PRODUCT COPPER | PROVINCE OR TERRITORY | N.T.S. AREA 93 L/16 | REF. CU 1

NAME OF PROPERTY: GRANISLE (McDONALD ISLAND) (COPPER ISLAND) (RICHMOND)

OBJECT LOCATED - Orebody.

UNCERTAINTY IN METRES 100. Lat. 54°56'40" Long. 126°09'20"

Mining Division Omineca District Range 5 Coast

County Township or Parish

Lot Concession or Range

Sec Tp. R.

OWNER OR OPERATOR AND ADDRESS

Noranda Mines Limited

DESCRIPTION OF DEPOSIT

The island is underlain chiefly by volcanic and sedimentary rocks of the Lower Jurassic Hazelton Group which are divisible into two distinct members. Green to purple water-lain andesite tuffs and breccias with intercalated chert pebble conglomerates underlie the central and eastern part of the island. These rocks, which strike northerly and dip at moderate angles to the west, are apparently overlain in the western part of the island by massive and amygdaloidal andesitic flow rocks and thin-bedded shales.

Copper mineralization is associated with a series of Eocene porphyry intrusions which occur in the central part of the island. The oldest of these is an elliptical plug of quartz diorite, however the largest and most prominent is a 400 to 650-foot wide dyke of biotite-feldspar porphyry which strikes north-easterly across the island.

The first intrusive stage is represented by the northeast-oriented oval cylindrical pluton of fine-grained, dark grey quartz diorite, the original dimensions of which were approximately 1,000 by 1,650 feet (300 by 500 metres) in plan.

Associated minerals or products of value - Gold, silver, molybdenum. See Card 2 ....

HISTORY OF EXPLORATION AND DEVELOPMENT

The property is located on McDonald Island (Copper Island) in Babine Lake, some 40 miles northeast of Smithers.

The Richmond group of claims was staked by H.J. McDonald in 1909. Exploration work was done in two adits 78 and 26 feet in length, a 26 foot deep shaft, and 4 open cuts. The Consolidated Mining and Smelting Company of Canada Limited optioned the property in 1929 and diamond drilling totalling 4,000 feet was carried out in 8 holes. This work indicated approximately 8,000,000 tons of material grading 0.01 ounce of gold and 0.15 ounce of silver per ton, and 0.8% copper. The company gave up the option and the claims reverted to Mr. McDonald.

Copper Island Mines, Limited, a private company, incorporated July 1946, held 3 recorded claims. Four diamond drill holes totalling about 1,700 feet were put down but when the average assay was found to be only 0.60% copper work was stopped. Kennco Explorations (Canada) Limited made a biogeochemical survey of the island in 1951.

The Granby Mining Company Limited acquired the property (31 Crown-grants, Lots 7656-7686) in 1955. A subsidiary company, Granisle Copper Limited, was incorporated in February 1957. By the end of 1962, 79 holes totalling 26,281 feet had been drilled in the zone of copper mineralization. Early in 1965 the company announced plans for production at a rate of 5,000 tons per day and indicated a reserve of 22,700,000 tons grading 0.53 per cent copper. Production began in November 1966. A diamond drill program was begun in 1969 to investigate the area around the orebody and the orebody at depth. As a result of this work reserves were estimated in September 1971 at 87,600,000 tons at 0.44% Cu; ore-to-waste ratio 1: 1.2 (Can. Mines Handbook 1972-73, p. 142).

In August 1971 Zapata Norness Incorporated, of Houston, Texas, acquired through its subsidiary, Zapata Resources Limited, approximately 50.75 percent of the shares of The Granby Mining Company which were previously owned by Pacific Holdings Corporation of Los Angeles.

The mill capacity was expanded to over 13,000 tons per day in 1972. Reserves as of Sept. 30, 1974, were 73,281,000 tons averaging 0.43 per cent copper. The company name, Granby Mining Company Limited, was changed in February 1975 to Granby Mining Corporation.

continued reverse Card 2 ....

Mineral Development Sector, Department of Energy, Mines and Resources, Ottawa.
503306 *

HISTORY OF PRODUCTION

From 1966 to 1973, inclusive, 18,534,959 tons of ore were milled at this property. From this ore 93,959 ounces of gold, 917,439 ounces of silver, and 183,246,349 pounds of copper were recovered. From 4,373,075 tons milled in 1974, 19,863 ounces of gold, 209,084 ounces of silver, and 40,643,225 pounds of copper were recovered.

From 1975 to 1982 inclusive 31 539 807 tonnes of ore were milled. From this ore 3 292.510 Kg of gold, 34 714.279 Kg of silver, and 118 745 384 Kg of copper were recovered.

MAP REFERENCES

Geology of Granisle Mine, Sc. 1":650 feet, Fig. 28, Geology, Exploration, and Mining, 1971, p. 179, British Columbia Dept. of Mines.

#Geology of the Northern Babine Lake Area, Sc. 1":1 mile, Fig. 14; and Geology of McDonald Island, Sc. 1": 1,000 ft., Fig. 15, Report of Minister of Mines, British Columbia, 1965.

Map 671 A, Houston, (Geol.), Sc. 1":4 miles.

Map 5317 G, Fulton Lake, (Aeromag.), Sc. 1":1 mile.

*Map 93 L/16, Fulton Lake, (Topo.), Sc. 1:50,000.

General Geology West-Central British Columbia, Sc. 1": 4 miles, Figure 8, Bulletin 64, BC EMPR, 1981.

REMARKS

Comp./Rev. By	DMacR	DMacR	DMacR				
Date	11-75	01-81	06-89				

REFERENCES

+Carter, N.C.; Granisle Mine; Geology, Exploration, and Mining, 1971, pp. 178-183, British Columbia Dept. of Mines.

++Carter, N.C., and Clarke, W.G.; Granisle Copper Limited; Report of Minister of Mines, British Columbia, 1965, pp. 93-99.

Granisle Copper Limited, by the Staffs, Granisle Copper Limited and The Granby Mining Company Limited, Western Miner, Vol. 41, No. 5, May 1967, pp. 31-38.

Reports of Minister of Mines, British Columbia: 1913, p. 113; 1927, p. 149; 1929, p. 180; 1946, p. 89; 1955, p. 29; 1956, p. 29; 1957, p. 13; 1959, p. 18; 1962, p. 16; 1963, p. 27; 1966, p. 97; 1967, p. 104; 1968, p. 132.

Geology, Exploration and Mining; British Columbia Dept. of Mines: 1969, p. 114; 1970, p. 165; 1972, p. 425; 1973, p. 351; 1974, p. 265.

Granisle; Western Miner, Vol. 47, June 1974, pp. 11-22.

Minerals Sector; Corporation Files: "Pacific Base Metals Limited"; "The Granby Mining Corporation"; "Granisle Copper Limited"; "Noranda Mines Limited".

Lang, A.H.; Houston Map-Area, British Columbia; Paper 40-18, p. 12, Geol. Surv. of Canada.

Kerr, F.A.; Mineral Resources Along the Canadian National Railway, Between Prince Rupert and Prince George, British Columbia; Paper 36-20, p. 155, Geol. Surv. of Canada.

Carson, D.J.T., and Jambor, J.L.; Mineralogy, Zonal Relationships and Economic Significance of Hydrothermal Alteration at Porphyry Copper Deposits, Babine Lake Area, British Columbia; Canadian Institute of Mining and Metallurgy, Bulletin, Vol. 67, February 1974, p. 110.

Bell Copper mine, Granilse operations become Babine Division; Canadian Mining Journal, May 1980, p. 67.

+++Fahrni, K.C., Kim, H., Klein, G.H. and Carter, N.C.; Granisle; Porphyry Deposits of the Canadian Cordillera, The Canadian Institute of Mining and Metallurgy, Special Volume 15, pp. 239-244, 1976.

Carter, N.C.; Granisle; International Geological Congress, Guidebook A09-C09, pp. 27-35, Canada, 1972.

con't reverse card 2

BCI 93 L-146.

PRODUCT	COPPER	PROVINCE OR TERRITORY	British Columbia	N.T.S. AREA	93 L/16	REF.	CU 1

NAME OF PROPERTY GRANISLE (McDONALD ISLAND) (COPPER ISLAND) (RICHMOND)

DESCRIPTION OF DEPOSIT (continued)

The most important intrusions are biotite-feldspar porphyries of several distinct but very similar phases that overlap the period of mineralization. The largest and oldest is the wide northeasterly trending dyke which is intrusive into the western edge of the quartz diorite pluton. The main porphyry is light to dark grey and ranges in composition from quartz diorite to granodiorite depending on the amount of K-feldspar present, most of which is of secondary origin.

Occurring along the contact between the biotite-feldspar porphyry and the quartz diorite are narrow discontinuous dykes and stringers of intrusive breccia which range from several inches to several feet wide and follow the principal fracture directions. The dykes and stringers are contained in a northerly trending, vertical zone which is up to 200 feet (60 metres) wide. The intrusive breccias commonly contain 1 to 2-centimetre rounded fragments of both the medium grey mineralized porphyry and the quartz diorite in a fine-grained light to dark grey granulated matrix of strained and fractured quartz, broken plagioclase grains, and locally abundant very fine-grained biotite. The breccias are also mineralized, with some disseminated chalcopyrite occurring in the matrix.

An oval zone of potassic alteration is roughly coincident with the ore zone or the pit outline. The potassic alteration zone is gradational outward to a quartz-sericite-carbonate-pyrite zone. The pyrite halo is elliptical in plan, and is roughly coaxial with the ore zone, but extends 500 to 800 feet (150 to 250 metres) beyond it. The entire quartz-sericite-carbonate-pyrite zone measures 3,300 by 4,000 feet (1,000 by 1,200 metres). Within this zone, the intrusive rocks and most of the volcanic rocks are weathered to a uniform buff colour. Abundant fine-grained quartz has been introduced, mafic minerals have been altered to a mixture of sericite and carbonate, and plagioclase is clouded by sericite. Pyrite occurs both as disseminations and as fracture fillings.

The principal minerals within the ore zone are chalcopyrite, bornite, and some pyrite. Medium to coarse-grained chalcopyrite is most widespread, occurring principally in quartz-filled fractures which vary from 1 to 5 metres wide. The mineralized fractures have preferred orientations of north 35 to 60 degrees

continued above

DESCRIPTION OF DEPOSIT (continued)

east and north 30 to 60 degrees west, and dip steeply. A horizontal fracture set in the pit is only weakly mineralized. Chalcopyrite is also disseminated in the quartz diorite and associated metasedimentary and metavolcanic rocks.

Bornite is most widespread in the southern half of the ore zone where it occurs with chalcopyrite and quartz in fractures. The greatest concentrations of bornite were confined to the upper 250 feet (76 metres) of the south end of the orebody. During the first few years of mining operations a number of veins up to 0.3 metre wide and composed of coarse-grained bornite, chalcopyrite, quartz, biotite, and apatite were uncovered. They were vertical and had a strike of north 50 degrees east but were discontinuous.

Gold and silver are recovered from the copper concentrates. Molybdenite occurs locally within the ore zone, most commonly in drusy quartz veinlets which appear to be later than the main stage of mineralization. Magnetite and specularite are common in the north half of the ore zone where they occur in fractures with chalcopyrite and pyrite.

HISTORY OF EXPLORATION AND DEVELOPMENT (continued)

By 1978 Zapata Canada Limited (formerly Zapata Resources Limited) had acquired a 93% interest in Granby Mining Corporation; Granby owned a 98% interest in Granisle Copper Limited. On January 1, 1979 Granby Mining Corporation amalgamated with Granisle Copper Limited and Zapta Canada Limited to form Zapata Granby Corporation, a wholly owned subsidiary of Zapata Corporation, of Houston, Texas.

Noranda Mines Limited on November 3, 1979 purchased the Granisle mine plus working capital for $32,000,000, the operation becoming a part of the Babine Division of Noranda Mines. Reserves were reported as 41,943,000 tons at 0.41% Cu (Noranda Mines Limited 1979 Annual Report). A molybdenum recovery plant was added in 1980 but not operated because mining was not in the area of molybdenum mineralization. The mine closed July 2, 1982. Reserves were reported as 15,614,000 tons at 0.442% Cu (Noranda Mines Limited, 1984 Annual Report). Some 13 million tons were deleted from reserves in 1980-81, in part because of a high strip ratio. The 14,000 ton per day mill was put up for sale in 1989.

REFEREMCES (con't)

BC EMPR; Mining in British Columbia, 1975-80, p. 24.

Canter, N.C.; Porphyry Copper and Molybdenum Deposits, West-Central British Columbia; Bulletin 64, p. 134, BC EMPR, 1981.