PRODUCT	COPPER	PROVINCE OR TERRITORY	British Columbia	N.T.S. AREA	93 M/1	REF. CU 2

NAME OF PROPERTY MORRISON (ELLEN)

OBJECT LOCATED - Centre of deposit.

UNCERTAINTY IN METRES 200. Lat. 55°11'25" Long. 126°19'00"

Mining Division Omineca District

County Township or Parish

Lot Concession or Range

Sec Tp. R.

OWNER OR OPERATOR AND ADDRESS

Noranda Mines Limited.

DESCRIPTION OF DEPOSIT

Morrison is one of several porphyry copper deposits of both economic and sub-economic grades that are related to the Eocene Babine intrusions - small dykes and plugs of biotite-hornblende-plagioclase porphyry known as "BFP".

Host rocks for the BFP intrusions at Morrison are siltstones, silty argillites and minor conglomerates which were considered to be part of the upper portion of the Hazelton Group, but under current revision by Tipper & Richards of the Geological Survey of Canada are assigned to the late Middle to early Upper Jurassic "Bowser Lake Group".

In most localities on the Morrison property, the Hazelton sedimentary rocks are massive and strongly altered, and bedding is not visible. Where observable, bedding generally strikes northerly to northwesterly and dips steeply.

The Morrison siltstones and silty argillites are very fine to medium grained and consist largely of a heterogeneous mixture of detrital quartz, feldspars, and volcanic and sedimentary rock fragments. Throughout the entire property these rocks are cut

see Card 2 ....

Associated minerals or products of value

HISTORY OF EXPLORATION AND DEVELOPMENT

The property is located on the east side of Morrison Lake, approximately $3\frac{1}{2}$ miles north of the north end of Babine Lake and 53 miles east of Hazelton.

Noranda Exploration Company, Limited during a reconnaissance geochemical survey in 1962 collected copper-anomalous stream sediments from the stream that flows over the copper zone. During follow-up work in 1963 mineralization was exposed by trenching. The property was staked (22 claims) and subsequently expanded to 33 claims in the Alva, Frances, Dyke, Dull, Axe, She, and Ellen groups. Subsequent work included geological, geophysical and geochemical surveys, and bulldozer trenching. Diamond drilling to the end of 1970 totalled some 39,492 feet in 80 holes. Drilling from 1963 to 1973 was done in 95 holes. Geological reserves are reported at approximately 86 million tonnes averaging 0.42 per cent copper, calculated at a cutoff of 0.3 per cent copper. (Carson & Jambor, 1976 - in CIM Special Vol. 15, p. 264).

Reserves are reported as 38 000 000 tonnes at 0.42% Cu, 0.34 g/mt Au, 3.4 g/mt Ag (Preliminary Map 65, BCDM, 1986).

HISTORY OF PRODUCTION

MAP REFERENCES

#Geology of the Morrison Deposit, Sc. 1":1,000 ft., Fig. 3, Report by Carson and Jambor (1976).

Geological Map of the Morrison Lake Area, Sc. 1":1 mile, Fig. 14, Report of Minister of Mines, British Columbia, 1966, p. 100.

Map 5242 G, Old Fort Mountain, (Aeromag.), Sc. 1":1 mile.

*Map 93 M/1, Old Fort Mountain, (Topo.), Sc. 1:50,000.

General Geology West-Central B.C., Sc. 1":5 miles, Fig. 8 and Porphyry Deposits, Fig. 4, accomp. Bulletin 64.

Geologic setting and ages of the Morrison deposit, Fig. 47, Bulletin 64, p. 143.

REMARKS

Comp./Rev. By	DMacR	DMacR					
Date	6-78	05-87					

REFERENCES

+Carson, J.T. and Jambor, J.L.; Morrison: Geology and Evolution of A Bisected Annular Porphyry Copper Deposit; Porphyry Deposits of the Canadian Cordillera, The Canadian Institute of Mining and Metallurgy, Special Volume 15, pp. 264-273, 1976.

Carson, 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, No. 742, pp. 110-133, February 1974.

Reports of Minister of Mines, British Columbia: 1965, p. 104; 1966, p. 101 ++ ; 1967, p. 106; 1968, p. 135.

Geology, Exploration and Mining; British Columbia Dept. of Mines: 1970, p. 170.

Carter, N.C.; Porphyry Copper and Molybdenum Deposits, West-Central British Columbia; Bulletin 64, p. 142, BCDM, 1981.

PRODUCT COPPER	PROVINCE OR TERRITORY British Columbia	N.T.S. AREA 93 M/1	Card 2 - REF. CU 2

NAME OF PROPERTY MORRISON (ELLEN)

DESCRIPTION OF DEPOSIT (continued)

by abundant BFP dykes and sills. Light tan-coloured, medium- to fine-grained rhyodacite dykes with aplitic textures occur at a few localities.

The BFP pluton at Morrison is a faulted plug, with nearly vertical contacts, which occupies a northwesterly oriented elliptical area of 900 by 150-300 meters. Before faulting, the plug was roughly circular in section, with a diameter of about 500 meters. Numerous offshoots of the plug, many of which are northerly trending dykes or sills, occur everywhere in the Hazelton sedimentary rocks. The offshoots vary in width from less than 1 meter to greater than 500 meters. Most BFP contacts are sharp. Angular inclusions of siltstone have been observed in only a few localities.

Unaltered BFP is speckled with abundant $\frac{1}{4}$- to 5 mm phenocrysts of plagioclase (zoned oligoclase-andesine), biotite and hornblende in a fine-grained matrix of the same materials as well as quartz and K-feldspar. Apatite and magnetite are common accessory minerals. At Morrison, all rock exposures are altered, and hornblende phenocrysts in particular have been largely replaced by hydrothermal chlorite or biotite. The copper deposit is within a centrally located biotite zone, the quality of which decreases outward. Surrounding the biotite zone is a chlorite-carbonate zone. Intense clay-carbonate alteration is associated predominantly with the Morrison fault and related shears.

The most prominent structure at Morrison is the north-northwesterly trending Morrison fault, which bisects the BFP plug and copper zone. The fault is apparently vertical and has a right-hand heave of approximately 300 meters. The vertical displacement, although unknown, is believed to be considerable, because the offset segments of the copper zone do not fit well in detail, suggesting that they represent different levels of erosion. Rather than a single break, the Morrison fault is a linear zone of parallel shears and fractures. The zone averages about 25 meters in width, but ranges from 50 meters in its central portion to only a few meters at its extremities.

The Morrison copper zone is a vertical annular cylinder that conforms to the shape of the BFP plug and is disrupted by the Morrison fault. The copper zone is defined by external and

continued above ....

DESCRIPTION OF DEPOSIT (continued)

internal boundaries that mark the limits of rock which consistently grades greater than 0.3 per cent copper. In most places, the external boundary is relatively sharp and copper content declines outward to less than 0.1 per cent within about 40 meters. However, along the western and northwestern edges of the copper zone, sporadic areas of +0.3 per cent copper occur for several hundred meters beyond the 0.3 per cent copper boundary. The low-grade core averages between 0.15 and 0.2 per cent copper. Between the internal and external 0.3 per cent isopleths, copper increases fairly regularly to form a higher-grade annulus. In the annulus, which is 15 to 150 meters wide, copper exceeds 0.5 per cent. Maximum grades over appreciable widths are about 0.7 per cent copper, and the average grade of the entire +0.3 per cent zone is 0.42 per cent copper. Molybdenum averages approximately 0.01 per cent and gold and silver 0.3 gram per tonne and 3 grams per tonne respectively. Spotty occurrences of galena and sphalerite, in carbonate-cemented brecciated veins within and near the Morrison fault and in smaller parallel shears, contribute to relatively high, but uncommercial, values of lead and zinc.

Chalcopyrite and pyrite are the main sulphides at Morrison. All the copper sulphides are primary. Chalcopyrite is the main copper-bearing mineral. It is distributed chiefly along thin seams and veinlets or fracture stockworks with or without quartz and biotite, but about 20 to 30 per cent of the mineral is finely disseminated in the BFP matrix and in peripheral sedimentary rocks.

Minor to moderate amounts of bornite at a few places in the copper zone contribute significantly to copper grades. However, most of the high-grade sections owe their copper content solely to chalcopyrite. Very minor molybdenite occurs in some chalcopyrite-pyrite seams and as minute disseminated flakes in the copper zone, which averages about 0.01 per cent molybdenum.