PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	British Columbia	93 B/9	CU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ* GIBRALTAR (SUNSET), POLLYANA (COPPER CREEK)

OBJECT LOCATED – *OBJET LOCALISÉ* Gibraltar East zone.

UNCERTAINTY *FACTEUR D'INCERTITUDE*

Lat. *Lat.* 52°31'05" Long. *Long.* 122°17'30"

Mining Division *Division minière*: Cariboo

District *District*: Cariboo

County *Comté*

Township or Parish *Canton ou paroisse*

Lot *Lot*

Concession or Range *Concession ou rang*

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

OWNER OR OPERATOR/*PROPRIÉTAIRE OU EXPLOITANT*

Gibraltar Mines Ltd.

DESCRIPTION OF DEPOSIT/*DESCRIPTION DU GISEMENT*

The Gibraltar porphyry copper-molybdenum deposit is unique within the Canadian Cordillera, because it occurs within the regionally metamorphosed Granite Mountain pluton. The pluton, which has been dated at 204 my (Triassic), intrudes Late Palaeozoic volcanic rocks of the Cache Creek Group and is one of several Mesozoic intrusions which occur along the east side of the Fraser River fault system between Williams Lake and Prince George, B.C.

Granite Mountain pluton is 127 square kilometres (49 square miles) in size and therefore is a valid, albeit small, batholith. The younger Sheridan Creek stock, adjoining to the south, is 35 square kilometres (15 square miles) in size and appears to be mainly in fault contact with Granite Mountain batholith. Another small stock is present along the northeast contact of Granite Mountain batholith near Burgess Creek.

Based on hand specimen identification, three phases are recognized in Granite Mountain batholith: diorite in the south, quartz diorite in the mineralized central part, and leucocratic quartz diorite in the northern half. Dykes are rare and, where present, are generally less than 5 metres in width. Sheridan

see Card 2 ....

Associated minerals or products – *Minéraux ou produits associés* Molybdenum, silver.

HISTORY OF EXPLORATION AND DEVELOPMENT

HISTORIQUE DE L'EXPLORATION ET DE LA MISE EN VALEUR

This property is located at Cuisson Lake, about 25 miles north of Williams Lake. The claims cover the valley east and north of Cuisson Lake and extend eastward to cover much of the westerly slope of Granite Mountain. Several mineralized zones have been located between elevations of about 2,900 and 4,000 feet.

The showings were originally staked and prospected as a number of separate properties. The Rainbow group of claims, staked by Messrs. Briand and Foyle in 1917, was located at about the 3,500 foot elevation. In about 1925 the Pollyanna claim was staked by J.F. & H.B. Hill. Manderfield's claim (name unknown) was staked about 1,000 feet northerly from the Pollyanna and the Conway claim was staked 1,200 feet northwesterly from Manderfield's. The Arctic and Laughing Water claims were staked about 2 miles southwest of the Pollyanna.

By 1928 several of the properties had been consolidated as the Pollyanna group of 5 claims owned by Messrs. Hill, Conway, and Thompson. The Hill group of 8 claims, owned by H.F., H.B., and J.F. Hill, was located at about this time at the 3,050 foot elevation. The Copper Queen claim, south of and adjoining the Pollyanna, was staked by Messrs. Fuller and Haws in 1929.

No further work was reported on these showings until 1950 when the Copper King group of 10 claims was staked by Messrs. Johnson and Moffat. The claims covered the former Pollyanna, Conway, Manderfield, and Copper Queen claims. Exploration work on the above properties to 1950 included numerous trenches, and 3 shafts, 10 to 30 feet deep.

Kimalco Mines Limited, a private company, incorporated in September 1956, acquired about 100 claims covering these showings. Exploration work during the year was concentrated on the Sunset claim group, located at the 3,000 foot elevation on Granite Creek on what was later to become the Gibraltar West zone, and included driving an adit 110 feet and packsack diamond drilling in 27 short holes. Major Mines Limited, incorporated in August 1958 to acquire the holdings of Kimalco Mines, carried out 3,000 feet of diamond drilling in ten holes on the Sunset showing in 1959. The Sunset claims lapsed and were restaked by Mr. Hilton in January 1962. Intensive exploration in the area began with geochemical and

see Card 2 ....

HISTORY OF PRODUCTION/*HISTORIQUE DE LA PRODUCTION*

From the start of production in March 1972 to the end of 1974, 39,340,997 tons of ore were milled. From this ore 281,264,475 pounds of copper, 775,549 pounds of molybdenum, and 141,594 ounces of silver were recovered. Production for the period 1975-78 inclusive totals 35 961 028 tonnes milled. From this ore 127 276 801 Kg copper, 508 048 Kg molybdenum and 15 310.699 Mg of silver were recovered.

MAP REFERENCES/*RÉFÉRENCES CARTOGRAPHIQUES*

Map 12-1959, Quesnel, (Geol.), Sc. 1":4 miles, Geol. Surv. of Canada.

Geological sketch, southern Granite Mountain pluton, Fig. 22, Geology, Exploration, and Mining, 1973, p. 302, British Columbia Dept. of Mines.

#Geology of the Granite Mountain Pluton, Sc. 1":2 miles (approx.), Fig. 8, BCDM Geological Fieldwork 1977, p. 40.

Map 1538 G, Alexandria, (Aeromag.), Sc. 1":1 mile. (1964).

*Map 93 B/9 W, Alexandria, (Topo.), Sc. 1:50,000.

REMARKS/*REMARQUES*

Comp./Rev. By *Comp./rév. par*	DMacR						
Date *Date*	07-81						

REFERENCES/*BIBLIOGRAPHIE*

Reports of Minister of Mines, British Columbia: 1917, p. 133; 1925, pp. 155, 156; 1928, p. 197; 1929, p. 192; 1950, p. 106; 1957, p. 17; 1959, p. 23; 1966, pp. 121-123; 1967, p. 122.

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Reinecke, Leopold; Mineral Deposits Between Lillooet and Prince George, B.C.; Memoir 118, p. 98, Geol. Surv. of Canada, 1920.

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Drummond, A.D., Tennant, S.J., Young, R.J.; The Interrelationship of Regional Metamorphism, Hydrothermal Alteration and Mineralization at the Gibraltar Mines Copper Deposit in B.C.; Canadian Institute of Mining and Metallurgy, Bulletin Vol. 66, February 1973, pp. 48-55.

Drummond, A.D.; Gibraltar; International Geological Congress, Canada, 1972, Field Excursion A09-C09, pp. 48-53.

Rotherham, D.C., Drummond, A.D., and Tennant, S.J.; Exploration of Gibraltar; Western Miner, Vol. 45, No. 2, February 1972, pp. 25-28.

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Cariboo's Gibraltar Achieves Production; Canadian Mining Journal, June 1972, pp. 71-78.

Mineral Policy Sector; Corporation Files: "Gibraltar Mines Ltd."; "Major Mines Ltd."; "Coast Silver Mines Ltd."; "Canex Aerial Exploration Ltd."; "Placer Development Limited".

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PRODUCT *PRODUIT*	PROVINCE OR TERRITORY *PROVINCE OU TERRITOIRE*	N.T.S. AREA *RÉGION DU S.N.R.C.*	REF. *RÉF.*
COPPER	British Columbia	93 B/9	CU 1

NAME OF PROPERTY *NOM DE LA PROPRIÉTÉ* GIBRALTAR (SUNSET), POLLYANA (COPPER CREEK)

DESCRIPTION OF DEPOSIT/DESCRIPTION DU GISEMENT (continued)

Creek and Burgess Creek stocks are quartz diorite to granodiorite in composition.

All three phases of Granite Mountain batholith are medium to locally coarse-grained porphyritic rocks which are foliated to some degree. Zones of strongest foliation trend east-westerly (azimuth 100-280 degrees) and commonly have gentle southward dips. In the most intensely foliated zones granitic textures are obliterated and the rocks are quartz-bearing chlorite schists and chloritic sericite schists. Such schistose rocks are common in narrow sinuous zones within a broad band of strongly to moderately foliated rocks that envelopes the mine area and follows the quartz diorite-leucocratic quartz diorite boundary.

Four mineable zones, the Gibraltar East, Gibraltar West, Polyanna, and Granite Lake, occur in the quartz diorite phase and comprise an elliptically shaped sulphide-bearing stockwork which is 4 km long and 1.6 km wide. The stockwork, which comprises four ages of vein development, has been imposed on and modified by continuing deformation within the saussritized, main quartz diorite phase. Although the individual veins parallel and crosscut the foliation the overall dip of the mineralization is about 30° south due to the effect of the regional foliation. Chalcopyrite is the main primary copper mineral. Sparse molybdenite occurs as pockets and seams in some of the narrow quartz veins. Secondary enrichment, mainly chalcocite which coats and replaces pyrite and chalcopyrite, is economically important and occurs to varying degrees in all of the Gibraltar deposits.

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

geophysical surveys by Keevil Mining Group Limited in 1962-63. Mr. Hilton optioned his claims to Gibraltar Mines Ltd. in 1964; additional staking was done to a total of about 160 claims (Zephyr and Pan groups) covering much of the valley east and north of Cuisson Lake. The company began a program of geophysical and geochemical surveys and diamond drilling, concentrated in the vicinity of the Sunset adit. In May 1966 Cominco Ltd. optioned the claims and with Mitsubishi Canada Limited carried out a joint program of geophysical and geochemical surveys and diamond drilling. The option was terminated in January 1968 and Gibraltar resumed drilling late in the year.

Claims covering the Pollyanna showing, located about 1 mile northeast of the Sunset adit, were restaked by Mr. R. Glen in 1963 and optioned to the Duval Corporation in 1965. Work by the company during 1965-66 included induced potential and geochemical soil surveys and diamond drilling. In 1967 Duval reached an agreement with Canex Aerial Exploration Ltd. for joint exploration of the Pollyanna property. Subsequent work, including further geophysical and geochemical surveys and diamond drilling, partially outlined the Pollyanna ore zone.

Early in 1969 Gibraltar Mines drilled the discovery hole on the Gibraltar East zone, some 500 feet from the Pollyanna boundary. Canex and Duval obtained a joint option on the Gibraltar property in May 1969. On studying all the induced potential and drill log data a definite mineral pattern enclosed by a distinct pyrite halo became apparent. Based on this information, step out drilling on 800 foot centers was carried south from the Pollyanna zone and resulted in the discovery of the Granite Lake zone; this ore zone extends easterly across the Gibraltar-Gunn Mines boundary. Canex optioned claims covering this extension from Gunn Mines Ltd. in September 1969.

The Jan and Summit claim groups, totalling 13 claims adjoining the Gibraltar property on the northwest, were acquired by Coast Silver Mines Ltd. in about 1965. Exploration work by the company included geophysical surveys and diamond drilling in several holes. Gibraltar Mines optioned the property in 1966 and an induced potential survey carried

p.t.o. ....

out over the common boundary indicated several anomalies on which drilling was begun. Canex optioned the property from Coast Silver in October 1969.

The extensive diamond drill program begun by Canex in 1969 was continued into 1970, outlining the Gibraltar East, Pollyanna, and Granite Lake zones, and partially outlining the Jan-Summit zone. The decision to place the property in production was announced on November 6, 1970.

Ore reserves at December 31, 1971, using a cutoff grade of 0.25 per cent copper, were:

Zone	Short Tons	Copper (%)
Gibraltar East	150,000,000	0.372
Granite Lake	120,000,000	0.373
Pollyanna	81,000,000	0.360
Gibraltar West	9,000,000	0.400
TOTAL	360,000,000 (326,500,000 tonnes)	0.371 (plus 0.016% MoS_2)

(CIM Vol. 15, p. 196)

Canex and Gibraltar purchased Duval's interest in the Pollyanna property, giving Gibraltar 100% ownership, and Canex 71% interest in Gibraltar. Canex is a wholly owned subsidiary of Canadian Exploration, Limited, which is a subsidiary of Placer Development Limited.

In June 1971 Cuisson Lake Mines Ltd. was incorporated by Gunn Mines (30%), Canex (30%), and Gibraltar (40%) to acquire 55 claims from Gunn Mines, including the extension of the Granite Lake orebody. Some 14 million tons of the above reserve figure are contained in this extension and will be mined by Gibraltar under a lease agreement.

Mining of the orebodies will be in sequence with the first stage of each involving production from the secondarily enriched parts of the orebodies. Production began in Stage 1 of the Gibraltar East pit. Mill tune-up operations began in the 30,000 ton per day mill on March 8, 1972. The average throughput to the end of 1972 was 39,500 short tons per calendar day. The operation of the molybdenum circuit was limited to test runs; the average molybdenum content of ore processed during 1972 was below economic recovery levels. Clearing of the Granite Lake zone began during the year. The company name (Canadian Exploration, Limited) was changed in 1972 to Canex Placer Limited.

During 1973 the nominal 30,000 tons-per-day concentrator operated at a throughput in excess of 41,000 tons-per-day. The molybdenum recovery circuit was phased into service during the latter part of the year. Stripping of overburden from the Granite Lake zone began during the year.

Mining in Stage 1 of the Gibraltar East Pit was completed in August 1974, by which time development of the Granite Lake Pit was sufficiently advanced to supply the concentrator requirements. Stripping of overburden from the Pollyanna zone began in 1974. Production from Stage 1 of the Granite Lake zone continued until September 1977 when production began from Stage 1 of the Polyanna pit. The mine was closed by a strike from May 26, 1978 to February 6, 1979. Production from the Polyanna pit continued until April 1980 when Stage 2 production began in the Gibraltar East pit.

Reserves of mineralized material at a cut-off grade of 0.25% Cu and a strip ratio of 2.39:1 at December 31, 1980 were:

Zone	tonnes	Cu (%)	Mo (%)
Gibraltar East	97,000,000	0.35	0.0078
Granite Lake	79,000,000	0.35	0.0084
Polyanna	47,000,000	0.35	0.0102
Gibraltar West	8,000,000	0.40	0.0084
TOTAL	231,000,000	0.35	0.0085

Not included in the above is 10,900,000 tonnes at 0.37% Cu and 0.0096% Mo in the Cuisson Lake Mines portion of the Granite Lake zone. (Gibraltar Mines, 1980 Annual Report).

continued above ....