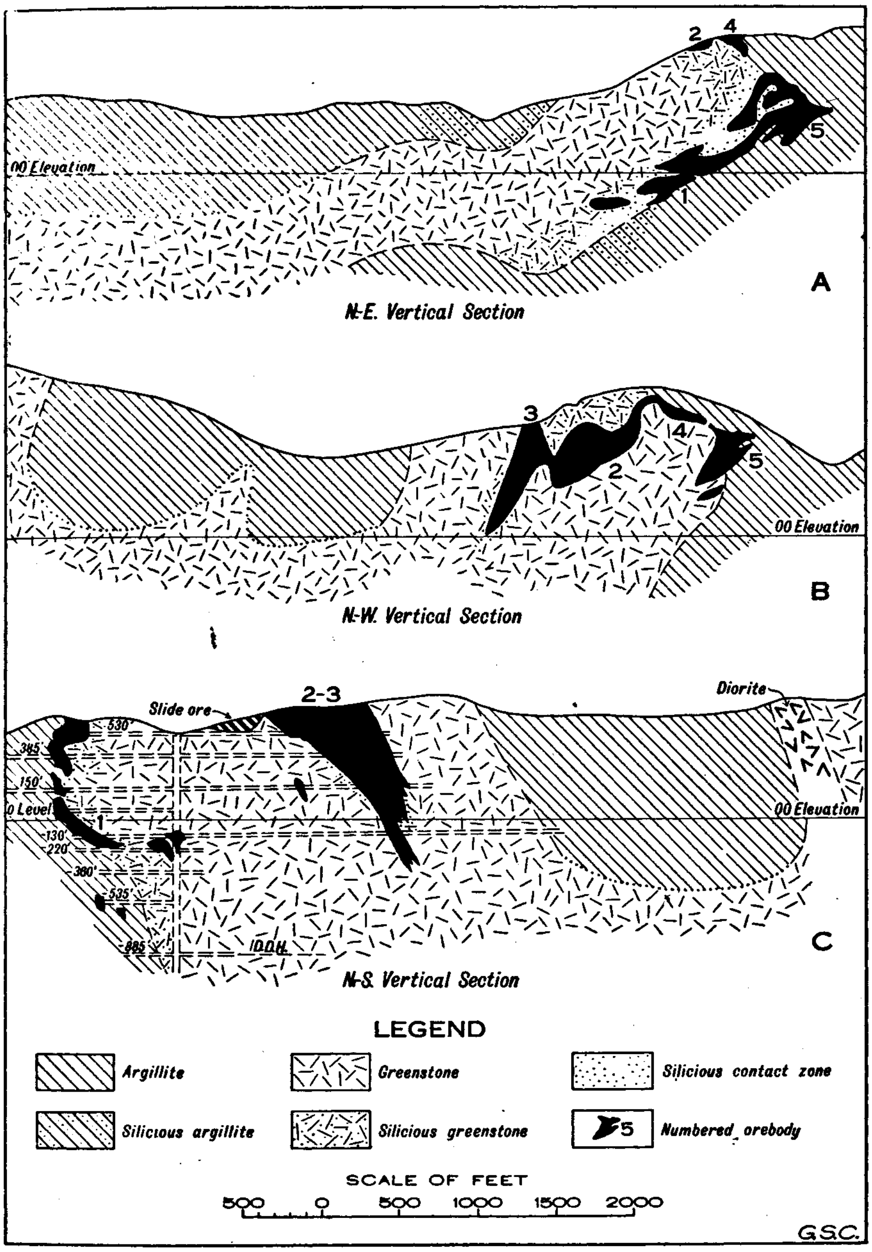

Fig. 1.—Vertical sections, Hidden Creek mine.

greenstone prong invaded the zones of intense deformation and was itself deformed by succeeding strains. The greenstone of the prong was sheared and foliated and finally differentially mineralized by silica, pyrite, pyrrhotite, and chalcopyrite. The silicification of the contact zones, especially in the lower levels, is intense, and the 'weld' is so clean it is difficult to tell where the greenstone ends and the slates begin.

FAULTS

In spite of the intense folding, clean-cut faults are lacking in the mine area, though correlation, if possible, in zones of over-riding or other areas of intense deformation would, probably, show some displacement. A relatively poorly mineralized highly schistose zone between No. 2 and No. 3 orebodies has been regarded as a fault, but it probably results from wrinkling (Fig. 1).

An apparent displacement and brecciated zone in the valley of Falls creek, above No. 1 dam, 1½ miles southwest of the mine, suggest faulting, but the structure was never closely investigated and might have resulted from folding of the Bonanza mine type but more compressed.

DYKES

Over 100 individual dykes were identified in the mine area and many more cut the rocks of the general area. Most of the dykes are less than 3 feet wide, but some are 25 and even 40 feet wide. Some dykes extend for hundreds of yards laterally, and individual dykes cut the rocks of the developed ore zone from the surface at plus 700 feet to the lowest level at minus 885 feet, a vertical range of about 1,600 feet.

Five ages of dykes, at least, are represented. Rock types were noted and classified by Dr. J. A. Bancroft as: "diorites, diorite porphyries, malchites, gabbro-diorite porphyries, diabases, kersantites, bostonites (felsites), minettes, quartz porphyries, aplites, pegmatites, etc." None of the dykes show foliation and all are believed to have been intruded subsequent to the development of foliation and schistosity in the greenstones.

COMPOSITE PLAN AND SECTIONS

A study of the sections (Fig. 1) will give an idea of the shapes of the various orebodies at the levels indicated by figures in the ore outlines. The vertical sections show the lenses and orebodies in section. Where the ore makes against the slate, the boundaries are as clean cut as indicated, but in the siliceous contact zone and in the greenstone the cut-off is not as clean, and mining limits were determined largely by sampling.

REFERENCES

(1) McCONNELL, R. G., Geol. Surv. Can., Mem. 32, 1912.
(2) DOLMAGE, Victor: Geol. Surv. Can., Sum. Rept., 1922, Part *A*.
(3) NELSON, N. E.: *The Hidden Creek Orebodies;* Can. Inst. Min. and Met., Vol. 38, 1935, pp. 349-357.