

PRODUCT COPPER
PRODUIT

PROVINCE OR PROVINCE OU
TERRITORY TERRITOIRE

British Columbia

N.T.S. AREA 93 A/12
RÉGION DU S.N.R.C.

REF. CU 1
RÉF.

NAME OF PROPERTY CARIBOO BELL (BJ)
NOM DE LA PROPRIÉTÉ

OBJECT LOCATED - No. 3 zone.
OBJET LOCALISÉ

UNCERTAINTY Lat. 52°33'13" Long. 121°38'42"
FACTEUR D'INCERTITUDE Lat. Long.

Mining Division Cariboo District
Division minière

County Township or Parish
Comté Canton ou paroisse

Lot Concession or Range
Lot Concession ou rang

Sec. Tp. R.
Sect. Ct. R.

OWNER OR OPERATOR/PROPRIÉTAIRE OU EXPLOITANT

Highland-Crow Resources Ltd.

DESCRIPTION OF DEPOSIT/DESCRIPTION DU GISEMENT

The deposit occurs in an alkalic intrusive complex in the Quesnel Trough, a 35-km-wide northwesterly trending Early Mesozoic volcanic-sedimentary belt of regional extent which is fault-bounded against metamorphic Paleozoic and older rocks to the west and east. The alkalic complex is centrally located in the trough at Bootjack Lake. It intrudes Upper Triassic volcanoclastic rocks, flows and rare limestone which extend from Beaver Creek in the southwest to the northeastern margin of the trough near Likely.

The flows are of two principal types, green augite trachybasalt flows and purple analcite trachybasalt flows. Vaguely banded, green, feldspathic crystal and lapilli tuff forms screens within the Cariboo Bell intrusion and a broad apron occurring to the northwest and east.

The Cariboo-Bell intrusive complex is a tilted multiple laccolith, roughly 6 km long and 2 to 3 km thick at the center, that underlies 25 km² between Trio and Polley lakes. It consists of six lithologically distinct phases, five comprising one or more stacked lenses concordant with the

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Associated minerals or products - Gold, silver.
Minéraux ou produits associés

HISTORY OF EXPLORATION AND DEVELOPMENT
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

The property is located near the west end of Quesnel Lake, the claims covering the area between Bootjack and Polley Lakes. The No. 3 zone lies at approximately 3,800 feet elevation on the southwesterly slope of Mount Polley. The No. 2 zone lies about 1,500 feet east of No. 3 zone.

Mastadon-Highland Bell Mines Limited located the BJ group of 130 claims after a preliminary examination of the area in the summer of 1964. Attention was drawn to the area by magnetic anomalies on Map 1533 G. Reconnaissance geochemical and magnetometer surveys were run that fall.

Work during 1965 included an induced polarization survey of an area east of Bootjack Lake, a detailed geochemical soil survey, and 25,000 feet of trenching.

Cariboo-Bell Copper Mines Limited was incorporated in December 1965 to continue the exploration work. A program of geological, geochemical, and ground magnetometer surveys and diamond drilling was begun. In October 1966 an agreement for further exploration work was reached with three Japanese companies, Mitsui Mining & Smelting Co. Ltd., Sumitomo Metal Mining Co. of Canada Ltd., and Nippon Mining Company, Limited. To the end of the first development stage, in March 1967, diamond drilling totalled 48,301 feet in 123 holes; percussion drilling totalled 6,585 feet in 32 holes. Metallurgical tests indicated the sulphide copper recovery is satisfactory at a very fine grind but that oxide copper is not recoverable using conventional flotation reagents; a substantial portion of the copper content of the indicated reserves occurs as oxides. In June 1967 the Japanese companies abandoned the option to proceed with stage two of the project. Some geological and topographic mapping was done during 1968-69 and additional claims were staked in the Green, Red, and Blue groups for a total of 258 in all.

Leitch Gold Mines Limited purchased the assets of Mastadon-Highland Bell Mines in January 1970. The company name (Leitch) was changed in 1970 to Leitch Mines Limited. Exploration work was resumed in 1970 with Leitch Mines providing the funds. A low-level airborne magnetic survey, detailed geological mapping, geochemical sampling, and approximately 75 line-miles of

see Card 2

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[†]Hodgson, C.J.; Bailes, R.J.; Verzosa, R.S.; Cariboo-Bell; Porphyry Deposits of the Canadian Cordillera, The Canadian Institute of Mining and Metallurgy, Special Volume 15, pp. 388-396, 1976.

Reports of Minister of Mines, British Columbia: 1965, p. 140; 1966, pp. 126-131^{††}; 1967, p. 122; 1968, p. 152.

Mineral Policy Sector; Corporation Files: "Cariboo-Bell Copper Mines Limited"; "Leitch Mines Limited"; "Highland-Crow Resources Ltd."; "E & B Explorations Inc"; "Imperial Metals Corporation"; "Mascot Gold Mines Limited".

Geology, Exploration, and Mining; British Columbia Dept. of Mines: 1969, p. 176; 1970, p. 208; 1971, p. 135; 1972, p. 332; 1973, p. 293; 1975, p. E-126; 1977, p. E 181; 1978, p. E 191.

Geological Fieldwork, British Columbia Dept. of Mines: 1975, pp. 59-64,

Exploration in British Columbia; BCDM: 1979, p. 207; 1980, p. 309; 1981, p. xii; 1982, p. 226.

Geological Association of Canada, Victoria, B.C., May 1983, Field Trip Guidebook, Trip #4.

MAP REFERENCES/RÉFÉRENCES CARTOGRAPHIQUES

Map 3-1961, Quesnel Lake, (Geol.), Sc. 1":4 miles.

#Detailed Geology of the Cariboo-Bell property, Sc. 1":1,660 ft. (approx.), Fig. 3, CIM Spec Vol 15, p. 392.

Geology of the Cariboo-Bell, Sc. 1":1,000 ft., Fig. 22, Report of Minister of Mines, 1966, p. 128, British Columbia Dept. of Mines.

Map 1533 G, Hydraulic, (Aeromag.), Sc. 1":1 mile (1962).

*Map 93 A/12, Hydraulic, (Topo.), Sc. 1:50,000.

REMARKS/REMARQUES

Comp./Rev. By Comp./rév. par	DMacR	JL	DMacR	DMacR			
Date Date	12-78	10-82	12-83	05-87			

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CARIBOO BELL (BJ)

DESCRIPTION OF DEPOSIT/DESCRIPTION DU GISEMENT (continued)

northeast-dipping host strata, and the sixth a breccia which is partly concordant and partly discordant. The order of relative age of phases in the upper part of the laccolith is established as: syenodiorite, monzonite porphyry, intrusion breccia and pyroxenite/gabbro. The relative age of two pseudoleucite syenite lenses at the base of the laccolith is unknown.

Intrusion breccia is the most complex phase of the laccolith and the most important in terms of copper mineralization. With the exception of a breccia on top of Polley Mountain, intrusion breccia occurs in several contiguous bodies peripheral to a syenodiorite lens in the central portion of the property. Fragments of syenodiorite, monzonite porphyry, and volcanic rocks, comprising up to 70 per cent of the intrusion breccia, are contained in a pink fine-grained syenite matrix.

Superimposed crackle breccia consists of a network of irregular veinlets, pods and drusy cavities containing magnetite, chalcopyrite and various alteration minerals. Copper grade is directly proportional to intensity of development of crackle breccia.

Of six copper zones so far outlined at Cariboo-Bell, four are complex intrusion and crackle breccias adjoining a lens of syenodiorite.

The No. 3 zone forms the central, better-mineralized core of a steeply westerly plunging pipe of intrusion breccia. The zone measures 150 to 240 m in diameter and extends to a drilled depth of 275 m.

Zones Nos. 1, 2 and 4 are tabular, sill-like breccia bodies which strike northerly and dip moderately eastward. The largest of these, the No. 2 zone, dips eastward at 10 to 30 degrees and measures 500 m in strike length, 250 m down dip and 150 m in thickness. It has sharp boundaries against the underlying syenodiorite, but is gradational to weakly mineralized monzonite and intrusion breccia in other directions. The No. 4 zone is essentially a northern continuation of the No. 2 zone, separated from it by intrusion breccia which assays below the cutoff grade. The separate zones No. 1 and 6 are crackle breccias in monzonite and lapilli tuff.

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HISTORY OF EXPLORATION AND DEVELOPMENT (continued)
HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

induced polarization survey were followed by 17,225 feet of percussion drilling in 56 holes. Most of this work was on unexplored portions of the property away from the previously known mineralization. Additional metallurgical testing was carried out by Lakefield Research Ltd.

Teck Corporation Limited on April 1, 1971 acquired the assets of Leitch Mines Limited. Under a June 1971 agreement Teck acquired the right, until the end of 1973, to purchase Cariboo-Bell Copper Mines Limited treasury shares to finance further exploration work, thereby giving Teck a 55% interest in Cariboo-Bell. During 1972-73 Cariboo-Bell carried out a geochemical soil survey (95 samples), and 5,385 feet of percussion drilling in 22 holes. Further work in 1975 included a geochemical soil survey (1,149 samples) for gold over 1.8 line-kilometres.

"Reserves are calculated only for the Nos. 2 and 3 zones, which together contain 25 million tonnes grading 0.49 per cent copper, approximately 0.56 ppm gold (0.02 oz/ton) and approximately 1.12 ppm silver (0.04 oz/ton) at a cutoff grade of 0.3 per cent copper. This tonnage is available for mining in two separate open pits at a stripping ratio of 2.4:1." (CIM Spec Vol 15, p. 393, 1976).

By a May 1978 agreement Cariboo-Bell merged with Highland Mercury Mines Ltd. and several other companies under the name Highland-Crow Resources Ltd.; Teck Corporation Limited held approximately 40% interest in the new company. Work during 1977-78 included 12 percussion drill holes totalling 927 metres. Late in 1979 diamond drilling was done in 6 holes to obtain material for further work on metallurgical problems that reduce copper recovery.

E & B Explorations Inc optioned the property in June 1981; the agreement was amended in August 1982 to give E & B a 100% working interest through expenditures of \$1.5 million by the end of 1984, with Highland-Crow retaining a 22% net profit interest. Work by E & B in 1981-83 included percussion and diamond drilling (2 832 m in 18 holes and 5 531 m in 24 holes respectively). This work outlined undiluted reserves of 128,000,000 tons grading 0.68% copper equivalent (Imperial Metals Corporation, 1983 Annual Report).

In 1983 a 12.8% interest in the property was held by Imperial Metals Corporation through wholly owned E & B Canada Resources Ltd and its subsidiary E & B Mines Ltd. In 1984 the E & B interest was acquired by Mascot Gold Mines Limited,

DESCRIPTION OF DEPOSIT/DESCRIPTION DU GISEMENT (continued)

Hypogene minerals in the ore zone consist of magnetite (4-8%), minor pyrite and traces of bornite. These occur as very fine grained disseminations, and in fractures and drusy cavities. Gold is present in native form as microscopic inclusions in chalcopyrite, according to several privately conducted metallurgical studies. The silver-bearing minerals of the ore are not identified.

Supergene minerals include malachite, amorphous chrysocolla, native copper, cuprite, chalcocite, digenite and covellite. These account for about 25 per cent of the copper contained in the zones and they persist to the depth of drilling. Oxidation of sulphides produced no significant leaching or secondary enrichment of copper in the zones.