

NAME BREnda MINE

SUBJECT CLIPPINGS

008495

PROPERTY FILE

092HNE047-003

NMINER

9 JUNE 1986

92HNE047(16E)

First quarter loss down after Brenda re-opens mine

After four years of losses, President J. A. Hall told shareholders that he is at least heartened to report only a small loss in this year's first quarter for Brenda Mines.

For the three months ended March 31, net loss was \$59,000 (1¢ a share). This is not comparable, says Mr Hall, to the net loss of \$1.8 million (43¢ a share) posted in the same quarter last year when the company's copper-molybdenum mine was shut down.

Closed Dec 14, 1984, the mine was re-opened Sept 15, 1985 as a result of government assistance. The mine operated for a total of 100 days in 1985, 91 of which were in the fourth quarter.

Since the resumption of mining operations last fall, there has been a build-up in concentrate inventories to more normal working levels, says Mr Hall. During this quarter, the value of production inventories increased 33% to \$12 million with an additional \$4 million in stores inventory.

Copper concentrates are smelted and refined in Japan under a firm sales contract and the valuation of 91¢ a lb at the end of the quarter was up 2¢ from the previous quarter, says Mr Hall.

During this first quarter 2.6 million tonnes of ore were milled at a rate of 28,946 tonnes a day. Production amounted to 4 million kg of copper, 1 million kg of molybdenum, 2.1 million g silver and 32,793

g of gold.

Mine Manager Gordon Harris says that at this time, under foreseeable economic conditions, plans are in place to continue to work the mine until December, 1988 when it is expected that operations will end. He adds, however, that if the economy improves, every effort will be made to extend the mine life.

Mr Hall reports that the oil and gas division had an operating loss of \$0.2 million this quarter as gas sales volumes dropped 14% compared to the same period last year.

The company's debt at March 31, was \$46.7 million, an increase of \$3.6 million for the quarter, but as of May 5, had declined to \$44,629, says Mr Hall.

The company received a dividend of \$434,000 (15¢ a share) from Kerr Addison Mines, says Mr Hall.

Regarding its mineral exploration activities, Mr Hall says that the company completed a flow-through share offering with CMP 1986 Resource Partnership for the funding of the company's \$3.5 million CEE this year. He says that Brenda will participate again in the Norex operated program with field work planned mainly for B.C. and the Yukon. When this year's program is completed, Brenda will have earned a 50% interest in all of Noranda Inc.'s Cordilleran projects.

Mr Hall says that Brenda will be issuing 215,054 treasury shares to CMP at a price of \$16.275 a share

GCNL 148 BRENDA MINES LTD. (BND-V,1) 86-08-05

PROFIT RECORDED - In the 6 months ended 30Jun86, Brenda 92HNE047(16E) Mines Ltd. produced 5,196,600 tonnes of ore, being 28,710 tonnes per calendar day. The concentrates contained 8,297,900 kg. of copper metal and 2,235,500 kg. of molybdenum. Brenda also produced 1,123,000,000 cubic feet of natural gas.

Net revenues from production was \$30,018,000. Operating income was \$1,502,000. Net earnings were \$184,000 being 4¢ per share. A loss of \$738,000 in first half 1985 is not comparable, since the mine was closed.

Higher ore grades and excellent metallurgical operations resulted in above plan molybdenum and copper production. The price for molybdenum strengthened to U.S. \$2.85 from \$2.60 per pound during the second quarter, while copper prices remained at about U.S. 65¢ per pound.

The oil and gas division had an operating loss of \$200,000 on net revenues of \$1,050,000 compared to a profit of \$200,000 on net revenues of \$1,500,000 in the 1985 second quarter.

Outstanding loans decreased to \$44,600,000 from \$46,700,000 during the second quarter.

BRENDA MINES 92HNE047(16E)

Brenda Mines Ltd operation is managed by Noranda which owns more than 40% of the company shares. Low copper and molybdenum prices and high operating costs forced Brenda mine to close in December 1984. However, after only eight months, Brenda was back in operation. The restart-up was achieved through concentrated efforts to reduce costs, not from an improvement in the copper price.

G R Harris, mine manager, elaborates on this point. On the recommendation of the BC government, a 30% reduction in the cost of power was negotiated with BC Hydro. This reduction over a period of three years is conditional on the level of mine revenue. Art Phillips, the provincial Critical Industries Commissioner, took part in discussions with the United Steel Workers local. It was decided that the union will continue with the existing contract until June 1987. Brenda provided operating capital to put the mine back into operation.

During the shutdown the mine plan was revised. The new plan has reduced mining costs but decreased the mine life from eight years to three.

Ron Bradburn, mill superintendent, discussed his operations, including the introduction of inert gas flotation is a cost-reduction feature. The system involved the installation of covers over the flotation cells and recirculation of the air to the cells. This produces an oxygen-free gas, and results in 50 to 67% reduction of the sodium hydro-sulfide consumption in the copper depression part of the molybdenum circuit. The inert gas flotation, introduced shortly before mine shutdown, also gave better copper and pyrite depression.

Brenda's moly flotation columns, 34" and 24" in diameter, gave benefits by a reduction of cyanide consumption, better cleaning and lower maintenance costs. However, Ron Bradburn pointed out that due to coarse molybdenite Brenda requires additional mechanical cells to keep the recovery high. from "BC Copper Stands Tall and Shines" by T. Crenski

N. MINER NOV 7/86

Brenda has loss in third quarter

Brenda Mines reports a third-quarter net loss of \$2.8 million or 61¢ a share, on revenues of \$11.6 million. The company reported a third-quarter loss last year of \$3,076,000, but notes results from that period are not comparable to the latest quarter since the mine was shut down for part of the 1985 third quarter.

For the nine months to Sept 30 this year, Brenda had a net loss of \$2,641,000, or 57¢ a share, on revenues of \$41,592,000, against a loss of \$5,638,000 or \$1.32 a share, on revenues of \$8,071,000, in the 1985 nine months.

Brenda says a reserve is being set up over the remaining life of the mine, to provide for minesite reclamation and shutdown expenses. Third quarter results include a provision of \$2.25 million for this purpose, with \$750,000 actually accruing to the third quarter, and an additional \$1.5 million as a correction to the first half results.

MINER
3 MAR 1986

92H/16E (09AHNE047)

Brenda reports 6.6-million loss in 1985

B.C. base metal producer Brenda Mines reports a loss of \$6.6 million for the year ended Dec. 31, 1985, compared to a loss of \$6.5 million for fiscal 1984.

The company's fourth quarter loss was \$1 million compared to \$3.7 million in the corresponding quarter of 1984.

Closed since Dec. 14, 1984, operations at Brenda's copper-molybdenum mine were reopened Sept. 15, 1985, as a result of government assistance. The mine operated for

a total of 106 days in 1985, 91 of which were in the fourth quarter.

Mine revenues for the year and quarter amount to \$17 million and \$13.1 million, respectively.

For the year 1985, production amounted to 4.7 million kg copper, 1.2 million kg molybdenum, 2.5 million g silver and 34,229 g gold. This compares to 1984 production of 7.7 million kg copper, 2 million kg molybdenum, 4.5 million g silver and 79,505 g gold.

For the fourth quarter 1985, pro-

duction was 4.2 million kg copper, 1.1 million kg molybdenum, 2.2 million g silver and 29,631 g gold. This compares to production in the corresponding period of 1984 of 2.9 million kg copper, 765,989 kg molybdenum, 1.7 million g silver and 29,259 g gold.

A fourth quarter loss for 1985 of \$0.6 million in oil and gas operations was attributed to higher than normal depreciation, depletion and surrendered lease costs.

Two significant items had an

impact on Brenda's fourth quarter results. Costs were reduced by a refund of \$1.5 million of surplus pension contributions made by the company in previous years. And \$3.5 million was spent on the 1985 mineral exploration program, all of which was funded by the issuance of 223,534 common shares to a resource partnership.

Brenda has reduced its debt for fiscal 1985. It now stands at \$43.1 million, down from \$50.8 million the previous year.

GCL #90 9 MAY 1986

NO.90(1986)
MAY 9, 1986

3 MONTHS ENDED 31 MARCH

Mine Production Revenue, Gross	\$15,766,000
Oil/Gas Production Revenue, Net	1,286,000
Smelter & Distribution Charges	2,459,000
Cost of Production	10,221,000
Deprec'n. Depl'n. & Amortiz'n.	2,230,000
Oil/Gas Exploration Expense	517,000
Admin., General Expense	746,000
Municipal & Sundry Taxes	170,000
Interest Expense	1,203,000
Dividend & Interest Income	480,000
Income, Resource & Oil/Gas Revenue Taxes	45,000
Net Loss	\$59,000
Loss Per Share	1¢

BRENDA MINES LTD. (BND-V,T) 92H/16E (09AHNE047)

	1986	1985
Mine Production Revenue, Gross	\$15,766,000	\$ 386,000
Oil/Gas Production Revenue, Net	1,286,000	1,650,000
Smelter & Distribution Charges	2,459,000	35,000
Cost of Production	10,221,000	746,000
Deprec'n. Depl'n. & Amortiz'n.	2,230,000	579,000
Oil/Gas Exploration Expense	517,000	236,000
Admin., General Expense	746,000	1,228,000
Municipal & Sundry Taxes	170,000	423,000
Interest Expense	1,203,000	1,246,000
Dividend & Interest Income	480,000	633,000
Income, Resource & Oil/Gas Revenue Taxes	45,000	-
Net Loss	\$59,000	\$1,824,000
Loss Per Share	1¢	43¢

The loss of 1¢ per share by Brenda Mines Ltd. in the first quarter of 1986 is not comparable with the loss of 43¢ per share in the first quarter of 1985 because the mine was closed during the 1985 period.

Management report that the price for molybdenum weakened during the quarter and is currently about U.S. \$2.65 per pound, retreating from \$2.90 per pound in mid-February. Copper prices rose to U.S. 67¢ per pound before declining to the present price range of 65¢ per pound.

Brenda's outstanding loans increased from \$43,100,000 to \$46,700,000 during the 3 months ended 31Mar86 as a result of the inventory build-up to normal working levels.

After the quarter ended, Brenda received income tax reassessments covering the years 1979 and 1980 aggregating \$3,200,000, including interest. The taxation authorities contend that part of the company's mining revenues are derived from foreign processing and are not eligible for earned depletion and resource allowances. The company strongly disputed this interpretation of the law and has already appealed this issue to the Federal Court of Canada.

In the 3 months ended 31Mar86, Brenda milled 2,605,097 tonnes of ore at an average rate of 28,946 tonnes per day. Mill head grades averaged 0.173% copper and 0.045% molybdenum. Brenda's production of metal contained in concentrates totalled 4,045,830 kilograms of copper, 1,033,761 kilograms of molybdenum 2,169,992 grams of silver and 32,793 grams of gold. Brenda also produced 543,300,000 cubic feet (gross) of natural gas compared with 628,200 000 in first quarter 1985.

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BRENDA MINES LTD. (BND-V,T) GCL 218

PERIOD ENDED 30 SEPT.	THREE MONTHS		NINE MONTHS	
	1986	1985	1986	1985
Ore Milled Ton	2,185,500	461,400	7,382,100	461,400
Tonnes Per Day	23,760	15,380	27,840	1,690
Metal In Concentrate Copper-kg	3,571,800	517,700	11,869,700	517,700
Metal In Concentrate Molybdenum-kg	780,100	138,400	3,015,600	138,400
Gas Produced Gross MMcf	647	415	1,770	1,688
Net Revenue	\$11,574,000	\$3,086,000	\$41,592,000	\$8,071,000
Operating Income (Loss)	\$(2,567,000)	\$(2,758,000)	\$(1,065,000)	\$(4,324,000)
Net (Loss)	\$(2,825,000)	\$(3,076,000)	\$(2,641,000)	\$(5,638,000)
(Loss) Per Share	(61¢)	(72¢)	(57¢)	(\$1.32)

The 1985 third quarter results are not comparable, since the mine was shut down for part of that period. Above plan copper and molybdenum production reflects

higher ore grades and very satisfactory metallurgical results. The molybdenum price increased to \$3.20 U.S. per pound in the third quarter, with the copper price drifting down to the 61¢ U.S. range.

92HNE047(16E)

GAL #216 8 NOV 1985

92H/16E (092HNE047)

BRENDA MINES LTD. (BND-V.T)

PERIOD ENDED 30 SEPTEMBER	3 MONTHS 1985	3 MONTHS 1984	9 MONTHS 1985	9 MONTHS 1984
Ore Milled - tonnes	461,391	2,843,031	461,391	3,884,060
- per day	15,380	30,935	1,690	14,227
Gas produced - net MMcf	337.9	141.3	1,256.9	733.5
Production Revenue, Net	\$3,086,000	13,911,000	8,071,000	21,158,000
Net Loss	\$3,076,000	417,000	5,638,000	2,953,000
Loss Per Share	72¢	10¢	\$1.32	69¢

MINE OPERATIONS RESUMED IN SEPTEMBER

Mining operations of Brenda Mines Ltd., which had been stopped on 14Dec84, resumed on 15Sep85 as a result of assistance in the form of reduced power costs and property taxes recommended by the Critical Industries

Commissioner and approved by the B.C. Cabinet on August 15.

The loss from the 1985 third quarter includes mine start-up costs totalling \$1,800,000. The Oil and Gas Division reported a loss of \$100,000 for the third quarter on net sales of \$1,000,000 versus a 1984 third quarter loss of \$200,000 on sales of \$600,000. These results reflect a normal seasonal sales volume reduction.

NMINER 9 DEC 1985

Brenda Mines reports a net loss of \$3,076,000 or 72¢ per share for the third quarter of 1985 bringing the net loss for the 9-month period ended Sept. 30 to \$5,638,000 or \$1.32 per share. In the same periods a year ago net losses were \$417,000 or 10¢ per share for the third quarter and \$2,953,000 or 69¢ per share for the 9-month period. Mining operations, which had closed on Dec. 14, 1984, reopened Sept. 15, 1985, as a result of government assistance, but production so far this year is only 461,391 tonnes of ore compared to 3,884,060 tonnes in 1984's first nine months.

92H/16E (092HNE047)

GAL #38 24 FEB 1986

BRENDA MINES LTD. (BND-T.V)

92H/16E (092HNE047)

	FOURTH QUARTER		TWELVE MONTHS	
	1985	1984	1985	1984
Operating Days	91	74	106	199
Ore Milled, Tonnes	2,544,922	2,225,007	3,006,313	6,109,067
Per Operating Day	27,966	30,068	28,361	30,699
Production - Metal Contained in Concentrates:				
Copper, Kilogram	4,175,180	2,999,470	4,692,860	7,790,650
Molybdenum, Kg.	1,086,280	765,989	1,224,520	2,011,623
Silver, gram	2,221,527	1,685,881	2,488,182	4,488,838
Gold, gram	29,631	29,259	34,229	79,505
Gas, Net MMcf	298.9	495.8	1,555.8	1,229.3
Production Revenue	\$13,906,000	\$10,281,000	\$21,977,000	\$31,439,000
Net Loss	\$1,005,000	\$3,700,000	\$6,643,000	\$6,491,000
Loss Per Share	22¢	86¢	\$1.47	\$1.52

Brenda Mines Ltd's fourth quarter loss of \$1,000,000 and a 1985 loss of \$6,600,000 compared favorably on the losses of \$3,700,000 and \$6,500,000 in the like prior periods.

Revenue From the Brenda mine near Summerland, B.C. in fourth quarter 1985 was \$13,100,000 and for the year, \$17,000,000. A fourth quarter loss of \$600,000 in oil and gas operations was attributed to higher than normal depreciation, depletion and surrendered lease costs.

Two significant items impacted fourth quarter results. Costs were reduced by a refund of \$1,500,000 of surplus pension contributions made by Brenda in previous years. The \$3,500,000 mineral exploration

program in 1985 was funded by issuing 223,534 common shares to a resource partnership.

Brenda's debt at year end stood at \$43,100,000, down from \$50,800,000 the previous year.

NMINER
22 AUG 1985

92H/14E
(092HNE047)

Noranda will reopen Brenda

VANCOUVER — Another base metal producer in British Columbia is reopening.

The decision follows approval by the B. C. cabinet of a recommendation by Critical Industries Minister Art Phillips which noted that a suitable framework had been established to reactivate the mine. Brenda Mines, a major copper-molybdenum producer near Peachland, will be operating again by September with full production scheduled for mid-month, according to mine manager, Gordon Harris.

Mr. Harris tells The Northern Miner that metal prices haven't really improved since the closure in mid-December, but he points out unionized workers have agreed to a wage freeze until June 30, 1987, which will help keep costs down.

Just as important, the Critical Industries Minister has negotiated reduced hydro rates and property taxes over a 3-year period. That maximum allowable reduction in hydro rates is 30% of the company's gross payment, he states.

Admitting the framework to reopen the mine is almost identical to that for Noranda's Bell Copper division at Granisle, B.C., (N.M., July 18/85). Mr. Harris says the company will be introducing a profit-sharing plan for all employees.

Brenda will also provide working capital of approximately \$15 million to keep the mine operating until revenue starts coming in. The mine has sufficient reserves for three years of operation, although higher metal prices could increase the reserve inventory, he says, adding more stripping would be required to tap these reserves.

He says the company has very little concentrate left after an 8-month closure, adding it will take about six months to achieve normal working inventories.

Typical of many B.C. mining operations, the company is helping to reduce its losses by keeping the mine running. There are costs associated with maintaining a mine on a standby basis, and often it's cheaper to stay in operation, which will probably be the case here under the present agreement.

However, Mr. Harris cautions that any deterioration in metal prices would cause the company

to look at the mine's economics again.

The mine opening was expected, especially after Mr. Phillips announced a similar plan to reactivate the Bell Copper mine. But whether other mines will be reopening under similar conditions is still a matter of conjecture in B.C. mining circles.

Placer Development's Endako mine is a possibility, but problems between the company and union there have thwarted efforts thus far.

At last report, unionized workers were prepared to ratify a company offer that could have seen the mine reopened but the union executive would not allow members to vote on the offer.

Only a few employees remain in the area, a lot of whom work in the company's roaster, which handles concentrates on a toll basis. Most other mines now closed appear uneconomic at today's prices even with concessions, and will probably require significantly higher metal prices.

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GCNL #160

20 AUG 1985

BRENDA MINES LTD. (BND-V)

(JAT 16E) (092H NE047)

PRODUCTION WILL RESUME - Brenda Mines Ltd. expect to resume production by September after having come to an agreement UNDER SPECIAL AGREEMENT with B.C.'s Critical Industries Commissioner which has been approved by the B.C. government. The mine employs about 400 people. All will be recalled to work during the next few weeks.

Brenda has been closed since December 1984 and was also shut down for 8 months in 1983 and early 1984, each time because of poor copper and molybdenum prices.

Brenda management report that the agreement includes concessions from all parties involved. The employees' union agreed to extend the current contract to 30Jun87 with no increase in wages. Brenda will introduce a profit sharing plan for all employees. Brenda will provide working capital of about \$15,000,000. Hydro rates and property taxes will be reduced for 3 years. If metal prices rise to a point where Brenda can be profitable on its own, these reductions will be phased out. Mine managers Gordon Harris comments, "If we can move away from this special agreement before the 3 years recommended we shall certainly do so. We want to make a profit as soon as we can."

The alternative to reaching this agreement was to wait until copper and molybdenum prices rose to levels where the mine could make a profit. Brenda's open pit mine produced 7,826 tonnes of copper metal and 2,011 tonnes of molybdenum metal in 1984 when the mine operated for 7 months. The copper was all sold under contract to Japan. The molybdenum market lies in Europe. After an 8-month closure, inventory levels of concentrate are low and replenishment to normal working volumes will take at least 6 months after production begins.

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NMINER 18 JULY 85

To reopen the Bell mine, and Brenda could follow

92M/1E
(092M)
001

The planned reopening of the Bell mine of Noranda Inc. in central B.C., could signal the restart of at least one other shutdown Noranda mine in the province, The Northern Miner learns.

A company spokesman said the B.C. government's Critical Industries Commission, which has played a major role in the expected restart of the Bell mine by September of this year, is also considering assisting in reopening the Brenda mine.

92M/16E
(092M)
NE047

"There could be a decision on the Brenda by early August," Betty O'Keefe said, adding discussions on the possibility are at an advanced stage.

Three other Noranda mines in B.C., the Granisle, Boss Mountain, and Goldstream, remain shut-down, and there are no current considerations for reopening any of these, she said. "There is no prospect at all in the case of the Granisle mine," she added.

Meantime, recall of employees will start almost immediately for the Bell mine, a 17,000-ton-per-day operation which suspended operations in October of 1982. Its expected reopening will provide about 250 jobs for local area residents, who have been without regular employment since that time.

To make the Bell mine reopening possible, the Critical Industries Commission has agreed to reduce electric power costs for the mine,

and immediate implementation of a reduction in the property tax.

Other factors involved are:

□ Last year, Noranda spent more than \$6 million on a stripping operation to enhance the viability of the mine.

□ The company agreed to implement a profit-sharing plan for employees and a severance package.

□ The United Steelworkers of America, Local 898, agreed to a wage freeze by extending the union contract to cover the remaining life of the mine, which Noranda says is about three years.

According to John Kalmet, general manager mines in B.C. for Noranda, the Bell mine could not reopen if it had not been for the co-operation of the provincial government and the union.

"During the next two years we will be making marginal profits at best," he said, adding, it is expected the mine will be profitable by the third year.

Maurice Ethier, acting general superintendent at the Bell mine said everyone had to make "difficult decisions" in order to put the mine back into operation.

"We'll be working towards improving our methods as we prepare for production of copper concentrates." He said the new profit sharing plan will be a very real incentive for all employees to share in the rewards of a profitable operation.

NMINER 8 AUG 85 92M/16E (092M) NE047

Loss for Brenda, but says mine may reopen soon

Brenda Mines reports a loss of \$2.6 million in the first six months this year, just slightly greater than the \$2.5-million loss the company suffered in the similar period last year.

In the second quarter of 1985, there was a loss of \$738,000, against a loss of \$1,421,000 in the 1984 second quarter.

Brenda says its oil and gas division had an operating profit of \$200,000 in the latest 6-month period, while mining operations

took an operating loss of \$1.2 million.

Brenda's mine, which has remained closed down throughout the first six months this year, could reopen later this year if, among other things, a reduction in power costs is forthcoming, the company says.

A submission on such a reduction was made last April to the Critical Industries Commissioner in B. C., Brenda says.

Reopening would also be de-

pendent on increased prices for copper and molybdenum, it adds.

The company has an agreement with NIM and Co. Ltd. Partnership — 1985, for the issue of up to 222,855 flow-through shares for the financing of Brenda's exploration program in B. C. and the Yukon.

NMTOWER
16 MAY 1985

Brenda takes loss mine still closed

Brenda Mines, where the mine has remained closed since mid-December last year, reports a net loss of \$1.8 million, or 43¢ a share in the first quarter this year, compared to a loss of \$1.1 million, or 25¢ a share, in the similar period of 1984.

The company reports net revenues from production in the latest period of \$2,001,000, (\$1,706,000 in the 1984 first quarter), but notes that since the mine was closed in the first quarter both last year and this, revenues reported for the two quarters are a combination of production from the oil and gas division, and gain on sale of the mine's molybdenum inventories.

The market for molybdenum improved during the latter part of the latest quarter, and moly inventory was reduced by 890,000 kg to 822,000 kg at Mar. 31, Brenda says.

A cash surplus of \$8.3 million generated from first quarter sales was used to reduce company debt from \$50.8 million at year end, to \$42.5 million at Mar. 31.

The company's oil and gas division in the latest quarter had an operating profit of \$600,000 on net revenues of \$1.7 million.

924/116
(0724NE047)

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GCNL #85 2 MAY 1985

BRENDA MINES LTD. (BND-T,V) 92H/16E (072HNE047)

REDUCTION IN CHARGE - Brenda Mines Ltd. last week made a submission to B.C.'s newly established Critical Industries FOR POWER IS SOUGHT Commissioner, Art Phillips, which could result in reopening the Brenda mine near Peachland, later this year. Brenda has made an operating income profit in only one of the past four years and has been closed since December 1984. A previous shut-down extended from October 1983 to May 1984. A previous shut-down extended from October 1983 to May 1984. The labor union has cooperated in an attempt to keep the mine in operation. The Commissioner requires that both management and union have shown that every effort has been made to keep their operation viable. When Brenda mine is in full production it employs over 400 people and has an additional spin-off effect of 175 jobs.

Brenda has requested a reduction in power costs. At current rates Brenda could pay as much as \$6,000,000 annually for power. Another incentive to reopen the mine is the price of copper which has edged upward during the past two months from 65¢ U.S. per pound to the 70¢ level.

The Commissioner requires an audit of the company's books before recommending cost reductions to the provincial government cabinet for consideration.

NEWS ITEM 9 MAY 1985

Brenda seeking power relief

VANCOUVER - Brenda Mines has made a submission to the new Critical Industries Commissioner for B.C., Arthur Phillips, to reopen its base metal operation near Peachland, which was closed in December. The company is requesting a break in power costs which can reach \$6 million annually, citing the fact it has only made an operating income profit once in the past four years.

92H/16E (072HNE047)

Copper prices are a key factor in the proposed reopening. On the London Metal Exchange, the price has edged upward in the past two months to over 70¢ U.S.

Unionized workers are also co-operating and the company's books will have to be audited before the commissioner reaches a decision on cost reductions at the mine which ultimately must be approved by cabinet.

GCNL #93 14 MAY 1985

BRENDA MINES LTD. (BND-T,V) 92H/16E (072HNE047)

3 MONTHS ENDED MARCH 31	1985	1984
Net Revenues Fr. Production	\$2,001,000	\$1,706,000
Net Loss	(1,824,000)	(1,083,000)
Net Loss Per Share	(43¢)	(25¢)

MOLYBDENUM INVENTORY REDUCED IN QUARTER

Brenda Mines Ltd. revenues in the quarter ended March 31, 1985 are determined at time of production based on an estimated net realizable value and are subject to future adjustments when

final selling prices are known. As the mine was closed in the first quarter of 1985 and 1984, revenues reported for these quarters are a combination of production from the oil and gas division and gain on the sale of the mine's molybdenum inventories. The market for molybdenum improved during the latter part of the quarter and molybdenum inventory was reduced by 890,000 kg to 822,000 kg at March 31.

A cash surplus of \$8,300,000 generated from first quarter sales was used to reduce company debt from \$50,800,000 at year end to \$42,500,000 at March 31.

The oil and gas division reported an operating profit of \$660,000 on net revenues of \$1,700,000 in the three months ending March 31, 1985.

The tailings pond at Brenda mine site is at an acceptable level and no problems will be created by the spring run-off.

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NMINER
27 DEC 1984
Brenda Mines is now trading at a discount to book value

Brenda Mines has had a tough go of it in the past year.

It reopened its Peachland, B.C., copper-molybdenum mine earlier in the year after an 8-month shut-down only to abandon the pit again.

Nevertheless, Brenda could become a profitable buy, if, as Burns Fry analyst Gordon Bub believes, copper prices return to more normal levels.

As it is, the market is paying nothing for the copper-moly division of Brenda Mines, Mr. Bub noted in a recent investment report.

At the time of the report, company shares were trading at \$8.25, about a 60% discount to book value, the largest discount of all Toronto Stock Exchange-listed metal producers. Brenda's financial assets, net of debt, and its oil and gas interests alone exceed stock value by 43%.

"In other words the market is discounting Brenda's financial and oil and gas assets, and paying nothing for the copper-molybdenum mine," the analyst said.

Brenda's oil and gas reserves are valued at \$5.25 a share based on \$22.5 million in total reserves generating an annual cash flow of \$3.5

million.

Its investments include a 16.9% stake in Kerr Addison Mines for a market value of \$48.4 million, or \$11.30 per outstanding Brenda share.

The operation's cash costs are set at 80¢ (US) a lb. but this figure could fall to 70¢ given what Mr. Bub calls a reasonable smelting and refining contract. It currently costs Brenda 5¢ per lb. more for shipping concentrates to Noranda's Horne smelter than it does other producers who rely on Korean or Japanese smelters.

Brenda's operations are managed by Noranda, which holds a 49.9% interest in the company.

A return to more reasonable price levels for moly, which has been stockpiled at the mine, would also improve the cost picture.

Not as generally well known as the company's mining woes, is the brighter prospect presented by its participation in the Jabiru oil discovery offshore northwestern Australia. After a discovery well drilled by operator Broken Hill Proprietary, two wells came up dry.

In spite of this, production in the field will begin in early 1986. Brenda's share of cash flow at a 10,000-bbl.-per-day rate will be an

annual \$1.1 million. "However, we believe that 10,000 barrels a day will likely prove to be conservative," Mr. Bub said.

NMINER
28 FEB 1985
Brenda has loss again in 1984: mine is closed

Brenda Mines, where B.C. operations have been closed down since last December, reports a loss of \$6,491,000 in 1984, compared with a loss of \$3,110,000 in the previous year. In 1984's fourth quarter, the company incurred a loss of \$3,700,000, against a loss of \$3,079,000 in the similar period in 1983.

In the latest year, Brenda had net revenues from production of \$31,439,000, down from revenues of \$34,826,000 in 1983.

Brenda notes that since mining operations were also closed during the fourth quarter of 1983, the results for the 3-month period of that year are not meaningful, as the company reports revenues on a production basis.

The oil and gas division had net revenues of \$4.9 million for 1984, compared to \$4.7 million in the previous year. The division, however, incurred an operating loss of \$350,000 for the year. An operating profit of \$1.12 million was reported for 1983.

Brenda says its mine will remain on a care and maintenance basis until copper and molybdenum prices are at profitable levels.

92H/16E
(092HNE047)

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NMINER
25 OCT 1984

Brenda closes Peachland mine

VANCOUVER — For the second time this year Brenda Mines will shut down its copper-molybdenum operation near Peachland, B.C., because of low metal prices. According to Mine Manager Gordon Harris the mine will close for an indefinite period beginning Dec. 14, resulting in the layoff of approximately 300 employees.

At closing the mine will have been back on stream for seven months and Mr. Harris explains if metal prices improve as predicted in early 1985 the mine could be reopened in the spring. Previous forecasts, upon which the summer reopening was predicated, have not occurred, he adds, and molybdenum inventory is once again building up.

Pointing out that Brenda is not competitive at current prices, he says the company will attempt to reduce accumulated inventory during the shutdown. Brenda says the construction of tailings dams, the diversion of runoff water, and the installation of evaporation systems during the summer should secure the area from excessive runoff at least until the fall of 1985.

Last season excessive amounts of water accumulated in the tailings pond and Brenda had to apply for regulatory approval to release water from the dam. "This situation will not recur this winter," Mr. Harris states.

Things couldn't look worse for B.C.'s mining industry which, because of higher taxation and other costs, is becoming less and less competitive in world markets. In the past two years 19 of the province's 29 mines lost \$395 million and the industry's working capital fell from \$480 million to \$121 million in 1983, studies show.

Teck Corp's Highmont operation suspended production Oct. 19, and with copper prices at present levels the viability of Cominco's Valley Copper operation and Lornex Mining, also in the Highland Valley, are in question

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92H/16E

(092HNE047)

GCNL # 215, 1984 NOV 7 BRENDA MINES LTD. (BND-V,T)

9 MONTHS ENDED 30 SEPTMBER	1984	1983
Production Revenue, Net	\$21,158,000	\$34,610,000
Net Loss	(2,791,000)	31,000
Per Common Share	65¢	1¢

In presenting comparative results of Brenda Mines Ltd. for the 9 months ended 30Sep84, management note that the 1983 results benefitted from an after tax gain of \$2,888,000 on the sale of a holding of Brascade preferred shares.

Management comment, "Prices for copper and molybdenum remained below profitable levels, and for copper, prices are significantly lower than the 1983 averages. Copper fell below U.S. 55¢ a pound on the London Metal Exchange in mid-October and has been below 60¢ since July. The high value of the U.S. dollar relative to other currencies is probably the most significant factor contributing to the low metal prices and, until the dollar weakens, a substantial increase in prices is unlikely. "As the projected price increases did not materialize a decision was announced on October 22 (GCNL 104(84) refers) to close the mine on 14Dec84, and it will remain closed until metal realizations are at levels permitting profitable operations. If metal prices improve next year as expected, the mine could re-open next spring."

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GWL #150

3 AUG 1984

BRENDA MINES LTD. (BND-V,T)

92H/16E (092HNE047)

PERIOD ENDED 30 JUNE

THREE MONTHS

SIX MONTHS

	1984	1983	1984	1983
Production Revenue, Net	\$ 5,541,000	\$13,586,000	\$ 7,247,000	\$23,741,000
Net Earnings (Loss)	(1,421,000)	(75,000)	(2,504,000)	430,000*
Per Share	(33¢)	(2¢)	(59¢)	10¢

* After an after tax gain of \$2,100,000 from the sale of 362,438 conv. pfd. Brascade Shares.

HIGHER METAL PRICES NEEDED TO SUSTAIN MINE OPERATIONS

In presenting comparative first half and second quarter results, John Hall, president of Brenda Mines Ltd., notes that mining operations started up on 28 May 84 following a shutdown of nearly 8 months. A new labour contract

was ratified on May 11.

Mr. Hall says the expected rise in metal prices did not materialize with the strengthening economy and prices for copper and molybdenum weakened further during the second quarter. Higher prices will be necessary to sustain the company's mining operations.

The oil and gas division had a negative cash flow of \$12,000 after expenditures of \$300,000 during the second quarter.

Brenda's six-month net cash flow totalled \$1,350,000 after expenditures of \$480,000.

NM MINER 9 AUG 1984

Brenda reopens Peachland mine

It's been a tough two years for Brenda Mines, 49.9% owned by Noranda Inc. Net losses of \$7.2 million and \$3.1 million in 1982 and 1983 respectively have been followed by a net loss of \$2.5 million in the first half. Continued weakening of copper and molybdenum prices is cited for the poor performance by John Hall, president.

The company reports a net loss of \$1.4 million on net revenues from production of \$5.5 million in the second quarter. This compares to a net loss of \$75,000 on revenues of \$13.6 million in the same period a year ago.

Despite low prices for copper and molybdenum, the company reopened its mining operation near Peachland, B.C. at the end of May after an 8-month shutdown. Mr. Hall says the decision is justified by the desire to retain the company's skilled technical staff and to satisfy long term contracts in Japan and Europe. The company has 105 employees on staff.

Molybdenum inventories during the shutdown were reduced to 1,400 tonnes, enough to satisfy foreign contracts for five months, Mr. Hall tells The Northern Miner.

(092HNE047)

92H/16E

GWL #204

23 OCT 1984

BRENDA MINES LTD. (BND-T,V)

92H/16E (092HNE047)

MID-DECEMBER MINING - Because the market price for copper has remained below 60¢ U.S. per pound in recent weeks coupled with low prices and reduced demand for molybdenum, Brenda Mines Ltd. will suspend operations of their mine, near Peachland, B.C., for an indefinite period starting 14 Dec 84. Mine manager Gordon Harris says some improvement in metal prices is predicted for early 1985. If this materializes, it is possible the mine could reopen in the spring.

Brenda was closed in October 1983 for similar reasons and, when reopened in June, a rise in metal prices had been noted. This has not occurred and Brenda is not at a profit at current prices. In addition, molybdenum

(60)

MINER 10MAY1984

Brenda to reopen Peachland mine

VANCOUVER — Brenda Mines plans to resume production at its base metal operation near Peachland, B.C., "at the earliest date," shareholders were told at the annual meeting, although no decision has been made on the exact time. J. A. Hall, president, said it could be within weeks.

Citing the need to keep the company's skilled group of employees together and maintain its market presence, Mr. Hall also noted that labor negotiations for a new contract had gone to mediation, adding the company and union were still apart on monetary issues.

The mine, which closed over seven months ago, was the prime reason for Brenda's net loss in the first quarter of almost \$1.1 million compared to a profit of \$505,000 for the comparable period in 1983. Contributing to net earnings was approximately \$1.1 million (before taxes) from the company's oil and gas division and \$434,000 in Kerr Addison dividends. But that was not sufficient to offset cash shutdown costs for Brenda of about \$2.4 million.

High copper and molybdenum inventories continue to plague this and other base metal mining operations throughout the world which prompted Mr. Hall to caution "that surplus is also likely to limit the extent of further price gains over the balance of the year."

Demand for copper has been strong, primarily because of the housing and automotive sectors, and Japanese smelters have even been offering attractive smelter terms to

entice badly needed concentrates to their smelting operations.

There is also much uncertainty over molybdenum markets as well. Brenda reduced its moly inventory by 23% during the quarter to almost 1.9 million kilograms. Strength in this sector will relate to an increase in steel consumption, the result of new capital projects getting under way. But there is ample production capacity on hand to meet virtually any realistic scenario.

Although he said Brenda was lean and efficient before the shutdown, Mr. Hall conceded the company might still be "able to find ways of improving productivity and reducing costs."

Regarding Brenda's tailings pond, Mr. Hall said the almost complete drainage of minesite water into the dam over the years caused an unacceptable buildup in the pond. The threat of excessive spring runoff compounded the problem and there was some danger the pond would rise "beyond safe levels," he pointed out. So the company, with government approval, discharged tailings effluent into the water system and the program was concluded around mid-April when the tailings pond was at a safe level. Environmental groups opposed the discharge and at one point were adamant the water be stored in the open pit. The company's technical staff, and also independent consultants are now studying methods to alleviate the public's concerns about water disposal, he

said.

92H/16E
(092HNE 047)

GCN2 #95 16MAY84

BRENDA MINES LTD. (BND-V.T)

92H/16E (092HNE047)

MINE IS REOPENING - Brenda Mines Ltd. are reopening their copper-molybdenum mine near Peachland in the south Okanagan district of B.C. All 425 employees are expected to be at work by 28May84.

The mine was shut down last September because of poor metal prices. A Brenda spokesman says that, at current prices, the company still cannot operate profitably, but are reopening the mine in order to maintain a presence in the marketplace and keep their groups of skilled employees together.

The recall follows a contract settlement reached last week with United Steelworkers Union Local 7618, which maintains previous levels of wages and provides an increase in pension benefits.

MINER
JUNE 1984

Brenda Mine Reopens
Brenda Mines Ltd and the United Steelworkers of America, Local 7618 reached an agreement on an 18 month contract which maintains the previous levels of wages and provides an increase in pension benefits. Ratification of the agreement ensures the reopening of the Brenda Mines operation near Peachland, BC. All 425 employees of Brenda were recalled by the end of May 1984.

The copper-molybdenum mine was shut down September 1983 because of poor metal prices. The company says that, at current prices, it still cannot operate profitably, but is reopening the mine in order to maintain its presence in the marketplace and keep its skilled group of employees together.

92H/16E
(092HNE047)

W.M. JUNE
APRIL 1984

Diverse activities: strong base for Noranda

80M/9W

A giant among Canadian resource groups, Noranda Mines Limited and its associates cover minerals, forestry, oil and gas, and manufacturing and research. Because of its large involvement with copper and molybdenum, and the forest industries, Noranda has had to deal with very adverse conditions during the recent recession. Nevertheless, it remains a strong group, with hopes for improvements in various sectors in the foreseeable future.

In 1982 the metals and minerals group was reorganized into four groups covering: western Canada and the US; copper and related products; zinc and related products; Ontario mines and industrial minerals. Noranda ownership is complex, involving Brascade Resources, Kerr Addison Mines and others. Noranda has about 30% interest in Placer Development (covered elsewhere in this issue), and in turn Placer has a 6% interest in Noranda.

In western North America, Noranda's principal interests include Central Canada Potash, in Saskatchewan, which continues to operate successfully. In the metals field, the mining operations in British Columbia have not fared so well. The Boss Mountain molybdenum mine, in the Cariboo District of BC, closed in February 1983. The Babine Division, which includes Bell Copper and Granisle Mine (formerly Granby Mining), is

inactive except for an overburden stripping operation at Bell Copper, which has continued since late 83. When copper markets improve, the Bell Copper open pit mine could re-enter the field. The interesting underground Goldstream mine, which opened in 1983, has also been closed, partly because of the cost of complex underground development work, but this, too, could reopen when the economics improve. (WM July 83 p9-16.)

Noranda has a 49.9% interest in, and operates, the copper-molybdenum producer of Brenda Mines Ltd, at Peachland, BC. Major water and effluent problems at the site were being cleared up in March 1984, but caused production to be suspended for a while. There is a chance that a short-term opportunity in the molybdenum market might be of advantage to Brenda.

In the western United States, Noranda has mining operations in Arizona and California, and a good joint venture prospect in Alaska. Activity at the Noranda Lakeshore mine, Casa Grande, Arizona, had virtually ceased by early 1984, though processing of stockpiles was still proceeding in March. Copper oxide ores are processed.

In the Klamath River mining district of California, Siskiyou County, Noranda Grey Eagles Mines Inc developed a mining and processing facility to recover gold and silver at the site of the

abandoned Grey Eagle Copper Mine. The open pit operation will remove some one-million tons of ore from an area of about 18 acres, requiring removal of about 5-million tons of overburden. Topsoil was removed separately and is stored for reclamation.

Processing, at about 180,000 tons/year of ore, is a carbon-in-pulp operation involving ore grinding, cyanide leaching, carbon absorption, electrowinning, and bullion smelting. Operations were continuing through March 1984.

Noranda Mining Inc is involved in the Greens Creek joint venture project, which was formed in 1978 following the initial discovery in 1973 some 18 air miles southwest of Juneau, Alaska. The property lies within the Admiralty Island National Monument, but outside the nearby Wilderness Area. The 'careful development' of valid claims in the Greens Creek area is permissible, under relevant lands acts, but progress is slow because of the need to satisfy environmental regulations.

Drilling results reported in 1982 indicated geologic reserves of some 3-million tons containing 0.5% copper, 2.5% lead, 7-10% zinc, silver at 10+ oz/ton, gold at 0.1 oz/ton.

On a more optimistic note, Noranda is extensively involved in the very promising Hemlo camp, which has been covered in some detail by our contemporary *The Northern Miner* and elsewhere.

92A/16W
92A 00)
934/16E
093L 146)

Placer's 1983 earnings return to the black

Stronger precious metals prices in the first three quarters of last year provided a welcome boost to Placer Development's results last year. The diversified mining company recorded a net profit of C\$29.3-million on revenues of C\$282.4-million last year, compared with a net restated loss of C\$20-million on sales of C\$266.4-million in 1982.

Company chairman C. Allen Born highlighted the record 6.9-million oz. of silver produced at the Real de Angeles mine in Mexico (in which Placer holds a 34% interest) for its contribution to last year's profit. Also noteworthy were the 4.96-million oz. of silver produced at the Equity Mine (owned 70% by Placer) in Houston, BC.

Gold output from the new Golden Sunlight mine near Whitehall, Mont., added a further 79,700 oz. to total production, as did output from the Cortez gold mine, which yielded 47,355 oz. last year (Placer holds a 39.6% interest in the Cortez mine). In addition to its earnings from production, Placer also derived a net investment gain of C\$13.7-million from the sale of 20% of its interest in the Kidston gold mine in Queensland, Australia.

Officials at Placer noted that the Real de Angeles mine was expected to produce 7.5-million oz. of silver this year, more than 12% of Mexico's total production. Company spokesman William Thompson further observed that the Kidston gold mine, scheduled to be onstream by mid-1985, will produce on average 193,200 oz. of gold and 132,000 oz. of silver per year (MW Feb. 6, p2). Thompson said, "Our move away from base metals into precious metals in the past four years has been a strategic one, especially when you look at the currently depressed molybdenum and copper markets."

92/11W
(0932 001)

Noranda's Brenda mine will reopen April 1

Brenda Mines' molybdenum-copper operation in Peachland, BC, closed since Sept. 30, 1983, is being readied for reopening this Apr. 1. Projected full production at the mine, operated by major shareholder Noranda, is 33,400 tpd.

John Hall, senior vice president of Noranda, notes that the same conditions which forced the closing of the mine and idled some 450 workers still obtain: the depressed state of the

molybdenum market and high inventories. But, Hall told *Metals Week*, "It also costs money to keep a mine shut down. Brenda has been on a care-and-maintenance schedule, but with no water recycling our tailings dam has suffered damage from melted snow draining into the tailings area. We will need to build up the beach to improve the stability of the dam."

In 1982, its last full year of operation, Brenda milled approximately 9.5-million mt of ore at rates of up to 26,000 tpd to produce 4,370 mt of molybdenum concentrates. Ore reserves stand at 110-million mt averaging 0.148% copper and 0.032% molybdenum, in addition to 4.7-million mt stockpiled. C\$4.4-million in capital improvements went into the mill in 1982.

92H/16E
(012HNE047)

NMIMER
19 APR 1984

Brenda reports loss for second year

Brenda Mines recorded a loss of \$3.1 million or 73¢ a share in 1983, following a net loss in 1982 of \$7.15 million or \$1.67 a share. J. A. Hall, president, reports. However, he adds that the 1983 loss included the after-tax loss of \$2.79 million in an associated company.

"The unsatisfactory results for both years were due to continued depressed copper and molybdenum prices," Mr. Hall says in the annual report. He adds that survival has been the priority and with supply continuing to outstrip demand for the company's products, it will be the priority in 1984.

Mining operations were closed at the end of the 1983 third quarter and the mine was placed on a care and maintenance basis pending an improvement in copper and molybdenum prices.

The company reported a working capital deficiency of \$22,971,000 at year-end compared with the year-previous figure of \$16,834,000.

(092HNE047)

92H/166

(56)

(92H/16E) (092HNE047)

NMTR 10 NOV 1983

Share sale, investment income help reduce Brenda's losses

Brenda Mines, which closed down its molybdenum mine near Peachland, B.C., at the end of September for a 6-month period, reports a loss of \$460,000 for the three months ended Sept. 30, and a loss of \$30,000 for the first nine months of the year.

This compares with a third quarter loss last year of \$2,922,000, and a loss for the nine months in the same year of \$10,600,000.

The company notes that the gain on the sale of Brascade shares in this year's quarter, investment income, and profits from the oil and gas division, were the significant factors in the reduced losses in 1983.

The operating loss from mining operations totalled \$7.8 million for the first nine months of 1983.

Brenda said earlier the mine closure was intended to reduce cash losses and a steadily-increasing moly inventory, and notes in its current report that the build-up of moly inventory continued during the third quarter to 2,947,353 kg, compared with 1,418,946 kg one year ago.

On the oil-gas front, Brenda says discovery oil well "Jabiru 1A" drilled on the acreage contained within permit area NT/P26 in the Timor Sea off the northwest coast of Australia, reached a final depth of 3,225 m. The well tested 41° API oil over the interval 1,593.5 m to 1,651 m and on completion of the production testing program, the well suspended.

The tests gave a flow rate in excess of 7,300 bbl. per day, the maximum limit of the surface production facili-

ties on the rig. Plans are now being formulated for further exploration. Brenda has a 1.093% interest in the well.

Brenda had a working capital deficiency of \$19,515,000 as at Sept. 30, compared with a deficiency of \$32,755,000 at the same time the previous year.

NMTR 15 MARCH 84

Brenda reduces loss by more than half

Low price levels for both copper and molybdenum are blamed for a 1983 net loss of \$3,079,000 or 73¢ a share for Brenda Mines.

The loss was less than half the 1982 loss of \$7,150,000 or \$1.67 per share. Although Brenda points out that the 1982 loss included the company's share of the loss of an associated company, totalling \$2,790,000.

In the latest year Brenda milled 8,185,402 tonnes, but mining and milling operations were suspended on Sept. 30, 1983, and remain on a care and maintenance basis. Ore milled in 1982 totalled 9,484,562 tonnes.

Brenda says a loss of \$3,080,000 recorded in the fourth quarter of 1983 was not meaningful, since the company accounts for its revenue on a production basis, not an actual sales basis. As a result, no income was reported for the period the mine has been closed.

The oil and gas division had net revenue in 1983 of \$4,150,000, compared to \$3,730,000 in the previous year. The division also reported an operating profit of \$1.12 million against a loss of \$2,180,000 in 1982.

(092HNE047)

(92H/16E)

MEMOR 11 AUG 1983
 92H/16
 (92HNE 047)

Brenda to close mine for a 6-month period

Brenda Mines plans to close down its molybdenum mine near Peachland, B.C., for a 6-month period beginning at the end of September, the company discloses.

The company says the closure is intended to reduce cash losses, and a steadily-increasing molybdenum inventory. Brenda emphasizes that despite marginally higher prices for copper, silver, and gold, molybdenum continues to sell at a price below the cost of production.

Operating losses from mining were \$1,261,000 for the three months to June 30, and \$5,286,000 for the 6-month period to that date. Profits from oil and gas production were \$764,000 and \$1,432,000 in the second quarter and 6-month period respectively.

Brenda completed the second quarter with a reported loss of \$75,000, and a profit of \$490,000 for the first six months. The profit resulted from the sale of Brascade Resources shares in the first quarter, as well as from investment income and the profits from the oil and gas division.

In addition to the low molybdenum price factor, the company says it has been able to sell only 63% of its production to date this year. Moly inventories currently represent more than one year of sales at current levels, and stand at 2.7 million kg, an increase of 132% in the past year.

GAL #215 NOV 1983

BRENDA MINES LTD.

92H/16E (092HNE047)

9-MONTHS ENDED 30 SEPTEMBER	1983	1982	Brenda Mines Ltd.'s mining and milling operations were suspended on 30 Sep 83 when 320 employees were laid off. With operations on a care and maintenance basis, 88 are retained on a rotating schedule and 20 people are working fulltime. Management notes that the gain on sale of Brascade shares in the first quarter, investment income, and profits from the oil and gas division, significantly reduced losses in the 9 months ended 30 Sep 83.
Gross Value of Concentrates Produced	\$37,752,000	\$34,289,000	
Value of Oil & Gas Produced	3,647,000	2,192,000	
Total Value of Production	34,610,000	31,020,000	
Operating Loss	6,942,000	5,068,000	
Interest Expense, Net	3,928,000	6,675,000	
Securities Disposal Gain	2,888,000	-	
Income & Resource Tax (Recover)	(6,650,000)	(4,238,000)	
Oil/Gas Revenue Tax	-	292,000	
Dividend Income	1,301,000	-	
Share of Associate's Loss	-	2,796,000	
Net Loss	31,000	10,600,000	
Loss Per Share	1¢	\$2.50	
Cash Flow (Out)	(366,000)	(4,820,000)	
Working Capital Deficit	\$19,515,000	\$32,755,000	

The operating loss from mining operations in the 9 months totalled \$7,600,000. Prices for both molybdenum and copper remained at unprofitable levels and the build-up of molybdenum inventory continued during the third quarter to 2,947,353 kilograms compared to 1,418,946 one year ago.

The discovery oil well Jabiru 1A, drilled within permit area NT/T26 in the Timor Sea off the northwest coast of Australia, reached a final depth of 3,225 meters. The well tested 41 degrees API oil over the interval 1,593.5 m to 1,651 m and, on completion of the production testing program, the well was suspended. The tests gave a flow rate in excess of 7,300 barrels per day which is the maximum limit of the surface production facilities on the rig. Plans are now being formulated for further exploration. Brenda's interest is 1.09375% in the permit area.

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NM MINER
26 MAY 1983

Brenda follows lead of other mines turning profit in the first quarter

VANCOUVER — The trend, at least for the first quarter of 1983 in B.C.'s base metal sector is definitely towards profitability. Brenda Mines (51% Noranda) posted net earnings for the quarter of \$505,000 or 12¢ per share compared to a loss of \$4.2 million or 99¢ last year. As a result it joins Lornex Mining and Cominco's Valley Copper division (both in the Highland Valley) as money makers.

Brenda's president, J. A. Hall, told the annual meeting bank debt was reduced by \$9.5 million in the quarter and this was attributable to its sale of Brascade Resources shares, Petroleum Incentive Program (PIP) grants and Kerr Addison dividends. Regarding Brenda's equity in Kerr Addison, he argued the company's "strong financial position continues to make Brenda's ownership in shares of the company attractive." In the first quarter Kerr reported net income of \$4.3 million and a working capital of \$52.3 million at the end of the period.

Mr. Hall predicted that price levels could recover during the year with molybdenum rising to approximately \$11 per kg. But he added: "Until demand improves to the point where stocks are brought down substantially, there is little prospect for prices to reach reasonable levels of profitability." This likely won't happen before 1984 and he cautioned it probably won't be attractive to "consider new investment and expanded production" before 1985.

Comparing the high cost for water rental and hydro power to imposing an additional tax burden on mining companies he claimed government is making it hard for the resource sector to compete "in world markets" or create and "maintain jobs in the province."

Discussing mining operations, Brenda's vice president and general manager, John B. Knapp, noted that milling rates average just over 30,000 tonnes per day and he added even though molybdenum inventory remains high "no shutdown of operations is planned for this summer."

R. H. Pemberton, director, oil and gas division, said results during the fiscal year "were somewhat better than we had forecast." Net revenues increased slightly to \$2.5 million and capital expenditures of \$2.9 million were down from the \$4.7 million originally projected.

In the first quarter, Brenda participated in 14 wells and 10 of these were cased for future gas production. Five were farm-outs at no cost to the company and all of these were successful. Startup production from eight new project areas will be delayed for a year, said Mr. Pemberton, thereby reducing revenue predictions. However, capital costs associated with gas plant construction will also be delayed.

"We believe 1983 and 1984 will be a rough period for the gas industry in Canada which will not turn around until a substantial increase in domestic or export demand occurs."

92H/16E

(092 HNEO 47)

Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Scottie Gold Mines 104B11E 104B 074	The company's gold-silver mine was recently placed in production. Total: \$7.5 million	7,500			
Teck Corp	Construction is slated to begin on the Bullmoose coking coal mine in northeast BC in the spring of 1982. It is designed to supply 1.7 million tons of coal annually, beginning in late-1983. Total: \$220 million		110,000	110,000	
Westmin Resources 92AF12E 92AF 071 072	The shaft is being sunk for development of the Creek zone copper-lead-zinc deposit near the Myra and Lynx mines at Buttle Lake, BC. Production is expected by 1983 and ore will be milled at the existing concentrator. Total: \$15 million	5,000	5,000	5,000	

NHNER 12 NOV 81

Copper, moly prices hurt Brenda Mines

Lower prices for copper and molybdenum have hurt Brenda Mines' nine month earnings despite substantially increased production. The company shows net earnings of only \$970,000 (23¢ per share) for the period, compared to \$17,722,000 (\$4.20 per share) in the like period of 1980.

Third quarter losses for Brenda were \$3.6 million or 87¢ per share, compared with a profit of \$4.1 million in the 1980 third quarter.

Production of copper, molybdenum, silver and gold were all up substantially during the period. The company produced 8.5 million kg

copper compared to 6.6 million kg in 1980, while moly production was up to 2.0 million kg compared to 1.5 million. Silver production was up to 4.5 million g compared to 3.5 million g, and the company produced 75,618 g gold during the period compared to 60,940 g in 1980. The company also produced gas for the first time, registering 109.4 million cu. ft. in the first nine months.

Brenda also says the losses were due in part to increased expenses.

92AF116E
92AF11E047

Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Equity Silver (continued)	Regional exploration		100		111
	Replace mill equipment	155	6		6
	Buy on-stream analyzer	200			
	Additions to flotation	200			
	Mill expansion				2,500
	Replace plant equipment	121	300	70	280
	Move carpenter shop	55			
	Replace misc. equipment	41	177	39	363
	New warehouse storage	50			
	Buy computer facilities		75	75	
Replace telephone system	20				
Total: \$11.64 million					
Esso Minerals Canada	Having just bought the Byron Creek colliery in southeastern BC, Esso plans to expand it.	35,000	35,000		
Total: \$70 million					
Fording Coal Ltd	The \$115 million coal mine expansion at Elkford is well under way.	38,000	26,000	20,000	
Total: \$84 million					
Lornex Mining Corp Ltd 92117W 09215E008	The \$160 million expansion of the copper mine at Logan Lake, BC, is complete. Project included upping the milling rate to 80,000 tpd and purchasing additional pit equipment.	78,300			
Total: \$78.3 million HIGHLAND VALLEY					
Noranda Mines Ltd 82M19W 082M 141	The Goldstream copper-zinc mine near Revelstoke is scheduled to be in production late in 1982 at a rate of 1350 tpd. Total cost of the project is estimated at \$62 million.	27,600	16,300		
	Studies have started on modifications to the ore handling and processing systems at the Granisle mine.	300	300		
Total: \$44.5 million					
Norco Resources	A hydraulic and longwall coal mine is planned at Bowron River, near Prince George, BC. Output will be sold to Taiwan Power Co.	40,000	41,000		
Total: \$81 million					
Placer Development Limited 93K3E 093K 006	The bulk of spending at the Endako moly mine will be for upgrading the mill.				
	Replace mobile equipment	50	1,291	1,511	
	Upgrade and replace process equipment	536	1,815	1,040	
	Complete flotation expansion	185			
	Complete roaster expansion	1,697			
Total: \$8.125 million					
Ruth Vermont Mine Limited 82K115W 082KN E009	This silver-lead-zinc producer was reopened this summer in southeastern BC.	4,000			
Total: \$4 million					

Company	Purpose of expenditure	S000s to be spent			
		1981	1982	1983	Beyond 1983
BP Canada	Plans are being made for the Sukunka coal mine development near Chetwynd, BC. Total: \$400 million			400,000	
Carolyn Mines Ltd 92H111W 092HNW003	The Ladner Creek gold mine development was completed this year. Total: \$10 million	10,000			
Cominco Ltd 82F19E 082FNE052	The modernization and associated metallurgical projects at the Trail smelter will receive the bulk of spending - \$355 million. Trail modernization Sullivan mine and mill Minor projects Total: \$443 million	85,000 7,000 12,000	105,000 10,000 12,000	160,000 40,000 12,000	
Crows Nest Resources Ltd	The Line Creek coal mine at Sparwood is nearing production set for next year. Total: \$120 million	70,000	50,000		
Dankoe Mines Ltd 82E14E 082ESW002	Spending is modest at the silver mine near Keremeos, BC. Total: \$750,000	250	250	250	
Denison Mines Ltd	With the promise of a rail line to northeastern BC, development of the Quintette coal deposit is planned by 1985. Total: \$700 million		100,000	100,000	500,000
Dickenson Mines Limited KAM-KOJIA 82F114W 082FNA1257	The silver-lead-zinc mine near New Denver, BC is receiving several improvements. Conversion to central diesel plant for mine and mill plus upgrading and increasing hydro plant. Replacing mill equipment and upgrading capacity 60 per cent to 200 tpd Total: \$550,000	100	300	150	
Dimac Resource Corporation 82M13E 082AM 136	This small tungsten mine was recently placed in production near Clearwater, BC. Total: \$2.5 million	2,500			
DuPont Canada Inc 94E11E 094E 086	The Baker gold mine at Chappelle, BC, is in production. Total: \$6 million	6,000			
Equity Silver Mines Ltd 93L11W 093L 001	This newly-opened silver mine is planning expenditures of about \$7 million for mining and \$3 million for milling. Replace pit equipment Total: \$10 million	477	695	4,673	855

92H/16E

CMJ Capital Spending Report

BRITISH COLUMBIA \$2,996 billion

Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Afton Operating Corporation 92I/10E 092JNE003	Mobile equipment for open pit copper mine	3,500	3,500		
	Systems improvements at mill	750	750		
	Systems improvements at smelter	750	750		
	Total: \$5 million				
BC Coal Ltd	The \$278 million Greenhills coal mine is expected to begin production in mid-1983 at a rate of 1.8 million tonnes/year.	63,000	100,000	60,000	
	Expenditures at Sparwood include \$17.6 million for pit equipment, \$13 million for land acquisition and residential construction and \$1.6 million for a new lab.	53,000	46,000	28,000	10,000
	Construction at the Harmer mine includes a new dry and office and maintenance shop extension.	9,458	7,635		
	Cost of increasing the throughput of Westshore terminals and upkeep.	43,000	74,000	38,000	
	Total: \$472.093 million				
BC Hydro	The price tag of the Hat Creek coal mine and generating plant due to come on stream in 1988 has risen to \$5 billion, with roughly 45 per cent of the cost being for the mine.	32,000	32,000	32,000	129,000
	Total: \$2.25 billion				
Bethlehem Copper Corporation 92I/7W 092ISE001	Spending at this open pit copper mine has nearly doubled this year over last.				
	Replace mining equipment	4,554	2,117	1,468	
	Construct tailings dam	7,316	2,376		
Total: \$17.831 million					
Brenda Mines Ltd 92H/16E 092HNE047	A new mining shovel and mill equipment were added at this copper-moly producer.				
	New mining shovel	2,000			
	Classifying and flotation equipment	4,250			
	Normal equipment replacement	3,500	4,000		
Total: \$13.75 million					

Instead of their usual 40 hour week, employees came in 32 hours, meaning no layoffs were necessary.

In 1980 Brenda milled 24,937 tonnes per calendar day grading 0.128% copper and 0.033% molybdenum, which led to the production of 32,390 tonnes of copper concentrate and 4,106 tonnes of molybdenum concentrate.

The mining of fringe areas in the pit reduced the over-all grade of mill feed and, although the concentrator handled about the same tonnage as the previous year, it fell short of expectations. All of this was due to the crusher breakdown.

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Northern Miner August 20, 1981



Open pit of Brenda Mines' copper-moly operation near Peachland, B.C.

Photo by The Northern Miner

Brenda mine-mill complex highly efficient performer

By David Duval

PEACHLAND, B.C. (Staff) — Yes, Brenda does it — but quietly. That was the first thing this reporter discovered on a recent visit to Brenda Mines, near Peachland, B.C. Owned 50.9% by Noranda Mines, the copper-moly producer is located in the Okanagan Valley, only 14 miles northwest of that south-central B.C. community.

Formed in 1964, two prominent B.C. mining men, B. C. Brynelsen and N. M. Menzies oversaw its activities in the early years. Mr. Brynelsen is presently the company's chairman while Mr. Menzies sits on the board of directors.

Detailed exploration and feasibility work for the mine, which was funded by Nippon Mining and private individuals, began in 1965 and following this Noranda opted in with major project funding in 1966. The Canadian mining giant still retains management control of the company.

Strongly fractured

Geological work indicates that Brenda's mineralization occurs in a strongly fractured area 2,600 ft. long and 1,500 ft. wide. Ore grade mineralization extends to depths exceeding 900 ft. and a belt of lower grade marginal mineralization, up to 2,000 ft. wide, extends northeasterly to nearby Long Lake.

John Keyes, Brenda's mine superintendent, said 52,000 short tons per day were being moved out of the pit and some stockpiled ore was being added to the mill feed. That material is heavily oxidized and can't be handled in winter, he noted, since it plugs up the crusher. At year-end Brenda had about 9.9 million tonnes of stockpiled ore and the remaining stockpile currently averages 0.141% copper and 0.036% moly. Use of stockpiled material is intended in part to maximize the life of the mine.

The Northern Miner completely agreed with his statement that the operation was a well run and highly efficient mine-mill complex. Much of it, of course, is due to the company's stable work force and good operators, he concluded. Everything about the pit operation seemed perfectly synchronized. As soon as one truck pulled out after loading, another backed in. Then the cycle continued.

Computer assists

Brenda's engineering department has a Texas Instrument 990 computer which assists in pit planning, a company spokesman said. Among its many duties the computer produces 3-dimensional views of the pit and cross-sections with drill holes plotted on them. The co-ordinates of the holes are simply fed into the

computer and out comes the plotted data. This substantially reduces the amount of engineering staff time required compared to manual plotting, says Brenda.

The computer is also used for slope monitoring on a continuing basis in order to detect wedge failures before they happen.

Assay data from rotary drill holes are also fed into the computer and this will be used as a data bank for geostatistics. A system of kriging is being utilized to calculate the grade of pit ore more accurately. The computer's work involves four basic classifications: bookkeeping, monitoring geostatics and assaying.

Mr. Keyes said that operations personnel provide a great deal of input into the computer. And he states without hesitation, that the company's engineering department is a strong one. Two leach systems designed by Brenda engineers for production of more saleable concentrates were to start operation in 1981, says Brenda, and the company will receive royalty payments for their work.

Primary crusher

An equipment failure in the primary crusher forced closure of the entire crusher-concentrator complex in July until repairs could be made to the crusher's mainshaft.

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BRENDA MINES LTD: Improved prices for copper and molybdenum and the lower value of the Canadian dollar resulted in record first quarter earnings in 1979. Net earnings rose to \$5,168,000 or \$1.21/share, from \$2,621,000 or 61¢/share in 1978.

The milling rate remained steady at 29,850 tons/day and operating costs increased by 6.4% from the first quarter of 1978.

The company is continuing to participate in Dome Petroleum's Beaufort Sea drilling program with a \$5-million pre-tax investment. In the oil and gas area,

WESTERN MINER June 1979 49

Brenda is also involved with Sulpetro Limited in a joint exploration venture. To date, 11 of the 19 wells drilled have been completed as shut-in gas producers.

GcNL #162 22-08-79

BRENDA MINES LTD. 72H/16E 01557 092H/060470m

SIX MONTHS ENDED 30 JUNE			PRODUCTION STATISTICS:	
	1979	1978	SIX MONTHS ENDED 30 JUNE	
			1979	1978
Net Value of Concentrates			Ore Milled, Tonnes	4,917,317 4,907,988
Produced	\$47,320,000	\$30,928,000	Per Day, Av., Tonnes	27,167 27,116
Other Income	1,158,000	443,000	Copper Grade	0.157% 0.180%
Total Income	48,478,000	31,371,000	Moly. Grade	0.038% 0.044%
Operating Costs	15,453,000	15,030,000	Copper Conc., Tonnes	21,669 25,640
Interest Expense	17,000	-	Molyb. Conc., Tonnes	2,591 3,186
Depreciation, Amortization	2,196,000	2,136,000	Copper Recovery	82.37% 86.48%
Oil, Gas, Mining Exploration	7,062,000	5,154,000	Molyb. Recovery	78.52% 84.13%
Income, Resource Tax	12,105,000	2,541,000		
Net Earnings	\$11,645,000	\$6,510,000		
-Per Share	\$2.72	\$1.52		
Working Capital	\$47,263,000	\$32,138,000		

PROFIT ROSE 79%

Brenda Mines Ltd. second quarter earnings of \$6,477,000 exceeded expectations

due primarily to strong market prices for molybdenum and copper, coupled with the favorable exchange rate for U.S. currency. The latter accounted for over \$3,600,000 or 31% of earnings in the first half.

Productivity at 27,255 tonnes milled per calendar day was good and during May and June, 50% of the ore feed was obtained from stockpile. Although the grade of stockpiled ore is higher than that of current newly-mined ore, it has deteriorated due to oxidation and recoveries of copper and molybdenum were significantly lower in the second quarter.

Diamond drilling has started to assess low-grade mineralization on the perimeter of the existing orebody.

Sabre Petroleum's approximate 11% remaining interest in the Greater Cache, Alberta, gas project was acquired in May for \$908,000, giving Brenda an average 35% working interest in the project. Commencement of gas sales from Greater Cache depends on the current National Energy Board hearing on gas export to the U.S.

Brenda is again participating in Dome's Beaufort Sea exploration program, having acquired 0.1667% net profits interest in the next 9 wells drilled by Dome for \$5,200,000. Also, in the Beaufort Sea, Brenda will earn a 0.25% net profits interest in the Kopanoar M-13 by providing Hunt Petroleum's \$4,000,000 share of the cost of the completion and production test being conducted this month. Brenda also acquired for \$2,250,000, a 1.25% net profits interest in Dome's share of 2 wells now drilling: Texaco, Shell, et al., Blue E-18 on the Labrador Shelf, Eastcoast Offshore; and Dome Dundas N-82 on Melville Island in the Arctic Islands. These investments, totalling \$11,450,000, are eligible for additional tax write-offs available for petroleum exploration in frontier areas.

concentrate is then differentially floated. Further processing produces the final copper concentrate which is filtered and dried, ready for shipment. The main markets, are Japan and Korea.

The molybdenum rougher and scavenger concentrates from the separation circuits are pumped to the first cleaning stage and then go into regrind. The reground concentrate is subjected to further stages of cleaning to produce the final molybdenum concentrate.

The molybdenum separator is another phase of the flotation circuit which has come under computer control. Grade of the molybdenum concentrate is monitored and, depending on assays, the molybdenum cleaning flotation circuit is automatically adjusted to take off more or less concentrate to satisfy the grade recovery requirements.

Further processing to decrease certain impurity levels (copper and lead) is achieved through a special molybdenum leaching process developed and patented by Noranda Research Centre. Advantages to the leaching process, which uses a hot chloride leaching brine, includes a faster action and more effective washing capabilities.

Following the leaching process, the product is filtered, dried and packaged ready for distribution to markets in Belgium, England, and France.

The research which has contributed to the efficiency of the automated concentrator has not ended there. The Brenda staff are now working to develop automated control in the crushing operations.

At present, the ore from the pit goes to a primary crusher, a 60in by 89in gyratory unit which reduces the ore to less than seven inches. The crushed material falls to two apron feeders and is then moved by two conveyor belts and two

double-deck vibrating screens. The undersize material from the screen goes to the fine ore bin, and the ore on the screen decks is transported by conveyor belt to a stockpile. Coarse ore from the stockpile is fed into the secondary crushing plant by vibrating screens and two conveyor belts beneath the stockpile. Material from the secondary-tertiary crushing plant is then moved to the concentrator.

The first stage of a computer-monitored crushing system is scheduled for completion by mid-1980. Installation of the computer is planned for late summer 1979 and will be followed by tests for the following six to 12 months.

With the development of the project currently in progress, it is not possible to present the full background and technical data on the operation at this stage.

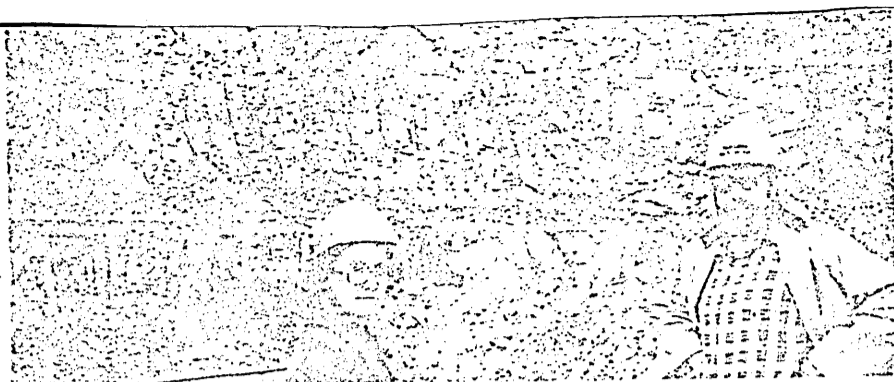
OPEN PIT

An all-time high of 19,268,000 tons of waste rock and ore was removed from the open pit in 1978. The pit is 900ft deep and has a circumference of 3000ft. Ultimately it will go to a depth of about 1200ft. Benches in the old section of the pit are 50ft with a 50ft berm and 45° slope angle. The new pit is being mined in double benches of 100ft.

Ore reserves at 31 Dec 1978 were calculated to be 97,650,000 tons grading

0.16% copper and 0.04% molybdenum.

The ore grade was lower than expected in 1978 due to a pit stability problem which temporarily interrupted mining in the lower area of the pit.



BRENDA: Looking towards the north wall of the open pit where the slope stability problem has occurred, from left, Betty O'Keefe of Noranda public relations and Garston Blackwell, chief mine engineer

A set of closely spaced gouge zones on the north wall striking east/west and dipping 50°-60° south into the pit were found to be sliding between the major rock masses north and south of them. A section of the road on the north side of the pit passes over this feature such that one side of the road is in the solid rock mass to the north and the other side is directly on the gouge/rock structure.

The stability problem due to the presence of gouge zones in the pit wall was increased by weakening of the rock mass by blasting operations. Groundwater flow and control added to the problem.

In spring 1978 settlement was noticed on the main haulage road at the 4860 elevation. A major displacement of about two feet occurred mid-June 1978 and by 15 June the south side of the road had to be blocked off leaving room for one-way traffic only.

Slope monitoring by a surveying device known as AGA710 Geodimeter has been in regular use at the mine since 1974. The geodimeter operates by use of a helium/neon laser beam providing precise mine slope stability measurement at considerable distances. Although slope monitoring using reflector prisms has been carried out on a routine basis using this equipment, this particular stability problem required the development of a simple control system which would enable shift bosses to check the slope movement at regular intervals.

Brenda personnel designed and installed well pumping systems to alleviate the water problem, and a beam and pillar monitoring system which facilitated simple and accurate monitoring of slope movement.

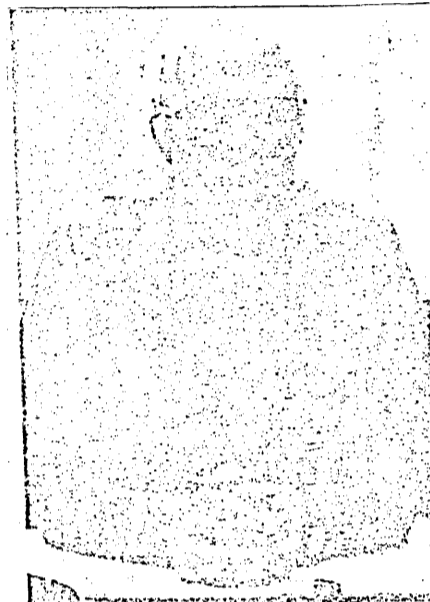
Using a steel beam attached to a solid ramp, the beam and pillar measures the vertical and horizontal components of movement by a circular potentiometer mounted on a pulley arrangement. A digital readout records the vertical and horizontal movement. Warning flashing lights were installed in the pit which were triggered by any movement over a quarter inch. A dial gauge was included as a double check on the system.

The beam and pillar was enough precaution to enable mining in the lower area of the pit until the early spring thaw in March 1979, at which time the target of ore mined had almost been reached.

PERSONNEL

The present staff numbers 470 and the estimated payroll for 1979 is \$11-million. The mine and mill is a 24-hour, seven day a week operation.

Brenda Mines Limited is owned 50.9% and managed by Noranda Mines. WM



BRENDA: John B Knapp, formerly mine manager, has recently been appointed vice-president. Gordon R Harris succeeds Mr Knapp as mine manager

Copper

92 H/16 E

ZONE

Western Miner
May 1979

Brenda Mines seek controlled efficiency

A high level of performance characterizes operations at the Brenda mine, situated eighteen miles from Peachland in the Okanagan Valley of British Columbia.

Copper and molybdenum ore is mined by open-pit methods and milled to produce copper and molybdenum concentrates.

The only economical solution to producing from a low-grade operation such as Brenda, is to treat as much ore as possible. John B Knapp, vice-president, told the Western Miner during a recent visit to the mine.

In 1978, ore was milled at the target rate of 30,187 tons/day, compared to 29,096 tons/day in 1977 and a record 30,345 tons/day in 1976. A total of 11,018,000 tons of ore was treated grading 0.165% copper and 0.04% molybdenum in 1978. Projections for 1979 are for approximately 11-million tons grading 0.128% copper and 0.036% molybdenum.

Despite lower grades than were expected and a resulting drop in metal production, net earnings increased dramatically to \$13,428,000 in 1978, a 44% increase over 1977. Operating the mill at a near record level in a period of higher copper and molybdenum prices and a lower Canadian dollar accounted for the improvement.

MILLING OPERATION

Designed to handle 24,000 tons/day of ore, the crushing and concentrating facilities have been operating at an increasingly higher rate since the mine opened in 1970. The development of a high level of automation has been effective in increasing the throughput and the efficiency of the plant.

An improvement in output was sought in the early years of operation, leading to the development and installation in early 1976 of a computer control system for the four grinding circuits.

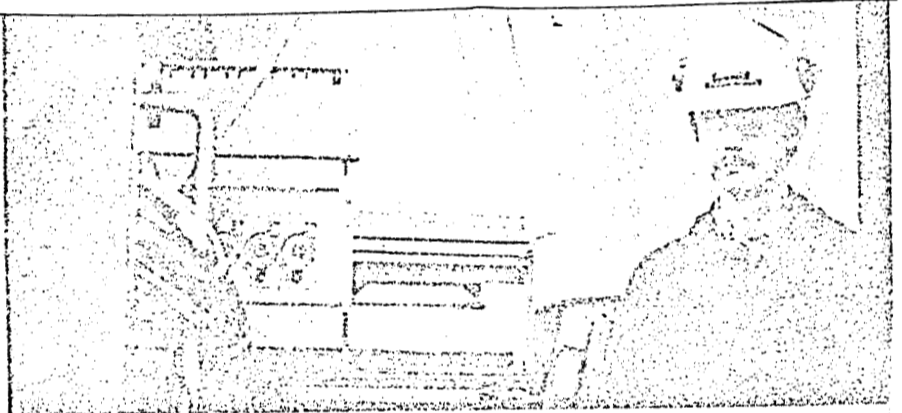
The system was developed by installing a digital computer on one of the four circuits to collect and measure data on all aspects of the grinding operation. It was determined that the rod mill sound level could be used to indicate overload conditions and similar tests on the ball mills indicated a strong relationship between the sound level and the density of discharge material from the mill.

Other important input signals to be measured include the power level, pump box level, cyclone density, and particle size on both the rod mill and ball mill.

The computer control measures all factors and determines whether a unit can handle more or less tonnage. It facilitates a continuous mill grinding process, keeps the grinding circuits loaded to capacity, and minimizes problems of overload. It has also been possible to increase the size of particles and improve throughput by allowing coarser material than was initially planned for in testing.



BRENDA: From left, John Knapp, vice-president, Betty O'Keefe of Noranda public relations, and Ron Bradbury, mill superintendent



BRENDA: Ron Bradbury, mill superintendent, beside the x-ray on-stream analyser

The concentrator is designed with four parallel circuits, each consisting of a 13ft6in-diameter by 18ft-long rod mill. Discharge from the rod mill is pumped to four 30in diameter cyclone classifiers, the overflow from which enters a ball mill and is then returned to the cyclones. The cyclone overflow flows by gravity to a conditioner and rougher flotation.

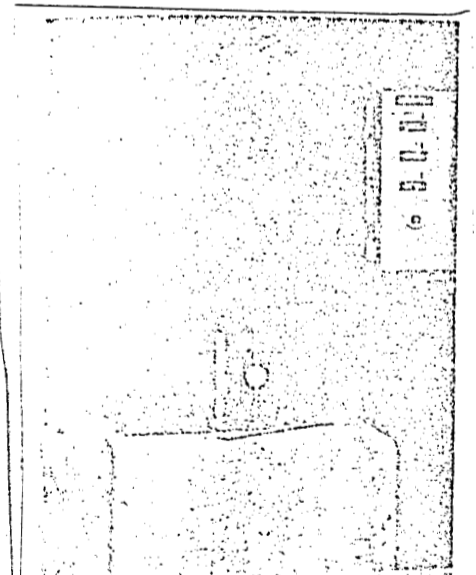
Having concentrated on the grinding process, all-important in a low-grade operation, the move towards automation was extended to parts of the flotation system.

Installation of an x-ray on-stream analyser was completed in 1978 and it has been fully operational since the fourth quarter of that year.

Selected streams pass through a flow cell in which the sample is irradiated. Resultant data are converted to give copper and molybdenum grades in the material.

Various streams around the flotation circuit are analysed, including the copper, molybdenum, tailings and mill feed. Data are fed into the main computer as well as printed out and are used in monitoring the flotation circuit.

The concentrate from the four circuits is combined for conditioning with sodium hydrosulphide to depress the copper in the first stage of the copper-molybdenum separation process. The



BRENDA: The beam and pillar monitoring system which was installed to facilitate simple and accurate monitoring of slope movement

W MINER APRIL 1978

BREXIDA MINES LTD: Net earnings for 1978 rose to \$13,428,000 for \$3.14/share, from \$9,480,000, or \$2.21/share in 1977. Revenue increased to \$73,112,000 from \$60,447,000 in 1977.

Fourth quarter profit for 1978 was \$4-million, or 94¢/share, compared to

\$2-million, or 47¢/share in the 1977 period. Revenue increased to \$19.9-million from \$14.7-million.

Higher prices for copper and molybdenum and the lower Canadian dollar value contributed to the profit gain.

An average of 30,187 tons/day was milled compared to 29,096 tons in 1977, but metal output decreased due to lower ore grade.

The company's investment in oil and gas was increased with a further \$7.2-million expenditure for a net profit interest in Dome Petroleum's Beaufort Sea exploration drilling program. Two transactions were made with Sulpetro late in 1978, one involving a commitment for \$6-million in oil and gas exploration projects and the second of \$1.2-million for interests in 15 shut-in gas wells.

GCNL #86 03-05-79

BREXIDA MINES LTD. 924110E 0557 0924110E047

3 MONTHS ENDED 31 MARCH

	1979	1978
Gross Value of Concentrates Produced	\$23,059,000	\$15,762,000
Smelting & Distribution Charges	2,255,000	2,091,000
Net Value of Concentrates Produced	\$20,804,000	\$13,671,000
Income Bef. Income & Production Taxes	11,318,000	5,666,000
Income & B.C. Resource Taxes	6,150,000	3,045,000
NET EARNINGS	\$5,168,000	\$2,621,000
Earnings Per Share	\$1.21	61¢
PRODUCTION DATA		
Ore Milled, Short Tons	2,686,500	2,633,600
Stripping Ratio, Ore/Waste	1.0/0.65	1.0/0.68
Milling Rate, Tons/Day	29,850	29,596
Mill Head Grades: Copper%	0.164	0.185
-Molybdenum%	0.039	0.041

John A. Hall, president, told the annual meeting that the high profit in the first quarter resulted from the higher grade ore in the bottom of pit No. 3. Although some 300,000 tons are left there, management expects lower ore grades over the balance of the year. Mr. Knapp, general manager at Brenda, told the meeting that, while final grades for the balance of the year will only be determined by

results from additional drilling, a copper grade of 0.11 to 0.12% and a moly grade of 0.028% to 0.029% MO is anticipated. Mr. Hall stated that operating costs are bound to increase due to the continuing escalation in cost of supplies, labor, increased drilling costs and tailings saddle dam construction.

With reference to communication, Mr. Hall stated that an on-site IBM system 34 computer with terminal to the larger Norcomp centre in Toronto was installed and is largely functional. In the near future, the computerized system will fully tie-in the operating departments to the service departments, namely, accounting, warehousing, purchasing, plant maintenance, engineering and assaying. The availability of data in a much shorter time and up-to-the-minute record of the warehouse inventory will add further to efficiency and productivity.

Various exploration programs will be carried out this summer on seven properties in B.C. All the areas are in the initial stages of exploration, through diamond drilling is scheduled for two properties. An interest was also acquired in a molybdenum prospect in the Yukon. Brenda is also participating in two joint ventures in B.C. and another in Idaho. The Idaho claims blocks are quite extensive and showings of molybdenite occur in a quartz vein structure. Considerable diamond drilling, drifting and geophysical work will be required to determine whether there is a potential mineable tonnage.

The main oil and gas involvement is with the Sulpetro-Brenda joint venture program. Eleven of the nineteen wells drilled to date have been completed as shut-in gas producers. The basic phase of the Brenda-Sulpetro program will be completed on the northern project areas during the 1979-1980 winter drilling season. Provided additional gas exports are approved by the end of 1979, Brenda will be making efforts to get the Greater Cache shut-in gas on production by as early as the end of 1980. Also, subject to gas export approval, wells at Amisk and Granlea should be on stream by 1980.

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interior and south of Fraser Lake-Nanderhoof.

Results from the URP geochemical program have indicated a number of Late Mesozoic granitic plutons with anomalous uranium values in southeastern and northwestern British Columbia. These may represent potential source rocks for basal-type deposits or may contain primary deposits within or adjacent to them. The distribution of some of these relative to Late Tertiary volcanic rocks is shown on Figure 5 and these include the Surprise Lake batholith near Adlin and the Fry Creek, Bettie, and Nelsasp batholiths and Hugabon and Horsechief Creek stocks in southeast British Columbia. URP data have shown anomalous uranium values in stream sediments and waters from drainages underlain by Eocene volcanic sequences along the west side of Okanagan Lake.

Molybdenum

Molybdenum production in British Columbia in 1977 was 34-million pounds, or about 20% of free world production, second only to the United States. The Province's prominent position in molybdenum production was attained in 1965 with the start-up of the Endako and Boss Mountain mines. Molybdenite is the principal commodity at present price levels at Brenda, and by-product molybdenite is recovered at four porphyry copper mines — Bethshegan, Lornex, Gibraltar, and Island Copper. Climax Molybdenum of British Columbia Limited have announced a 1982 production date for the former British Columbia Molybdenum mine on Lime Creek near Alice Arm. The deposit will produce 10 million pounds of molybdenum per year over a 25-year life.

At the end of 1974, molybdenum reserves of producing mines and significant undeveloped molybdenum-bearing deposits was estimated to be 1340-million tonnes of contained Mo, making British Columbia one of the world's truly great molybdenum metallogenic provinces.

A great number of significant molybdenite deposits and prospects are known throughout the Province (Fig 6) and, while the greatest known concentration is in the Intermontane Belt, they are distributed throughout all tectonic belts with the exception of the Eastern Margin Belt. The majority of deposits are stockwork and are associated with composite quartz monzonite stocks of Late Cretaceous-Early Tertiary age which intrude older layered rocks or granite batholiths, as at Adinac and Boss Mountain. 92A-2W

Molybdenite mineralization at Endako and Brenda is related to late stage intrusive phases of the Francois Lake and Henack batholiths, both of Late Jurassic age.

Significant molybdenum deposits have

been identified in the Omineca Belt and, like the majority of those in the Intermontane Belt, are related to small stocks of Late Cretaceous and Early Tertiary age. These include the clustering of deposits near Cassiar where the Mount Hasking and Mount Reed deposits are associated with small Eocene quartz monzonite stocks, while the Storie and Cassiar Moly deposits are hosted by acidic intrusive phases of a Late Cretaceous stock on the eastern margin of the older Cassiar batholith.

At Trout Lake in southeast British Columbia (Fig 6), molybdenum mineralization is related to a buried Late Cretaceous quartz monzonite stock which intrudes a highly deformed Lower Paleozoic sedimentary sequence. Drilling of this significant discovery by Newmont and Esso Minerals is continuing to further define a reported 900-foot intersection of 0.40% MoS₂. An underground exploration program is under consideration for 1979.

The significance of molybdenite mineralization in the Coast Crystalline Belt was recognized by the discovery of the US Borax Quartz Hill deposit east of Ketchikan in southeast Alaska. Molybdenite mineralization in quartz vein stockworks is associated with a multiple phase Oligocene intrusion which cuts older plutonic and metamorphic rocks. Similar young intrusions host molybdenite mineralization at the Salsal and Gem properties in southwest British Columbia. The Moly Taku prospect, east of the International Boundary in northwest British Columbia (Fig 6) and being explored by Omni Resources, may be of a similar type.

The great clustering of molybdenum deposits in the Alice Arm-Terrace area (Fig 6) includes the Lime Creek and other stockwork deposits marginal to the Coast Plutonic Complex as well as a number of occurrences within Coast granitic rocks. A significant feature of these deposits is their coincidence with the distribution of Quaternary basalt flows.

The discovery of significant molybde-

nite deposits in the Coast and Omineca Belts effectively renders two-thirds of British Columbia attractive for molybdenum exploration, particularly in areas that have heretofore received only limited attention.

SYNTHESIS

Exploration for a variety of mineral commodities increased throughout the Province in 1978. "Glamour" commodities were molybdenum, uranium, tungsten, and tin, and molybdenum exploration is expected to continue at a good pace while the levels of activity for uranium, tungsten, and tin will depend on the success of exploration ventures currently underway. Lead-zinc exploration is expected to increase, particularly in northeast British Columbia, and at present price levels increased effort will be directed to the search for gold and silver. Coal exploration should show a noticeable increase in response to work requirements on new licence areas. Finally, strengthening world copper markets will further encourage exploration for massive sulphide deposits and may in turn predicate a return to significant porphyry exploration.

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Endako - 93 K/3E; 93K-6; 06732
 Mt. Haskin - 104 P/6W; 104P-38; 04492
 Storie - 104 P/5W; 04491
 Cassiar - 104P/4W; 104P-35; 04489
 Trout Lake - 82K/12E; 82K/1W-3, 4, 87
 Salsal - 92J/14W; 92J/W-5; 00419
 Gem - 92J/9E
 Moly Taku - 104K/6W

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Island Copper - 92L/11W; 5984
Adinac { Ruby Creek } - 104N/11W; 104N-51; 1619
Boss Mtn. - 93A/2W; 93A-1; 00477

limestones adjacent to Cretaceous intrusions.

As shown on Figure 3, tungsten analyses of 700 stream sediment samples from the 1976 Uranium Reconnaissance Program survey area were released in August 1978. Anomalous values were obtained from several areas, principally in the southwest corner of the area adjacent to the US border.

One of the most active exploration areas in the Province was in the Atlin-Jennings River-Cassiar area where considerable effort was directed to the search for tungsten and tin. Three types of tin occurrences are known in this part of northwest British Columbia and adjacent Yukon. Cassiterite occurs in the gold placer creeks east of Atlin which drain the Surprise Lake batholith which hosts quartz-wolframite veins with tin as a minor constituent. Minor tin is associated with scheelite at the Adanac^{104/104} molybdenum property, and in skarns in the general area.

Geochemistry indicates higher than average trace amounts of tin in the polymetallic multiphase Surprise Lake batholith. Further east, the Seagull, Klinkut, and Glundebery batholiths underwent considerable exploration for tungsten and tin. Principal rock types are miarolytic biotite quartz monzonites with muscovite granite and aplite phases. Tin-tungsten mineralization with beryl-

limum and molybdenum is associated with fluorite and boron minerals (tourmaline, axinite) in skarns developed marginal to these plutons. At Ash Mountain, tin^{104/70} occurs in an andradite garnet skarn while at the Blue Lite property cassiterite and scheelite are contained in magnetite^{104/104}-pyrite veins. In the Cassiar area tin is a minor constituent of lead-zinc sulphide veins marginal to the Cassiar batholith.

Logtong, on the British Columbia-Yukon border (Fig 3), is a significant stockwork tungsten-molybdenum property on which a major drilling program was continued by Amax. Scheelite and molybdenite occur in a quartz veinlet stockwork in porphyritic alaskites, quartz monzonites, and contact hornfels and skarn. The skarns also contain beryl, minor wolframite, and tin, fluorite, and tourmaline. Published drill-indicated reserves are 200-million tons of 0.12% WO₃ and 0.06% MoS₂.

Tungsten analyses of stream sediments collected in the Atlin area by the URP survey were released earlier in 1978 and tungsten will be analysed along with 11 other elements in samples collected from the Jennings River-McDame map-area in 1978.

Uranium

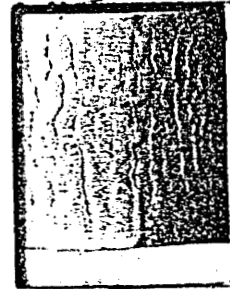
1978 was the third year in which intense exploration activity took place for uranium. It is probable that 60 per cent of

the mineral claim units recorded to date were located principally for uranium. Areas of significant claim staking activity were the Okanagan, the south-central interior, south of Fraser Lake, and Atlin (Fig 4).

Two potentially economic types of uranium deposit have been identified in British Columbia. Rexspar is a volcanogenic deposit in which uranium minerals and fluorite occur in trachytic volcanic rocks which are part of Paleozoic pile of schistose acid fragmental volcanic rocks. The Blizzard, southeast of Kelowna, is a basal or paleo-stream channel deposit in which secondary uranium minerals are contained in poorly consolidated Tertiary sediments preserved beneath a Pliocene basalt cap. Continued drilling of this deposit, owned by Lacana and under option to Norcen, has indicated the presence of 2.1-million tons averaging 5 pounds per ton U₃O₈.

Primary and secondary uranium minerals are also known to occur in pegmatite swarms in Monashee gneisses at China Creek near Castlegar and north of Grand Forks (Fig 4). Drilling programs on both of these properties were carried out during the year.

Exploration drilling for basal Tertiary-type deposits continued in the southeast Okanagan, at Chilanko River and 70 Mile House in the south-central



Thermal coal deposits explored elsewhere in the Province included drilling programs by Luscar-Weldwood at Quinson on Vancouver Island and by Cyprus Anvil at Tulameen and Telkwa. ^{92/10}

GOVERNMENT PROGRAMS TO ENCOURAGE EXPLORATION

Ongoing geological programs include regional mapping in areas of mineral potential and studies directed to the better understanding of ore deposits. Related programs include reconnaissance geochemical surveys in selected areas (Fig 2), principally through the

three-year Federal-Provincial Uranium Reconnaissance Program (URP) which was completed in 1978. This program involved the collection of stream sediments and waters at a sample site density of one per 5 square miles. Waters are analysed for fluorine and uranium and sediments for uranium and up to 11 other elements. To date results for six 1:250,000 map sheets have been published, including five in southeastern British Columbia (Fig 2) and the Atlin sheet in the northwestern part of the Province. The 1978 sampling program included the Jennings River-McDerm

map-area east of Atlin, and survey results will be made available in the spring of 1979.

The 1978 Accelerated Mineral Development Program, funded by \$5-million made available through Bill 5, Revenue Surplus of 1976/77 Appropriation Act, 1978, included an Accelerated Geochemical Survey of two map-areas in west-central British Columbia (Fig 2). This program is modeled after the Uranium Reconnaissance Program except that sample site density was one per three square miles. Data from this program are to be released in April of 1979.

The Accelerated Mineral Development Program also expanded existing Ministry programs including Prospectors' Assistance funds for mineral roads, and mine site reclamation. In addition, funds were made available to assist with labour costs for underground mine development and property exploration, and for the Mineral Exploration Incentive Program which reimburses junior mining companies and prospectors for one-third of field expenditures up to a maximum of \$50,000.

MOLYBDENUM, URANIUM, TUNGSTEN, TIN EXPLORATION

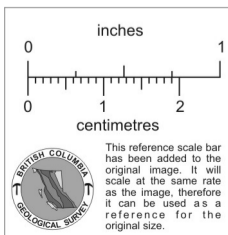
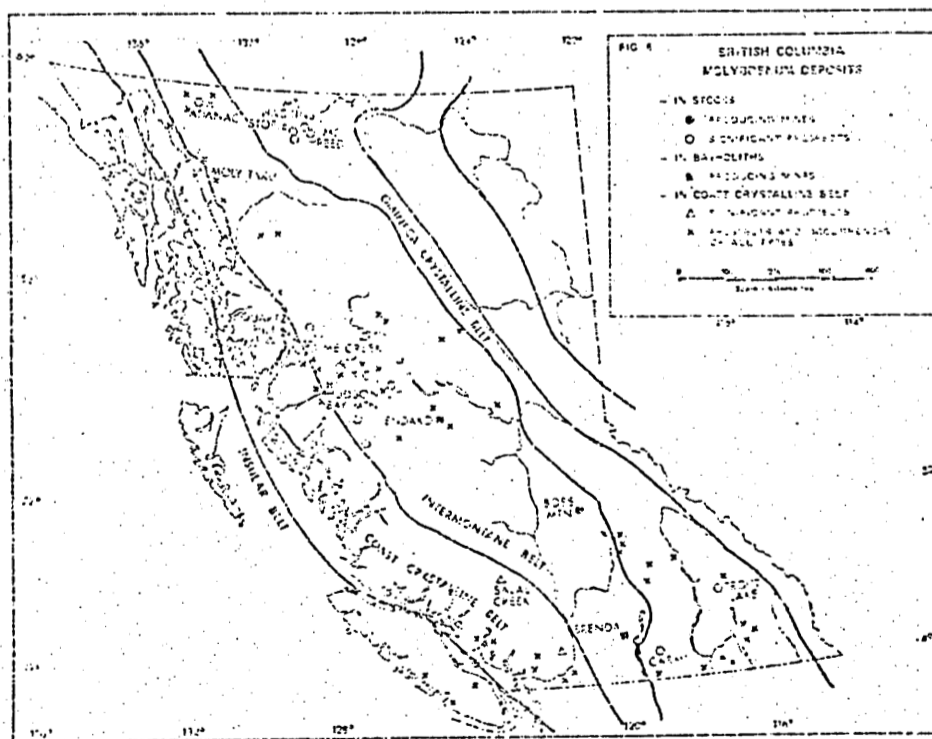
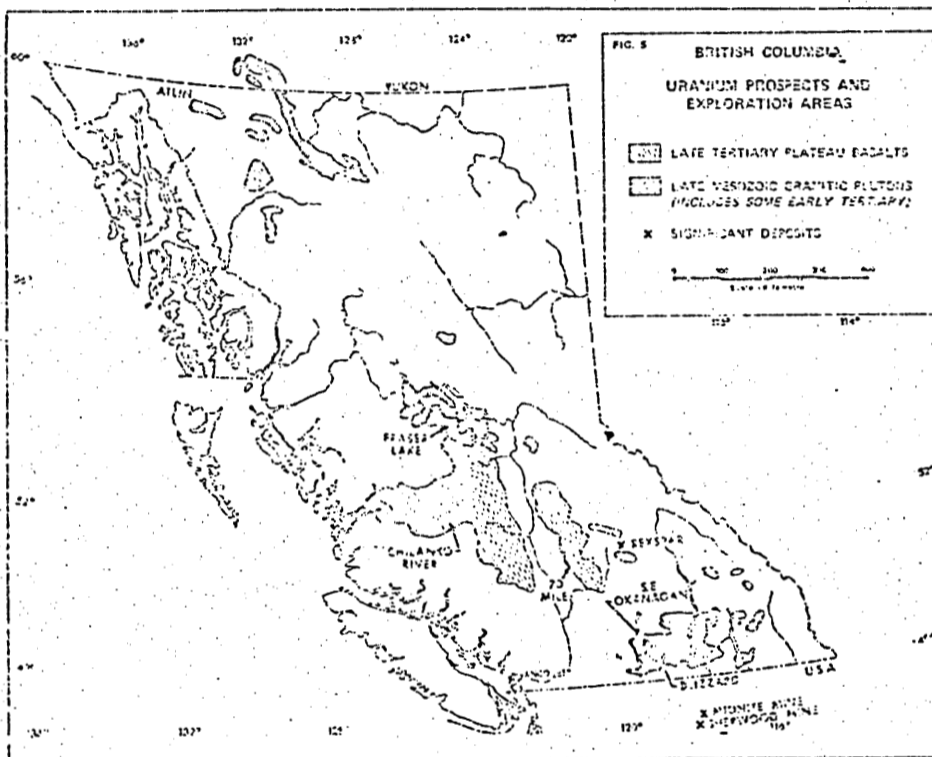
These four elements occur together in a number of areas in British Columbia, particularly in the Omineca Belt, noted for its diversity of elements. A significant correlation between the four has been noted in northwest British Columbia, specifically in the Atlin area where URP geochemistry has shown the Late Cretaceous Surprise Lake batholith to be anomalous not only in these four elements but also in lead and zinc and to a lesser degree copper and nickel.

Tungsten-Tin
Tungsten and tin minerals occur together in the northwest and southeast parts of the Omineca Belt (Fig 3), commonly within Mesozoic and younger granite plutons and adjacent late Precambrian and Early Paleozoic miogeoclinal sedimentary rocks.

At present there is no tungsten production in British Columbia. Tin is produced as a byproduct (187 478 kilograms, 1977) from the Sullivan mine where cassiterite occurs throughout the lead-zinc deposit but is mainly concentrated just above the footwall of the orebody and in tourmalinized fractures in the footwall. The origin of this tin mineralization is not clear but it may be related in part to tourmaline-bearing granitic stocks of Precambrian age which are known south of the mine.

Numerous tin occurrences are known throughout the Kootenays where many lead-zinc veins contain stannite and some tungsten. At the former Emerald tungsten mine near Salmon, scheelite occurs in skarns developed in Cambrian

Emerald - 82F/3E;
- 01195



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EXPLORATION REVIEW

The most active metal exploration areas in the Province included, from north to south: the Ash-Jennings River area (uranium, tungsten-tin), Kechika-Gataga Rivers (stratiform lead-zinc), Fraser Lake-Vanderhoof and central interior (uranium), and the southeast Okanagan (uranium). A notable feature of the 1973 exploration scene was the relatively low level of porphyry copper exploration, a reflection of depressed world copper prices over the past three years.

In contrast, exploration for massive sulphide deposits containing copper, zinc, and byproduct gold-silver increased over 1977. The Gossly copper-silver deposit south of Smithers (see Fig 1) was optioned from Equity Mining-Keneco by Canex Placer in mid-year. Additional development drilling and metallurgical studies are underway pending a production decision. Esso Minerals continued drilling the significant Kutchu massive sulphide deposit in northwest British Columbia, part of which is held by Sumitomo who have reported at least 10-million tons of good grade copper-zinc mineralization. Nearby is the Letain asbestos deposit (Fig 1), on which Cassia Asbestos conducted 15,000 feet of diamond drilling.

Other massive sulphide prospects explored in 1973 included two in the Coast Range — the Nifty near Bella Coola, drilled by Pan Ocean, and Magic Miss, property near Howe Sound north of Vancouver, drilled by Canex Placer. Regional exploration was conducted in the Columbia area northwest of Prince George and near Harriero Lakes north of Kamloops, where several prospects in Paleozoic Eagle Bay-Fennel Formation rocks were drilled. One of these programs disclosed interesting copper mineralization in acid volcanic rocks on the CC property, owned by the Vestor group of companies and under option to Craigmont.

Lead-zinc deposits explored in southeast British Columbia included the Vine deposit at Moyle Lake, drilled by Cominco and the Cottonbelt Shuswap-type deposit drilled by Metallgesellschaft.

Significant lead-zinc-barite deposits in Upper Devonian-Mississippian black shale sequences in the Kechika River area of northeast British Columbia attracted considerable attention. Gataga Joint Venture conducted a major drilling program at Driftville Creek and Cyprus Anvil drilled a similar deposit to the southeast. Also in northern British Columbia, exploration drilling continued on the Laxie property where galena and sphalerite occur in dolomitized limestone.

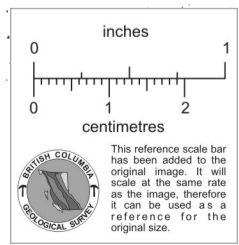
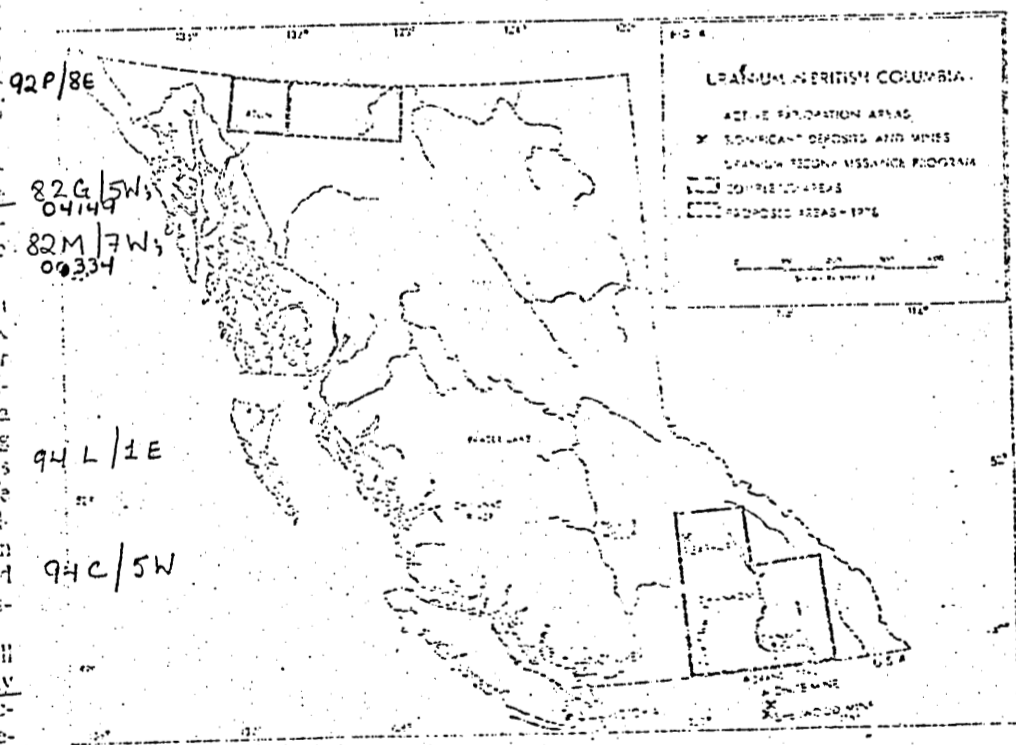
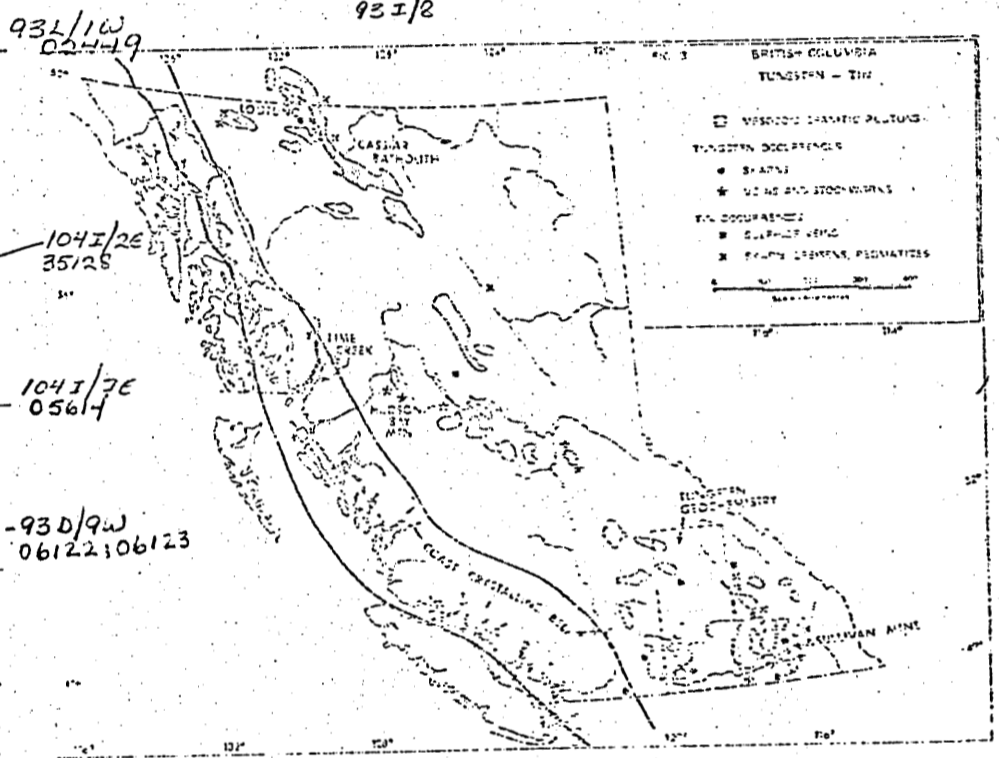
Underground development and mill construction went on at the Nu-Energy gold deposit near Cassiar where production and mill tune-up started in De-

ember 1973. Feasibility studies continued at the Carolin gold property near Hope. Exploration programs for gold and silver included Tournigan Mining's drilling and underground work at Big Missouri north of Stewart, and projects by several companies on gold mineralization on Porcher and Banks Island south of Prince Rupert and on the Queen Charlotte Islands.

The moratorium on the issuance of new coal licences was lifted in February and this had the effect of doubling the number of valid licences. In the Peace River Coalfield, significant drilling programs were carried out on the Saxon and

Belcourt properties of Denison Coal, on the Pacific Petroleum-Canadian Superior-McIntyre Wapiti River property, and on Ranger Oil's Mount Spieker property. Underground development and drilling on the Sukunka property was continued by BP Coal, and Bramada explored the Burnt River thermal coal deposit. Various companies began preliminary exploration of new licence areas.

Crowstree Resources continued development of the Line Creek thermal coal property in southeast British Columbia and also drilled their Corbin and Sage Creek properties.



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N. MINER 10-AUG-78
**Brenda does better
 in first half of 1978**

During the first half of 1978, Brenda Mines had gross operating revenue of \$35,237,000 resulting in net earnings of \$6,510,000 or \$1.52 per share ... a substantial increase from \$29,728,000, \$4,660,000 and \$1.09 respectively in the similar half of 1977.

Working capital stood at \$32.1 million as of June 30, 1978, an increase of \$6.9 million since the year end.

Production of copper and molybdenum was lower in the latest half but the increase in gross revenue resulted from higher moly prices and a lower Canadian dollar.

In June, the company invested \$5.2 million in Dome Petroleum's Beaufort Sea 1978 drilling program. A dividend of 10¢ per share has been declared payable Sept. 15, 1978 to shareholders of record Aug. 25. *92H116E 01557 092HNE047*

GCNL #227 27-Nov-78

BRENDA MINES LTD.

92H116E 01557 092HNE047

NINE MONTHS ENDED SEPT. 30	1978	1977
Net Value Concentrate Prod.	\$46,689,000	\$39,274,000
Other Income	679,000	422,000
Total Revenue	47,368,000	39,696,000
Operating Costs	22,551,000	19,890,000
Interest Expense	114,000	6,000
Deprec'n., Depl'n., Amort'n.	3,203,000	3,239,000
Oil, Gas, Mine Exploration	5,289,000	4,945,000
Income & Resource Taxes	6,790,000	4,170,000
Net Earnings	\$9,421,000	\$7,446,000
-Per Share	\$2.20	\$1.74
Working Capital	\$35,750,000	\$28,315,000

**NEW PRODUCTION
RECORDS SET**

Third quarter mine output exceeded that of any previous quarter, says John A. Hall, president of Brenda Mines Ltd. in an interim report. Concentrator operations were maintained at a satisfactory level and included an all-time single-month record of 30,157 metric tons per day in August. Metal recoveries for the third quarter were lower due to refractory ore and the planned treatment of slightly oxidized low grade stockpile ore.

Exceptionally wet weather caused a partial failure of the haul road along the north wall of the pit. Haulage from the bottom was suspended for reasons of safety which will delay the mining of more than 1,000,000 tons of higher than average grade ore. As a result, metal production will be below planned levels for the fourth quarter

NINE MONTHS ENDED SEPT. 30	1978	1977
Ore Milled, Metric tons	7,506,500	7,389,700
Av. Throughput, Metric tons/day	27,500	27,100
Average Grade		
-Copper Grade, %	0.172	0.189
-Molybdenum Grade, %	0.042	0.047
Production, Metric tons		
-Copper Concentrate	37,100	41,400
-Copper Recovery, %	85.94	87.84
-Molybdenum Concentrate	4,580	5,170
-Molybdenum Recovery, %	82.90	84.16

with mining confined to the lower grade upper levels. The area has been stable for two months and corrective action is being taken.

Mr. Hall says earnings continue strong due mainly to the buoyant molybdenum price and the high rate of exchange on U.S. dollar sales. Operating costs to September 30 were \$3.00 per metric ton milled.

With taxable income higher than expected, Brenda invested an additional \$2,000,000 in the Beaufort Sea Drilling Program bringing the total investment in 1978 to \$7,200,000.

Brenda will pay an extra dividend of 50¢ per share with a quarterly dividend of 20¢ per share (up from 10¢ in the previous quarter) on 14Dec78, record 24Nov78.

N. MINER
11-MAY-78

092H 16E - 01557-072HNE047

Favorable 1978 outlook

Brenda's first quarter earnings up

VANCOUVER — Net earnings of Brenda Mines for the first quarter ended Mar. 31, 1978, were \$2,621,000, or 61¢ a share, an increase from \$2,211,000, or 52¢ a share, for the corresponding period of last year, J. A. Hall, president, reported at the annual meeting.

Notwithstanding the low copper price, the outlook for the company for the remaining three quarters this year appears favorable. The bottom line earnings are still expected to be quite low for the years 1979 and 1980 unless there is a large upward move in the price of copper, Mr. Hall said. Lower mill head grades are forecast for those two years. The third quarter concentrator production may be restricted to some extent as a four-week trial operation is scheduled in an effort to reduce the handling difficulty and improve recovery procedures from the low grade stockpile.

Mr. Hall complimented his staff for producing worthy ideas. The technological improvements have been very low in capital cost when measured against the gain in productivity. For example, he pointed out, the other day the concentrator treated 38,000 tons, "which isn't bad for a mill originally rated at 24,000 tons per day". The two factors, technology and productivity, he noted, control costs.

Output near maximum

Production is near maximum, he continued. There may be a small reserve capacity available in the concentrator, but, at this time, the mining equipment is strained to meet the requirements of stripping. Production capital expenditures, mainly the replacement of mobile equipment to maintain production and possibly the tailings area extension, are expected to show a gradual decline in future years.

The company's greatest weakness, he told the meeting, lies in limited ore reserves and low grades. The first priority is to extend the life of the operation through mineral exploration, and, secondly, to be alert to opportunities in mining as well as in the energy sector.

Exploration expenditures for 1978 will total \$400,000, all of it in B.C. About half of the budget will

be spent on two joint venture projects where the claims are considered to be structurally favorable for tungsten and molybdenum.

Diamond drilling on the producing property north of the pit and around the perimeter failed to encounter economic mineralization. There has been only limited drilling below the bottom level of the pit, although it is known that the mineralization continues to depth. In view of the higher price for molybdenum, a drilling program is planned to obtain more data on the mineralization below the pit bottom.

Demand for molybdenum remains very strong, stimulated by forecast Arctic gas pipeline requirements and aggressive purchasing by consumers in the face of rising merchant premiums. The price for molybdenum oxide, c.i.f. overseas, was increased 48¢ to \$US5.08 a lb. on Mar. 7 and then by 75¢ to \$US5.83 a lb. on May 2.

In the first quarter concentrates produced were valued at \$15,762,000, against \$14,242,000 in the first quarter 1977. Daily milling

rate was 29,596 tons averaging 0.185% copper and 0.041% molybdenum, against 29,456 tons of 0.184% copper and 0.048% molybdenum in the like period of last year. Production totalled 8,617,900 lb. of copper, compared with 8,593,000 lb.; 1,870,000 lb. of molybdenum, against 2,117,000 lb. and 62,300 oz. of silver and 877 oz. of gold, against 63,000 and 745 oz., respectively, in the first quarter of 1977.

Working capital at Mar. 31, 1978, is reported at \$28.9 million, an increase of \$3.7 million from the year end.

Directors declared the quarterly dividend of 13¢ a share, payable June 15, to shareholders of record May 19.

GCNL #150 4-aug-78
SIX MONTHS ENDED 30 JUNE

BRENDA MINES LTD. 01557-092HNE047- 72H/16E

	1978	1977	
Gross Operating Revenue	\$35,237,000	\$29,728,000	Production of copper and molybdenum at the Brenda Mines Ltd. operation in the Okanagan Valley, B.C. was lower than in the first half of 1977. The increase in gross revenue resulted from the higher price for molybdenum and the lower Canadian dollar relative to the U.S. dollar.
Net Earnings	6,510,000	4,660,000	
Earnings Per Share	\$ 1.52	\$ 1.09	

Working capital was \$32,100,000, an increase of \$6,900,000 in the six months ended June 30th.

In June, the company invested \$5,200,000 in Dome Petroleum's Beaufort Sea 1978 drilling program.

A dividend of 10¢ per share was declared payable September 15, 1978 to shareholders of record August 25, 1978.

Brenda net up moly' price helps

Brenda Mines reports net earnings of \$9,480,000 or \$2.21 per share for the year ended Dec. 31, 1977 up from \$5,490,000 or \$1.28 per share in 1976. J. A. Hall states in the annual report.

In the fourth quarter earnings declined to \$2,023,000 or 47¢ a share from \$2,221,000 or 52¢ in the comparable 1976 quarter. During this quarter production was adversely affected by severe weather and other operating difficulties.

Principal factors accounting for the earnings for the year were the strong price of molybdenum, the benefit from the decline in value of the Canadian dollar, and efficiency improvements.

Smelter and distribution charges were \$1,622,000 above last year's costs reflecting higher volume and the general increase in transportation, treatment and commission payments. Average price received during the year was 62.7¢ per lb. for copper and \$4.23 per lb. for molyb-

See Page 8

Brenda

Continued from Page 1

denum, compared with 63.8¢ and \$3.22 respectively in 1976. Almost 70% of net revenue was derived from molybdenum.

Operating costs were \$2.51 per ton milled for the year which represents an increase of 13% over costs in 1976. Inflation and the added cost of mining from a deeper open pit lessened the effect of continued efficient production from all departments.

In July 1977 Brenda paid \$5 million to Dome Petroleum for a 1% net profit interest in 115,680 acres of petroleum permits in the Beaufort Sea. Three wells were drilled during the 1977 drilling season indicating the presence of both oil and gas. It will take several years to assess the commercial possibilities of this venture.

Brenda has also purchased an average 25% working interest in 127,000 acres of semi-proven natural gas lands from Sabre Petroleum for \$6.3 million in the Greater Cache area of east-central Alberta. It is expected that this interest will be developed into an ultimate net reserve for Brenda of a minimum of 21.7 billion cu. ft. of gas. Brenda's share of expenses during 1978 will be \$1.2 million.

At Dec. 31, 1977 working capital stood at \$25,203,910 compared with \$20,355,462 at the same date a year earlier.

N. MINER 9-MARCH-78

BRENDA 924/16E

NOVEMBER 28, 1975

GEORGE CROSS NEWS LETTER LTD. NO. 228 (1975) (Page Two)

BRENDA MINES LTD.

NINE MONTHS ENDED SEPT. 30,	1975	1974	Brenda Mines Ltd. has reported that re-
Gross Operating Revenue	\$25,526,000	\$31,579,000	cord quarterly production averaging 27,635
Net Income	1,546,000	8,601,000	tons of ore milled per day, higher ore
Earnings Per Share	36.1¢	\$2.009	grade and improved molybdenum prices con-

tributed to net earnings of \$754,000 in the third quarter compared with a net loss of \$89,000 in the second quarter. For the nine months provincial royalties amounted to \$1,315,000 or 35% of net earnings, and tax and royalty provisions were at an effective rate of 71.9% of income before taxes.

Brenda profits dip sharply

Net earnings of Brenda Mines for the year 1975 were \$2,018,477 or 47¢ per share compared with \$8,394,980 or \$1.96 a share a year earlier, the annual report states.

The huge drop in profits is attributed to a 35% decline in the average price for copper, and higher smelting, refining and transportation costs.

There was also an increase of \$3.9 million in smelter and distribution costs which, says President J. A. Hall, reflects the termination of the Nippon-Mitsui copper concentrate contract and the very much higher charges that now prevail in shipping to any of the custom smelters.

Further, the provision for income taxes, mining taxes and royalties had a serious adverse effect on earnings and accounted for 65% of pre-tax income.

Mr. Hall, however, adds that for 1976 it is possible there may be a favourable move away from the present punitive tax policies as federal and provincial governments recognize the symptoms of an atrophying mining industry.

Mining operations last year removed a total of 16,348,745 tons from the pit of which a record 10,048,545 tons of ore were delivered to the primary crusher. The concentrator operated at a record rate of 27,530 tons per calendar day and in 1975 produced 57,667 tons of copper concentrate (51,365 tons in 1974) grading 28.87%, and 7,543 (6,811) tons of molybdenum concentrate of 56.07% grade.

Ore reserves at Dec. 31, 1975 stood at 126,094,000 tons grading 0.176% copper and 0.047% molybdenum.

Current assets at the year end totalled \$22,851,727 against current liabilities of \$9,638,231.

N. Miner April 1978

92H

		BRENDA MINES LTD.	
		1977	1976
THREE MONTHS ENDED MARCH 31,			
Gross Value of Concentrates Produced	\$14,242,000	\$10,820,000	
Smelter and Distribution Charges	1,874,000	1,862,000	
Net Value of Concentrates Produced	\$12,368,000	\$8,958,000	
Income Bef. Inc. & Product'n. Taxes	4,913,000	2,006,000	
Income & B.C. Resource Taxes	2,702,000	1,123,000*	
Net Earnings	2,211,000	883,000*	
Per Share	52¢	21¢*	
Capital Expenditures	\$ 88,000	\$ 31,000	
Ore Milled - Short Tons	2,651,000	2,668,000	
Milling Rate - Tons Per Day	29,450	29,319	
Production - Metal In Concentrate			
- Copper, pounds	8,593,000	8,070,000	
- Molybdenum, pounds	2,117,000	1,969,000	
- Silver, ounces	63,000	63,000	
- Gold, ounces	745	1,160	
Copper In Concentrate, pound	67¢	57¢	
Molybdenum In Concentrate, pound	\$3.50	\$2.70	

* Comparative figures for 1976 have been restated to reflect the provision for recovery of royalty taxes payable. Restated earnings for first 3 months of 1976 are therefore higher by \$407,000.

Brenda Mines Ltd. president J.A. Hall, reported to the annual meeting that, in 1976, the concentrator operated at an average 30,261 tons per calendar day, approximately 10% higher than in 1975. The improved milling rate was due largely to the successful implementation of a computer control scheme into the operation of all four grinding lines. The importance of a 10% increase in the milling rate is that the value of the incremental tonnage was responsible for over 25% of the increase in net earnings. Net earnings for the first quarter of 1977 were substantially higher than in the same quarter of 1976 but almost identical to those of the preceding quarter. The 31% increase in the gross value of concentrates

produced, compared with the first quarter of 1976, was due to improved metal prices, lower Canadian dollar, higher volume and a favorable price adjustment on last year's production. Molybdenum concentrate accounted for 56.2% of the total production value. The cost of concentrate production increased over the comparable period last year. Wages were the main cost push factor and accounted for 42% of the increase.

The company paid a quarterly dividend of 13¢ per share on 16Mar77 and declared a dividend of 13¢ per share payable June 15 to shareholders of record 20May77. The A.I.B. rulings limits the Brenda dividends to .49¢ per year and their next quarter dividend payable 15Sep77 cannot exceed 10¢ in order for the company to stay within the A.I.B. regulation.

Mr. Hall said that the encouraging financial results confirm the excellent operating performance that has been gained from the computerized grinding control. The availability of the instrument remains in excess of 95% and it has now been in service for 15 months. Expenditures for the control system were \$230,000 and improvements and capital spares will bring the total to \$300,000. Late last year the directors approved the purchase and installation of an on-stream analyzer for flotation at an estimated capital cost of \$350,000. This additional control equipment will be installed & incorporated with the present computer control scheme over the balance of this year. It will expand the automatic control system and should provide a modest improvement in metal recoveries and more economical use of reagents.

Brenda's patented system for leaching molybdenum concentrate to prime quality specifications continues to be of interest to molybdenum by-product producers. All external material that has been submitted for testing has been leached satisfactorily under product'n. conditions. Design work has been compl. for Andina leaching plant in Chile, scheduled to start up early next year.

92H/16E

		BRENDA MINES LTD.	
		1976	1975
3 MONTHS ENDED MARCH 31,			
Net Concentrate Value	\$8,958,000	\$8,810,000	
Income Before Government Levies	2,006,000	2,566,000	
Government Levies	1,530,000	1,685,000	
Net Earnings	476,000	881,000	
Per Share	11.1¢	20.6¢	
Capital Expenditures	\$31,000	\$162,000	
Employees at March 31	436	437	
PRODUCTION STATISTICS			
Ore Milled - Short Tons	2,668,000	2,447,000	
Production - Metal in Concentrate			
- Copper, pounds	8,070,000	8,094,000	
- Molybdenum, pounds	1,969,000	2,114,000	
- Silver, ounces	63,000	61,000	
- Gold, ounces	1,160	860	
Selling Price Average:			
Copper in Concentrate Sold at	57¢	55¢	
Molybdenum in Concentrate Sold at	\$2.70	\$2.33	

GCNL # 88 (1976) MAY 7th
GOVERNMENT RIP-OFF CONTINUES
Addressing the annual meeting of Brenda Mines Ltd. on 6May76, president J.A. Hall attributed 1975's 76% decline in earnings from 1974 mainly to "low copper prices, rising costs due to the impact of inflation and the fierce, unjustified tax system." He then reported, "Results to date in 1976 reflect a continuation of poor economic conditions (see table). "Normally, higher copper and molybdenum prices, improved product demand and continuing strong production performance would enable one to make a positive forecast for higher profits over the balance of the year. Instead, and in spite of the apparent gradual improvement

in the economy, one must caution that income and mining taxes and royalties amounted to 76% of the pre-tax profit in the first quarter." Those government levies had reached 82% of pre-tax profit in March. "This strangulation of the company's ability to earn reasonable profits prevents repayment of borrowed funds, expansion and consideration of paying dividends," said Mr. Hall.

In the first 3 months this year, the milling rate averaged 29,319 tons per day, a new record for first quarter production. Mr. Hall stated that the computer control of the flotation circuits became fully operational in February and results to date have been excellent. Operating costs were \$2.16 per ton milled or 6% higher than the \$2.04 costs in the corresponding quarter last year.

Concerning metal prices and markets, Mr. Hall noted that, "Last year, production from copper mines was down 9%, metal production down 10% and consumption down 19%. We believe that improvement in demand will continue throughout 1976. Copper prices started to move up in February and the London Metal Exchange quotation has risen from 54¢ to 68¢. U.S. producers increased their quotation for cathode copper from 63¢ to 66¢ on March 19 and to 70¢ on Apr. 12. Following termination of Brenda's copper concentrate agreement with Nippon Mining, 16,500 short tons of concentrate were sold to Rudolf Wolff & Co. for toll smelting and refining at Anaconda in the United States, and 5,500 short wet tons were sold to Inco and also treated at Anaconda based on an exchange with Craigmont Mines. A production contract through March, 1976 was then negotiated with Noranda Mines and recently a one-year production contract was concluded with Noranda, starting in April, at competitive terms.

"As for molybdenum, demand during 1975 remained relatively strong as the reduction of 25% for stainless and tool steels was offset by increased requirements for energy related steels, including pipelines. Production of molybdenum as a by-product of copper mining continued to be down in first quarter 1976 and there was still little inventory build-up by either consumers or producers. The future of molybdenum remains bright because of pipeline steel demand. Further significant increases in the price of molybdenum products will be necessary over the next few years to justify new production."

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 NO. 232(1971)
 DECEMBER 1, 1971

George Cross News Letter

"Reliable Reporting"

NO. 232 (1971)
 DECEMBER 1, 1971

WESTERN CANADIAN INVESTMENTS

BRENDA MINES LTD.

Nine Months to Sept. 30,	1971
Value of Conce, Produced	\$21,748,000
Operating Costs	10,666,000
Interest on Debts	3,622,000
Depreciation & PreProd.	6,880,000
Provided for Mining tax	92,000
NET EARNINGS	488,000
Earnings Per Share	11.4¢

The Brenda Mines Ltd. nine months statement shows that with an average milling rate of 24,915 tons per day during the third quarter, the nine months total of ore milled was 6,680,000 tons with average grade of 0.21% copper and 0.06% molybdenum. Milling results were normal during the quarter and copper concentrate was sold currently as shipping lots were accumulated but, despite some improvement in sales, the unsold inventory of molybdenum increased 10% to 6,600,000 pounds.

As regards the \$11,400,000 value of concentrates in inventory, some \$4 to \$5 million represents working stocks normally required to serve customers in a wide-spread market. The valuation of the excess inventory of molybdenum concentrate includes provision for carrying charges and possible deterioration in realizations.

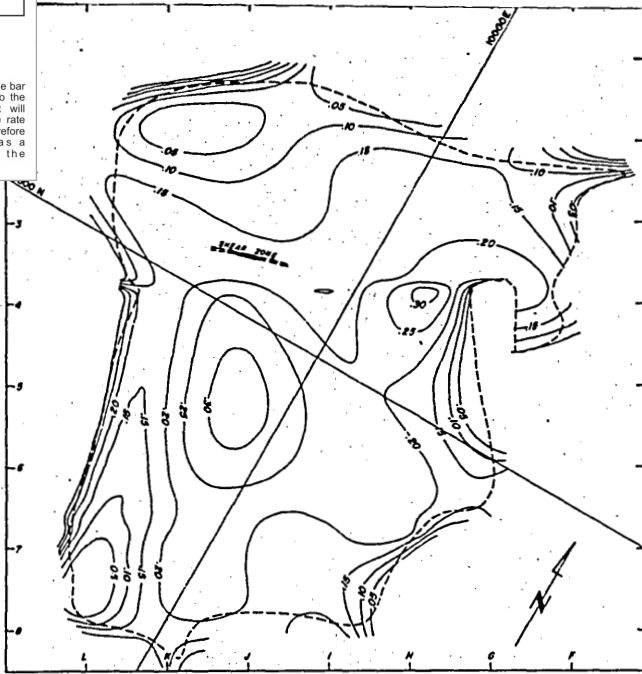
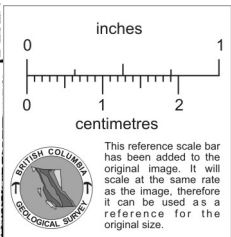
On November 1, Hippon invoked force majeure to reduce deliveries of copper concentrate by 20%. It is expected that alternative smelting arrangements can be made for any tonnage surplus to deliveries to Nippon.

The \$19,466,400 bank loan secured by first mortgage bonds has been converted to a Canadian dollar loan of \$19,575,900. The loan was formerly in U.S. funds. As the Canadian dollar equivalent at date of original issue was \$21,000,000, a profit of \$1,424,100 accrues and will be taken into fourth quarter earnings. The term of the loan was extended one year to June 30, 1974.

GCN L#28 9-2-78 BRENDA MINES LTD. 92H16E 01557

Year Ended Dec. 31,	1977	1976
Net Value Concentrate Prod.	\$51,787,000	\$40,910,000
Operating Costs	26,760,000	24,801,000
Interest Income)Expense	(578,000)	199,000
Exploration	4,994,000	- -
Depreciation & Amortiz.	4,391,000	4,115,000
Income & Resource Tax	6,740,000	6,305,000
NET EARNINGS	\$ 9,480,000	\$5,490,000
Earnings Per Share	\$2.21	\$1.28

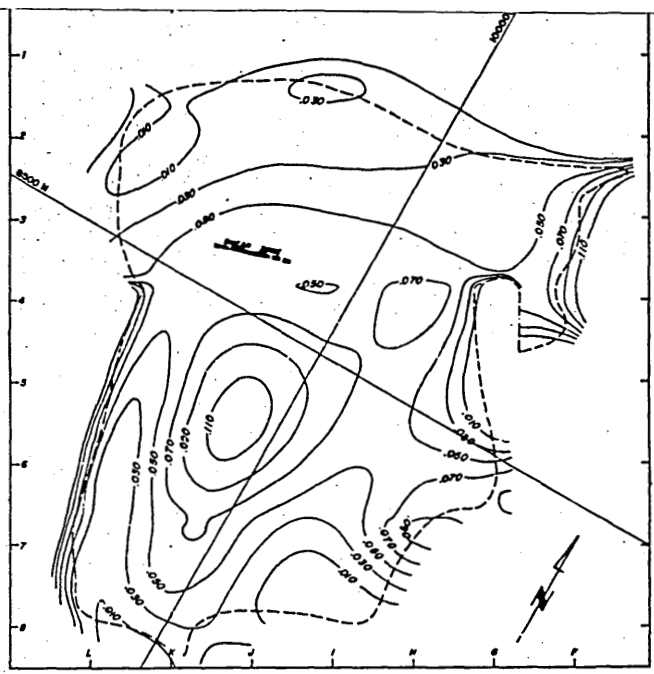
In presenting results for the year ended Dec. 31, 1977 showing a 73% increase in earnings per share over 1976, Brenda Mines Ltd. reports profit for the fourth quarter of 1977 was \$2,034,000 or 47¢ a share down from \$2,221,000 or 52¢ a share in fourth quarter 1976. The improvement in 1977 profits is attributed mainly to higher prices for molybdenum, the benefit of the decline in the Canadian dollar and improved efficiency in the concentrating process.



LEGEND
ALLOWABLE STANDARD DEVIATION (0.024% Mo)

COURTESY BRENDIA MINES LTD.
TREND SURFACE - COPPER
5160 LEVEL

DRWG No. 1364 C.W.B.G. LTD. DATE: APRIL, 1969



LEGEND
ALLOWABLE STANDARD DEVIATION (0.024% Mo)

COURTESY BRENDIA MINES LTD.
TREND SURFACE - MOLYBDENUM
5160 LEVEL

DRWG No. 1365 C.W.B.G. LTD. DATE: APRIL, 1969

COPPER trend surface pattern on 5,160-foot level, 200 feet below Figure Nos. 2 and 3 with same standard deviation. Figure No. 4

MOLYBDENUM trend surface on the 5,160-foot level. Again there is good confirmation with the copper trend on same level. Figure No. 5

- \$3.00 per ton but greater than \$2.00 per ton.
- "3" represents a block of value less than \$2.00 per ton but greater than \$1.25 per ton. This category would go to the concentrator if within the pit path, but would not be mined unless necessary.
- "4" represents a block of value less than \$1.25 per ton.
- "7" represents a block within the pit path with a standard deviation greater than 0.024 percent Mo and is used to indicate areas where additional sampling is desirable.
- "9" represents a block whose central coordinates are above sulphide-oxide sub-surface contact and in many instances were actually air.

Figure No. 6 shows such a printout for a portion of the deposit at an elevation of 5,185 feet. Pit design is then done by determining pit limits on the lowest level and assigning slopes to pit walls. Mineable reserves are quickly calculated for each level and totalled. Year by year grades and waste to ore ratios are readily attained at any desired production rate.

The property has been prepared for production, but it is too early to know how well mined grade checks with reserve estimates. To date there is some indication from assays on blast hole cuttings that realized grade may be slightly higher than predicted values.

One very interesting thing has occurred in the course of pit preparation at Brenda. A shear zone which visually carries molybdenum values substantially higher than normal has been partially exposed on two bench

levels. The extent and grade are as yet unknown, but it undoubtedly does represent an increase in the quantity of molybdenum reserves over estimates. The position of this shear zone is shown on Figure Nos. 3, 4, 5 and 6. Its presence was not noted in any drill hole. While any such increase is welcome, the shear zone might just as well have been a barren dike. The occurrence is cited to demonstrate the dangers inherent in blind acceptance of statistical analysis.

Some pertinent results of the Brenda feasibility study are summarized below.

1. For three raises driven along the course of drill holes, grade comparisons showed.

Type Samples	Percent	
	Cu	Mo
Diamond drill core	0.203	0.062
Combined core and sludge	0.22	0.067
Bulk samples	0.22	0.060
Pilot plant feed	0.232	0.055

2. Mineable ore reserves totalled 133,935,000 tons averaging 0.19 percent Cu and 0.055 percent Mo (0.091 percent MoS₂) by conventional calculation and 145,750,000 tons averaging 0.20 percent Cu and 0.055 percent Mo by computer based estimation. The ratio of waste plus low grade to ore is forecast to be 0.9 to 1.0.
3. Metallurgical recoveries based upon results of operation of the

pilot plant from August 1966 through February 1967 were forecast to be 88 percent for copper into a concentrate assaying 26 percent Cu and 82 percent for molybdenum in a concentrate assaying at least 54 percent Mo and meeting specifications for a high quality product.

4. Capital requirements were estimated to be \$56,500,000 in Canadian funds at a design capacity of 20,000 tons per day. When the planned production rate was later raised to 24,000 tons per day the capital requirement estimate was increased to \$60,000,000.

The final paragraph of the feasibility report is repeated below:

"Cash flow projections based on \$10,590,000 in equity and \$45,910,000 in loan financing, continuation of present Canadian tax laws and variable copper prices, metallurgical recoveries and rates of production show ranges in net cash flow from \$75,000,000 to \$96,000,000 after repayment of all loans plus interest at 7.0 percent, taxes, and providing for additional capital assets. This cash flow when discounted at 12.0 percent compound interest gives a present value of the equity position ranging from \$20,000,000 to \$26,000,000."

Production started early in 1970 so the validity of these statements will soon be demonstrated. END.

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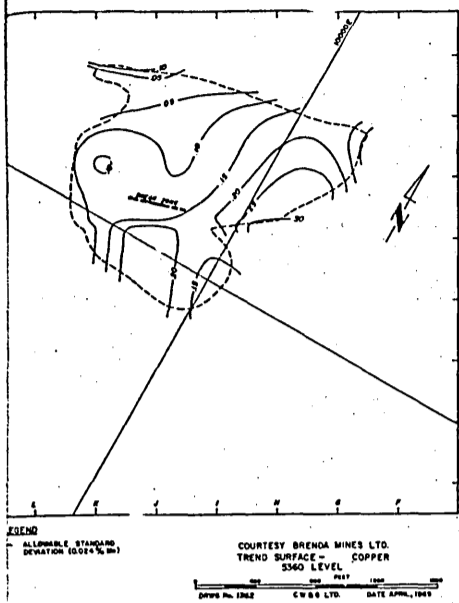
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COPPER trend surface on the 5,360-foot level at 0.024% Mo deviation. Figure No. 2.

- 50 tons of rock broken, and tower rejects were stored for feed to the pilot mill.
6. Installation and operation of an analytical laboratory.
7. Construction and operation of a 100 ton per day pilot mill. This was the smallest plant which would permit operation of the molybdenum separation and cleaning circuits on a continuous basis.
8. Detailed studies of power, water, and tailing disposal problems.
9. Market studies and negotiation of provisional contracts for sales of both copper and molybdenum.
10. Design of mining plans and concentrator to the point at which equipment could be tentatively selected and costed and delivery schedules determined.
11. Calculation of reserves by both conventional methods and by techniques using computers. This step involved careful examination of all assay data, comparison of results from cores and sludges—individually and combined—with rotary-percussion and bulk sampling, and statistical determination that drilling on the 400 by 400 foot grid pattern had provided grade information at a sufficiently high level of confidence to permit acceptable ore reserve estimates.
12. Economic analysis in which the effect of variables such as mining rates, pit configuration, metal prices, and metallurgical recoveries were examined and cash flow sheets prepared.

Technical Committee Formed

Carrying out of this work involved a large number of independent consultants and personnel of Brenda

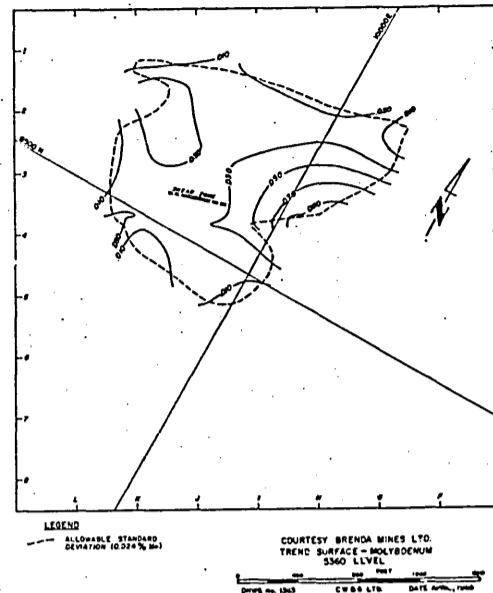
Table No. III
Recent Capital Expenditures as a Function of Daily Milling Rates

Nominal Milling Rate, Tons per Day	Capital Requirements in Dollars
10,000	\$25,000,000 - \$35,000,000
20,000	35,000,000 - 50,000,000
40,000	60,000,000 - 92,000,000

Mines Ltd. welded into an efficient and smooth-running team operating under a technical committee chaired by John A. Wood, vice-president of Chapman, Wood & Griswold Ltd. Major contributors were Britton Research Ltd. in metallurgical test work and flow sheet development; Wright Engineers Ltd. in concentrator design, estimation of capital requirements and operating costs for the mill as well as design, construction and operation of the pilot plant; Ker, Priestman & Graeme Engineering Ltd. in water supply studies; M. A. Thomas & Associates in electrical requirements; and the University of California in computer applications. Noranda Mines Ltd. furnished valuable assistance in obtaining the degree of analytical precision required to obtain meaningful metal balances in the pilot plant.

Neither time nor space permits a detailed discussion of the problems encountered and overcome in the course of the feasibility program. However, since the application of computers to estimations of tonnage, grade, and economic considerations is probably less well known than other portions of the project, a brief description of the techniques utilized will be given.

Figure No. 1 shows the drill pattern in plan. The grid is 400 by 400 feet and holes were drilled at angle of minus 63° and at bearings 30° west of north or 30° east of south, the attitudes giving the best intersections with the three fracture systems observed to carry most of the mineralization. Assay data, using combined core and sludge for diamond drill holes, for each 15-foot interval for each drill hole were punched on cards together with coordinates and elevation of the collar and the attitude of each hole. The grade distribution as represented by a polynomial equation and grades estimates for any given point in the deposit were determined from trends taken from surrounding sample points. The fitting of the model equation was accomplished by the least squares approach and the acceptability of the model prediction at any point is given by the standard deviation of the estimate at that point. In the Brenda analysis



MOLYBDENUM trend surface on 5,360-foot level. Compare with copper trend. Figure No. 3.

sample density was deemed adequate to predict grade within acceptable limits in the area in which standard deviations were no greater than 0.024 percent Mo and 0.03 percent Cu. This is equivalent to saying that all estimated grades will be within ± 0.024 percent Mo and 0.03 percent Cu on a 68 percent confidence level.

Grade predictions were made in plan for each level of the deposit based on a 50-foot pit bench height; that is to say, a plan for each 50 feet of elevation. Figures Nos. 2, 3, 4 and 5 show grade trend contours for copper and molybdenum at two levels 200 feet apart. The 0.024 percent Mo standard deviation contour is also shown on each of these figures.

From these trends grades were assigned to each 50-foot square within the area for each level and since levels were 50 feet apart vertically, the deposit could be broken down into 50-foot cubes each with an estimated grade in both copper and molybdenum. These grades were converted to net metal sales at the mine by applying metal prices with appropriate deductions for freight, handling, smelter charges, handling losses, metallurgical recoveries, etc.

Computer Designs Pit

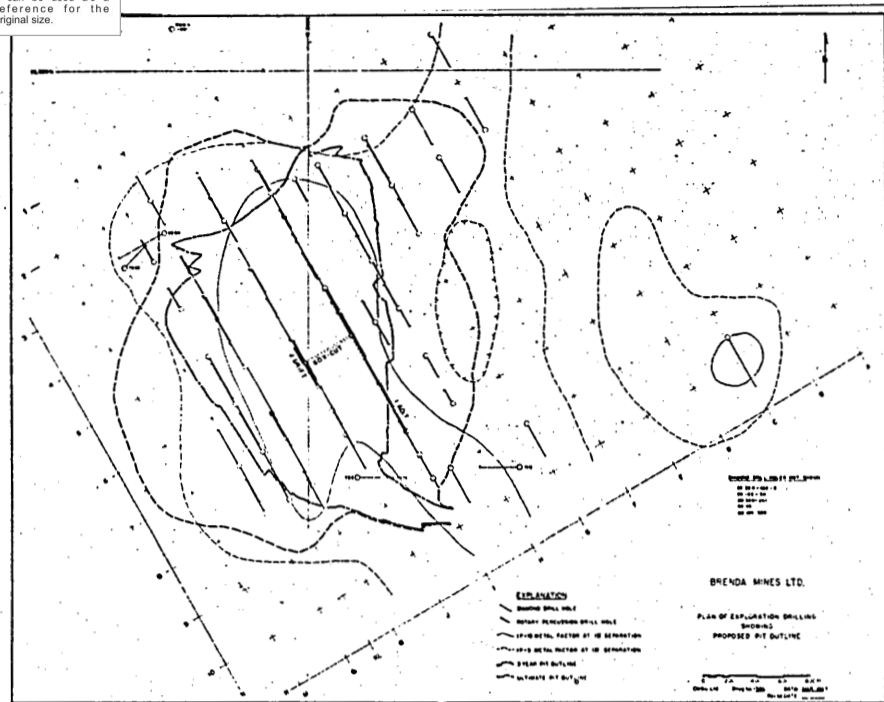
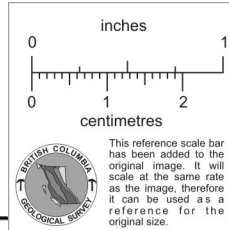
Pit design work was done on computer printout plans for each level on which relative grade was indicated by a numerical code:

"0" represents a block with a standard deviation greater than 0.024 percent Mo which was given no value.

"1" represents a block with a value equal to or greater than \$3.00 per ton. (Strange as it seems, at Brenda this category is considered to be high grade.)

"2" represents a block of value less than

33



EXPLORATION drilling plan with superimposed proposed pit outline. Hole grid is 400 by 400 feet and all holes were angled at minus-63° to crosscut three major mineralized fracture systems. **Figure No. 1.**

for one day at 1.0 percent and for six days at 0.167 percent. A blending step would be required—at a cost. Rock characteristics must be determined in order to know what blast-hole spacing will be required, what bit wear can be expected, and how much power will be required to crush it and grind it. Metallurgical studies must be thorough and samples tested must be truly representative of what will be fed to the mill. If several types of material are present the amenability of each to the process or processes to be used must be determined. Of course an appraisal of markets and an attempt to forecast prices for metals are important factors.

Brenda Case History

The remaining portion of this article describes the program carried out for Brenda Mines Ltd. under

the supervision of Chapman, Wood & Griswold Ltd. which led to the submittal of a feasibility report in March 1967 and resulted a short time later in the decision to put a large and very low grade mineral deposit into production at a design rate of 24,000 tons per day.

The Brenda deposit is situated in the Okanagan District of south-central British Columbia some 33 air line miles northwest of Penticton and 150 air line miles east of Vancouver (see Place-Fix Map). Reference to the possibility of widespread copper and molybdenum mineralization at what was then called the Copper King group appears in the Geological Survey of Canada *Memoir No. 243* published in 1947. In 1956, Noranda Mines Ltd. studied the property and put down three EX diamond drill holes. Assays of cores from these holes averaged 0.21 percent Cu and about

0.03 percent Mo. In 1957 a Canadian subsidiary of Kennecott Copper Corporation, under a joint venture agreement with Noranda, carried out a detailed geological, geophysical, and mapping program and drilled a large number of X-ray core holes to a depth of 20 feet. Charles Ney, who was in charge of this program, correctly inferred that the grade of the deposit was probably at least 10 to 20 percent higher than the tenor indicated by small diameter, shallow holes, and also properly concluded that even with such an increase the deposit was sub-economic at metal prices in effect at that time.

In October of 1964 Messrs. B. O. Brynelsen and M. M. Menzies, who had directed the work carried out earlier by Noranda Mines, decided, with permission from Noranda, but for the account of themselves and a group of associates, to determine to what extent grades actually did exceed earlier estimates. Three H-size diamond drill holes were put down close and parallel to the three Noranda EX holes. Results of very carefully weighted combined core and sludge assays from the large holes were 23.8 percent in copper and 133 percent higher in molybdenum than those for the small holes. This work was completed late in 1965 and together with favorable preliminary metallurgical tests resulted in a decision to proceed with a full scale feasibility program.

15 Months and \$15,000,000

This project started in January 1966, required 15 months and cost \$3,500,000.

Work done included:

1. 42,573 feet of BQ wire line diamond drilling in 74 holes.
2. 7,323 feet of rotary percussion drilling in 19 holes.
3. Underground work to provide correlation between drill-indicated grades and bulk samples and furnish material for metallurgical test work.
 - A. Drifting 1,475 feet
 - B. X-cutting 400 feet
 - C. Raising 960 feet.
4. Installation of a concrete pad divided into 14 wall-separated compartments so that muck from each underground round could be stored separately prior to crushing and sampling.
5. Installation of a crushing and screening plant and automatic sampling tower. Approximately 20 pounds of minus-½-inch material was retained as a sample for each

Table No. I
Some Major Large Scale Low Grade Copper-Molybdenum Mines

Company	Location	Estimated Reserves, Tons	Estimated Grade, Percent	Proposed Production Rate Tons per Day
Duval Corporation	Sierrita, Arizona	400,000,000+	0.35 Cu + Mo and Ag	72,000
Anaconda Company	Twin Buttes, Arizona	Unannounced	+ 0.4 Cu	30,000+
Lornex Mining Corporation	Highland Valley, British Columbia	293,000,000	0.427 Cu + Mo	38,000
Brenda Mines Ltd.	Okanagan District, British Columbia	167,000,000	0.19 Cu, 0.087 MoS ₂	24,000

Table No. II
Typical Mining and Milling Costs for High Tonnage Operations

Mining Method	Per Ton Cost of Breaking and Transporting Rock (Ore to Waste)	Milling Cost per Ton of Plant Feed	General and Overhead Costs per Ton of Plant Feed
Open pit	\$0.16 - 0.26	\$0.80 - 1.00	\$0.20 - 0.30
Block caving ¹	\$1.45 - 1.65		
Sub-level caving ¹	\$2.80 - 3.00		

1. Excluding primary development.

32

low grade deposits must be accurate

By E. P. Chapman, Jr.
 President, Chapman Wood & Griswold Limited, Royal George Building, 145 East 15th Street, North Vancouver, British Columbia, Canada*

great activity for building contractors or during a comparatively slack period can contribute significant variations in cost.

For the reasons cited, rule of thumb guide lines for preliminary estimation of capital requirements can be dangerous, but some attempts must be made in this regard at an early stage in the study of a large mineral deposit in order to justify the high cost of determining whether or not it is an ore body. To show the general range into which such capital expenditures might fall, reported figures for a number of properties placed in production during the past several years are summarized in Table No. III. All of the figures apply to open pit operations. Development costs for preparing a deposit for extraction by underground methods would usually bring total preproduction expenditures well above these figures.

Data Gathering Must be Precise

The multiplier-effect of large tonnage operations produces the same major impact on gross metal sales as it does on operating costs. If we are treating a material containing, say, 0.4 percent copper, each ton of feed to the concentrator contains eight pounds of copper. At 90 percent recovery 7.2 pounds goes into the concentrate. If the price for copper is 42 cents a pound we might expect a netback at the mill of about 35 cents a pound, and a net smelter return of \$2.52 per ton of mill feed.

At our 40,000 ton per day production rate we would have daily metal sales of \$100,800. If we go back to our minimum open pit cost of \$1.48 per ton we would have an operating profit of \$1.04 per ton and would generate a cash flow, before taxes, amortization, interests etc. of \$41,600 each day or almost \$15,000,000 a year. This sounds like very good business, but let us suppose that material which we believed would run 0.4 percent Cu, actually, because of dilution or poor estimation, only assayed 0.35 percent Cu; that our sample for metallurgical testing had not been representative so that we

could only recover 75 percent; that the price of copper dropped to 36 cents with a netback at the mill of 30 cents and that our maximum cost figure cited earlier applied. Under these circumstances our metal sales would be $7 \times 0.75 \times 0.30$ or \$1.575 per ton and since our cost is \$2.08 per ton we would be losing \$0.505 per ton, \$20,200 per day and over \$7,000,000 per year. If we had invested \$92,000,000 to bring our hypothetical deposit to the point of production, such an occurrence would be, to put it mildly, a disaster.

These rather simple and obvious mathematical exercises have been cited at some length because they are sufficiently realistic to demonstrate rather clearly the necessity of precise and detailed engineering work, careful and accurate data gathering, and experienced and qualified analysis

in carrying out a feasibility study on a project involving an investment of this magnitude.

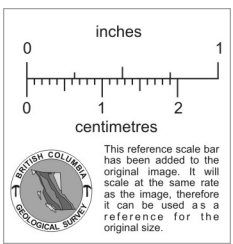
The determination of the potential profitability of very large, low grade rock mass is a complex and costly undertaking. Not only must the grade be estimated with a reasonable degree of accuracy, but the distribution of metals in the mass must be examined. Wide variations in the grade of feed to a mill cannot be tolerated. If a deposit has an average grade of, say, 0.5 percent it would not be feasible to feed the concentrator

COMPUTER PRINTOUT of portion of deposit at bench elevation of 5,185 feet. Nos. 1, 2, and 3 indicate high, medium, and low copper grades. No. 4 is waste; No. 7 beyond critical standard deviation. Figure No. 6.

1125.1 5578.0 8185.0 50.0 0.0 7.0 0.0 -50.0 0.0 77		COPPER RECOVERY IS 0.90 MOLYBDENUM RECOVERY IS 0.95		STANDARD DEVIATION 0.024	
LIFT ELEVATION IS 5185.0		DECU IS 0.24		DEMO IS 1.48	
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LEGEND:
 1,2,3 & 4 HIGH, MEDIUM, LOW & WASTE GRADES
 7 BEYOND CRITICAL STANDARD DEVIATION
 0 OUTSIDE DESIGNED PIT LIMIT

COURTESY BRENDIA MINES LTD.
 BLOCK VALUES and PIT DESIGN
 DRWG. No. 1366 CWB G LTD. APRIL, 1969



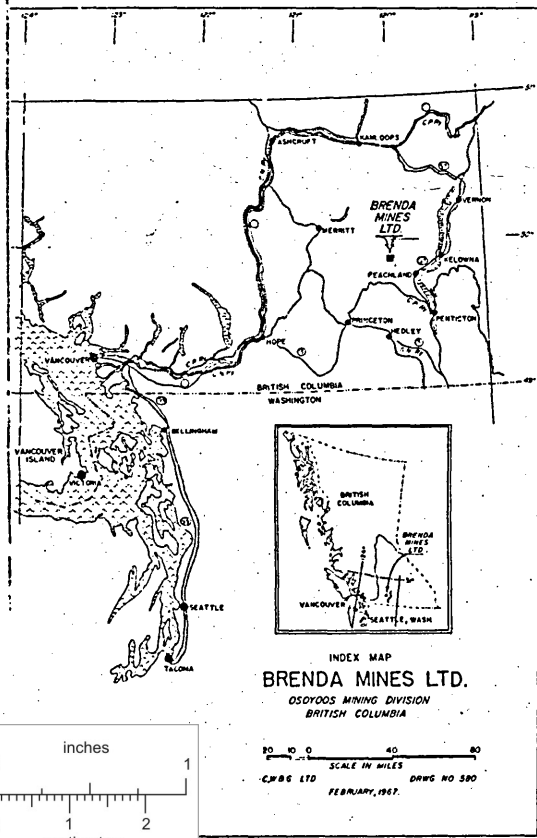
Why feasibility studies for very large low

by E.P. Chapman

During the current decade, the mining fraternity has given increasing attention to very large deposits containing very low concentrations of metals in comparison to grades heretofore considered to be the minimums amenable to profitable mining. The combination of tremendous advances in mining technology which have resulted in substantial increases in production rates per man shift from both surface and underground mines and generally higher metal prices has produced a greatly changed concept of what constitutes an ore body.

A number of highly qualified observers have commented publicly on the relationships between the growing demand for metals and the demand for ever higher standards of living on the part of the explosively increasing population of the world. Dr. James Boyd, President, Copper Range Company, pointed out in his Jackling Lecture presented to the annual meeting of AIME held in New York, New York in February 1967, that there is not now nor will there be in the foreseeable future a shortage of metals needed to meet any conceivable de-

PLACE-Fix map showing location of Brenda.



mand. The limitless intrusive rocks of the world and the sedimentary and metamorphic derivatives of these rocks contain ample quantities of all of the metals. Their availability for use is purely a matter of technology and the price we are willing to pay for them.

Tonnage Profitability Proven

The profitable mining operations being carried out by Palabora Mining Company Limited in the Republic of South Africa, by White Mine Copper Company in northern Michigan, United States and by Endako Mines Limited in British Columbia, Canada demonstrate that the mining industry is now able to profitably mine deposits in which concentrations of metals are but little higher than the average world-wide content of these metals in the rock types in which they are found. Announcements of deposits being prepared for production strikingly emphasize this point. Pertinent data for several such deposits, as reported in well known trade journals, are tabulated in Table No. I. Since many companies do not publish ore reserve figures the tonnages and grades given are only estimates from available information and are in no way official.

Similar deposits which are now being developed for large scale production include the Port Hardy copper deposit on Vancouver Island, British Columbia controlled by Utah Mining and Construction Company which is reported to contain 280,000,000 tons of 0.522 percent copper and 0.029 percent MoS₂. Also, Bougainville Copper Pty. Ltd. is developing an 80,000 ton per day copper-gold mine on Bougainville Island, Territory of Papua and New Guinea. Reserves are said to be 760,000 tons assaying 0.47 percent copper and 0.02 ounce gold per ton. These deposits have several common characteristics:

1. All contain more than 100,000,000 tons of reserves.
2. All have indicated net returns from metal sales of less than \$5.00 per ton at current metal prices.
3. All appear to be amenable to low cost extraction methods.

While Table No. I is confined to deposits containing molybdenum, copper or a combination of these two,

and to occurrences which will be mined by open pit methods, the basic economic premise that a small per ton operating profit multiplied by a large number of tons treated daily will generate a substantial cash flow will apply equally well to large tonnages of other metals which can be mined by caving methods and similar large scale, low cost underground techniques.

Numerous operations around the world have provided operating cost data for both surface and underground mining methods that constitute sufficient basis for rule of thumb assumptions of direct mining and milling costs for preliminary assessment of the potential value of a large mineral deposit. Some typical ranges of costs being realized by producers of large daily tonnages of concentrator feed are given in Table No. II.

While the differences between maximum and minimum in each category in Table No. II seem small, their effect upon cash flow becomes substantial indeed when the multipliers involved have been applied. For example, if a deposit is amenable to open pit extraction with a waste to ore ratio of 2 to 1, the range in direct operating cost would be from a minimum of $(3 \times 0.16) + 0.80 + 0.20$ or \$1.48 per ton to a maximum of $3 \times 0.26) + 1.00 + 0.30$ or \$2.08 per ton. At a production rate of 40,000 tons per day the difference in daily cost amounts to \$24,000 and the yearly difference to more than \$8,000,000.

The capital required to place a deposit into production on a large tonnage basis can vary through a wide range. Some of the factors having a substantial influence on the amount of money needed are:

- Transportation facilities required.
- Living and recreational facilities needed for staff and employees.
- Availability of water and power.
- Amount of preproduction development and/or stripping necessary.
- Availability of areas for tailing and waste disposal.
- Complexity of concentrating plant required.
- Proximity to sources of mining and building supplies and an adequate pool of labor.
- Availability of aggregate for foundation and construction concrete.

The variation in these factors alone can be very great. Other considerations, such as whether or not construction is carried out at a time of

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GCNL #119 7 June 1968 BRENDA MINES LTD.

MAJOR CONCENTRATOR CONSTRUCTION
PHASE NOW UNDERWAY -ON SCHEDULE
AND WITHIN BUDGET TO DATE

Nippon Mining Co. Ltd., Mitsui & Co. Ltd., and Brenda signed a number of agreements which provided \$60 million for the construction of the mill and all facilities.

The monies provided by those agreements will build the second largest open pit non-ferrous base metal mine in Canada.

The schedule is for completion of construction and the commencement of operations in the fall of 1969. To date, approximately \$20 million has been either spent or committed towards construction, pit and site development and the purchase of equipment.

"The Okanagan Valley has already begun to feel the economic impact of this giant industrial development. The long term beneficial effect on an area noted primarily for its agricultural and tourist industries is hard to estimate. Many new businesses, capital investment and technical and professional people are now being attracted to the area as a result of the development of the Brenda mine.

Although the financing arrangements were not completed until this April, the project has not been delayed. Noranda Mines Ltd., the project managers, have provided not only the money to permit continuous work on the development, but also Noranda has formed the project team by bringing together experts in various fields from its many operations across the country.

The report summarizes the four financing agreements (See GCNL No. 85, page three, Apr. 25, 1968) and states that shareholders ratification of the agreement will be sought at the annual meeting.

Brenda has also a contract with Nippon-Mitsui Copper Concentrate that provides for the first right of refusal for the purchase by Nippon of all Brenda's copper concentrates for the next five years from first production, and that Brenda will meet with Nippon before the end of such five year period to negotiate a further agreement. The agreement also gives Nippon the right of first refusal to purchase copper concentrates from the company, but this right does not extend beyond 1986. As Nippon was a substantial partner in the original financing of the property, it was agreed then that it would have the first right of refusal on copper concentrates, and this agreement formalizes the earlier agreements made with the Nippon Company.

Under the Noranda Sales Agency agreement, the company has appointed a subsidiary of Noranda Mines, Noranda Sales Corporation Ltd., as the selling agent for Brenda's molybdenum products for a minimum of 5 years from first production.

Construction progress to May 15, 1968 is reported as follows: The 14 mile gravel road from Peachland was completed with the Province bearing 47% of the cost. Stripping for pit preparation reached a production rate of 150,000 tons per month. This rate will be increased to 600,000 tons per month with the delivery of larger mining equipment. Three 100-ton trucks and one 11-cubic yard shovel are being assembled at the mine and a large rotary drill will be in operation by June 30, 1968. The power line to the open pit was installed and the British Columbia Hydro and Power Authority completed the main power line ahead of schedule.

Construction camps, guard house and sewage lagoon are in service. Clearing, grading and rock excavation work for the plant area was 90% completed. A concrete batching plant was installed at the site. Excavation and foundations have begun for the concentrator and service buildings and construction was started on five staff houses in Peachland. Contracts were awarded for structural steel and for the concrete outlet at the main water dam. The access road to the main tailings dam was started in April. The construction crew averaged 160 men during the first quarter of 1968.

Final engineering design and detail of the crushing, screening, ore storage grinding and flotation areas progressed on schedule. Purchase orders were placed for all the major functional process equipment.

The project has not progressed to the stage where a final detailed cost calculation can be made. Tailings disposal and some other items will cost more than originally estimated. but the overall estimate of \$60 million still appears in range."

On the basis of computer studies, Noranda has advised that the proposed pit ore contains reserves estimated at 177 million tons grading 0.183% Cu. and 0.049% Mo. These reserves include 26 million tons to be mined during the first three years grading 0.212% Cu and 0.063% Mo. Metallurgical tests conducted by Noranda have indicated a potential recovery of 88% for copper and 82% for moly in separate concentrates, at the grade of ore to be mined initially.

0.105% M.S.

0.82% MoS₂

(Continued from Page One)

The financing agreements provide for the following:

	Amount
(a) Bank of Nova Scotia — loans secured by a first mortgage, a general assignment on receivables and a charge on inventories. Interest will be charged at 7½% on \$21,000,000 and 7% on \$4,000,000	\$25,000,000
(b) Nippon Mining Co. Ltd. and Mitsui & Co. Ltd. — secured by 7.3% second mortgage debenture	7,500,000
(c) Noranda Mines Ltd. — secured by third charge 7.2% income bonds	27,500,000
	<u>\$60,000,000</u>

Concurrent to the issue of the 7.3% debenture and the 7.2% income bonds to Nippon and Noranda, Brenda will issue 40,000 shares to Nippon and 1,740,000 shares to Noranda. This stock issue is by way of a bonus in consideration for providing the financing. With the issue of these shares, Brenda's total issued capital will stand at 4,190,000. Of this amount a total of 1,900,000 shares will have been issued to Noranda, and 340,000 shares to Nippon, including shares originally purchased by these companies. Not known, of course, is how many, if any, shares may have been purchased by these companies on the open market.

Agreement Changed

The original financing deal under which Noranda would have purchased 1,100,000 shares of Brenda at \$8 a share had to be completely revised when the cost of the project escalated from an estimated \$35 million to the present \$60 million figure. Noranda had taken down 160,000 shares before the new financing agreement was negotiated.

If additional funds should be required, Noranda has undertaken to provide up to \$15 million above its initial commitment of \$27.5 million. Any additional funds so provided would be secured by 7.2% income bonds, with four additional Brenda shares being issued to Noranda for each additional \$100 provided.

B.C.'s Biggest

The \$60 million financing agreement is one of the biggest ever arranged for a mine in British Columbia. It repre-

sents a signal success for B. O. Brynensen, Brenda president, who with his associates M. M. Menzies and M. E. Davis, both vice-presidents, who kept the property alive during the period of its early discouragement.

The ground was staked 18 years ago by Bob Bechtel, amateur prospector from Peachland, who subsequently discovered some old adit workings, apparently driven years earlier in search for gold. Mr. Brynensen, acting as western superintendent for Noranda, took up the property, but Noranda lost interest. Later, Kennecott did some work and dropped it. But, Mr. Brynensen and his associates were not satisfied that the right answers had been secured. He and his partners financed further drilling with larger size core which improved grade sufficiently to make the project interesting. Noranda stepped back in and the current development program was initiated. Work has been continuous since, except for a short period, when the project was almost derailed by the Carter proposals to eliminate the 3-year tax exemption for new mines and depletion allowances.

Huge Deposit

Brenda has a huge deposit of low grade copper-molybdenum ore (it will be the lowest grade operation in Canada). But it is economic by virtue of a favorable tax climate, because of various natural physical advantages, and because of advanced engineering and handling concepts.

The oval-shaped orebody occurs in a stock of granodiorite with chalcopyrite and molybdenite filling along fracture planes. Maximum dimension of the deposit is roughly 2,500 ft. by 3,500 ft. It has a vertical extent of at least 1,000 ft. A higher grade core will be mined in the first few years and any of the lower grade material that has to be excavated will be stockpiled.

The initial pit, with limits of about 2,000 ft. by 2,500 ft., will provide 10 years' life. Initially, grade should average about 0.55% copper, including molybdenum as a copper equivalent. The long term average will be more in the neighborhood of 0.4% including molybdenum as copper equivalent. (The conversion rate for molybdenum to copper is 5.4.)

Large Reserves

Ore reserves have been estimated at 167.5 million tons grading 0.19% copper and 0.087% molybdenite. Initial grade has been figured at 0.245% copper and

0.128% molybdenite after deleting material that will be sent to low grade stockpile.

On a marginal situation such as this it is difficult to forecast exact grade figures, but it is estimated that annual output will be on the order of 8-12 million lbs. of molybdenum and 35-40 million lbs. of copper.

The company has not made public any estimates of costs, but it could be figured that operating costs will not run more than \$1.50 per ton. Manager Gordon Montgomery told The Northern Miner that he expects to have no more than 250-300 men on the job, a fantastically low figure for an operation of this size.

Big Equipment

To get out the production of 24,000 tons a day, plus low grade and waste stripping that will have to be handled, the mine expects to operate initially with two drills (Bucyrus-Erie 60-R rotary drill, drilling 12½-in. diameter holes), two shovels (11 cu. yd. Marion 182-M), and eight trucks (100-ton capacity Electrahaul). The shovels, it will be noted, can pick up about 30 tons at one scoopful, thus three or four shovelfuls will fill a truck. The big equipment, handling big tonnage is the secret to the low costs.

Metallurgy Good

The 60-in. crusher is one of the biggest ever to be installed in Canada. It will be able to gobble up cubes four feet across. In the open pit, holes will be drilled on 30 ft. spacings with benches 50 ft. high, each hole thus breaking about 3,500 tons. The cuttings from each hole will be sampled to determine grade and the muck pile will be flagged to designate ore, low grade, or waste.

The ore presents no particular metallurgical problems, and the plant will be automated to the nth degree. With grinding to about 50%-200 mesh it is expected that a recovery of better than 82% of the molybdenum and over 90% of the copper will be achieved.

Excellent Location

Re-location and grade improvement of the 15 miles of road from the mine to Peachland has been virtually completed. Concentrates will be trucked out to railroad. For a 5-year period all copper concentrates are being purchased by Nippon Mining Co. and will be shipped to Japan. Molybdenum concentrates are being marketed through Noranda Sales Corp. some being destined for Mitsui & Co.

The mine has an ideal location in the heart of the Okanagan Valley, a noted fruit producing area and tourist centre. The mine site, at an elevation of 5,000 ft., is easily reached from the towns in the valley where the majority of the workers are expected to acquire homes. No townsite at the mine is planned, although temporary accommodation is now provided there for the mine and construction workers.

Assisting Mine Manager Montgomery are Peter Stym, mine superintendent; Bert Maxey, service superintendent; Wm. Allen, chief engineer. Hector Tetu, Noranda construction expert, is supervising construction, and Lyall Ames, Noranda general superintendent of mills, is in charge of mill design.

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TWO SECTIONS — SECTION ONE

24,000 Tons Daily To Start

B.C.'s Biggest, Canada's Lowest Brenda Finalizes \$60 Million Plan

PEACHLAND, B.C. (Staff) — With the final signing of financing agreements, Brenda Mines is well along the road to production. And, as visitors to the mine site can attest, the mine operators have obviously not been waiting for signatures to be penned to the financing documents.

With funds advanced by Noranda Mines, work has been going ahead full blast for some time now. Pit preparation started last November. All of the major mining and milling equipment has been selected and is on order or is in the process of being ordered. Some is already on the property.

Development of the plant site is essentially completed. Foundations for the service buildings, housing,

garage, shops, etc. are well under way. This will be the first major structure to be completed and is expected to be ready for use this fall. Foundations for the concentrator have also been started. Actually, over \$15 million has already been spent.

Target date for production is October, 1969, and no one on the job has any doubt that the objective will be met handily.

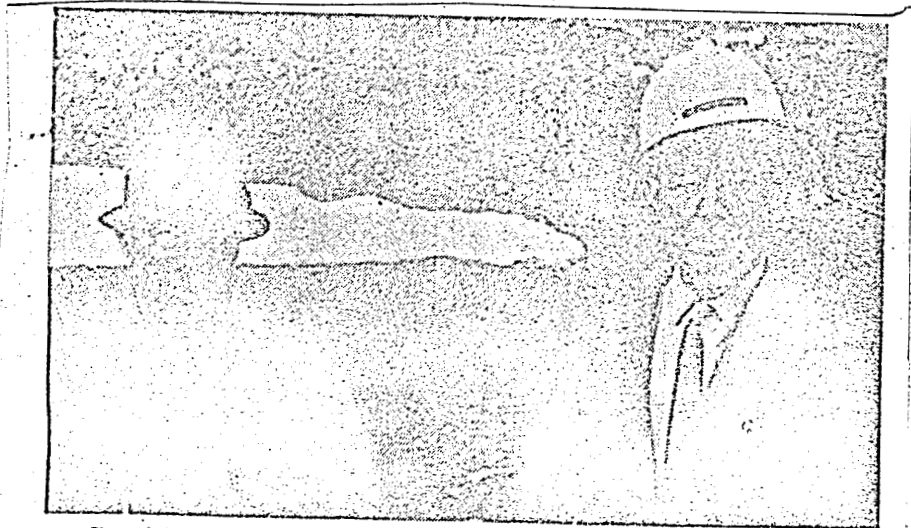
Brenda's 24,000-ton capacity mill is probably the largest initial starting capacity ever installed in Canada. Others have grown to greater size, of course, and so will Brenda. The crushing plant has a rated capacity of 3,000 tons an hour and it will be able to do its job in only one 8-hour shift. The concentrator itself is being generously designed, so it will be no great surprise if it proves capable eventually of handling a somewhat larger tonnage.

The formal signing of documents in Vancouver last week covering the \$60 million financing for the Brenda project was attended by representatives of Noranda, Bank of Nova Scotia, Nippon Mining Co. and Mitsui & Co., several of the Japanese executives having flown over from Japan for the occasion. It took nearly an hour for all the parties to sign the voluminous documents.

See PRODUCTION Page Nine



President of Brenda Mines since incorporation and prime mover behind the production decision, B. O. Brynelsen.



Brenda's mine manager Gordon H. Montgomery talking with Noranda's general superintendent of mills, H. Lyall Ames. Mr. Ames works out of Noranda's Toronto head office.

BRENDA MINES LTD.

MAJOR FINANCING AGREEMENT FORMALLY COMPLETED TO PROVIDE \$60,000,000.

- Formal signing of the documents covering the \$60,000,000 financing of a 24,000 ton per day copper molybdenum mine has been jointly announced by;

NORANDA MINES LIMITED

BANK OF NOVA SCOTIA

NIPPON MINING CO. LTD.

MITSUI & CO. LTD.

BRENDA MINES LTD.

The signing completes all of the financial arrangements, marketing arrangements and development details for bringing the Brenda copper molybdenum property located near Peachland, British Columbia, into production during 1969.

Brenda will be the largest base metal open pit mine and the lowest grade operation in Canada when it is completed. It is economic because of advanced engineering and handling concepts.

B.O. Brynelsen, president of Brenda, acting as spokesman for the participating companies reviewed the history of the property from the time of the initial discovery by prospector Bob Bechtel through to its evaluation and aggressive exploration work headed by M.M. Menzies and B.O. Brynelsen. He stated that the corporate and financial structure was developed by M.E. Davis, vice president. Nippon Mining Co. Ltd. was an early financial participant and throughout demonstrated great confidence in the project. Noranda Mines Limited supplied financial and technical support and encouragement in the final exploration phase, and will continue through as managers and a major participant.

All copper concentrates for a 5 year period are being purchased by Nippon Mining Co. Ltd. and will be shipped to Japan. Molybdenum concentrates are being marketed through Noranda Sales Corporation Ltd. Mitsui & Co. Ltd. are important purchasers of molybdenum concentrates.

To date in excess of \$15,000,000 has been expended and committed to placing the property in production. Mining operations consisting of pit preparation have been underway since early November, 1967. Re-location in grade improvement on the 15 miles of road from Peachland to the mine has been virtually completed. All of the major mining and milling equipment has been selected and is on order or is in the process of being ordered. Footing and foundations for the concentrator and service building, the two major structures, are now underway and plant site development is essentially completed.

The following summarizes the financing agreements completed at April 24, 1968:

Funds to be provided by:

Amount provided

(a) Bank of Nova Scotia - loans secured by a first mortgage, a general assignment on receivables and a charge on inventories. Interest will be charged at 7 $\frac{1}{2}$ % on \$21,000,000 and 7% on \$4,000,000	\$25,000,000
(b) Nippon Mining Co. Ltd. & Mitsui & Co. Ltd. - secured by 7.3% second mortgage debenture.	7,500,000
(c) Noranda Mines Limited - secured by third charge 7.2% income bonds.	27,500,000
	<u>\$ 60,000,000</u>

Concurrent to the issue of the 7.3% debenture and the 7.2% income bonds to Nippon and Noranda, as outlined above, Brenda will issue, as fully paid and non assessable, 40,000 shares to Nippon and 1,740,000 shares to Noranda.

If additional funds should be required, Noranda will provide up to \$15,000,000 above its initial commitment of \$27,500,000. Any additional funds will also be secured by 7.2% income bonds, with 4 additional shares of Brenda being issued to Noranda for each \$100 of additional funds provided.

The annual meeting for Brenda Mines Ltd. will be held as soon as preparations can be completed. The meeting was deferred until after the signing of these agreements.

B.O. Brynelsen said the agreement is an example of co-operation between diverse mining groups in Canada and Japan which would continue to ensure the achievement and success of the property.

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There are indications of other potential ore-grade zones of mineralization on Brenda's large (2,000 acre) property. In particular, we understand that recent drilling by Noranda on a zone which straddles the mutual boundary on the north end of Brenda's property has returned significant values.

Although Brenda presently is not in a position to become financially involved with outside exploration programs, the company may profit indirectly from the continuing exploration activities of several small west coast mining companies which are managed by Brenda's administrative staff.

There is also the possibility that a smelter will be built in the general area -- either government subsidized or perhaps a joint project among producers similar to the Valleyfield zinc refinery set-up. The planned output of copper from Brenda, Noranda's Babine Lake property and possibly that from Lornex (another copper-molybdenum prospect) could justify the expenditure. Actually, this is more than just a vague possibility because the initial contract for Brenda's copper concentrate was set at five years specifically to provide for this eventuality.

JB:sf

This information has been compiled from various sources and may not be complete. It is not guaranteed and is not a representation by us. Any opinion expressed herein is based upon our interpretation of the information from such sources. This information is not furnished in connection with a sale or offer to sell securities or in connection with the solicitation of an offer to buy securities. Our firm, or its partners or members of their families, may at times have a long position in the securities mentioned herein and may make purchases or sales of these securities while this memorandum is in circulation.

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Based on the above, it appears that for the first three or four years cash generation should approximate \$4.00 and earnings \$3.25 per share.

In the fifth year and beyond, indications are that mining the average grade ore at 30,000 t.p.d. could result in cash flow and earnings as low as \$2.00 and \$1.50 respectively; but, there are three additional factors which may mitigate against an immediate decline of this order:

7 | 1. Metal output will be somewhat higher than our projection because of the additional mill feed which will be provided by the low-grade stockpile. Furthermore, it will be recalled that mining costs of this material, which will have to be removed during the normal course of pit development, will be borne by the high-grade ore. Thus, costs per pound of metal recovered will be less than before.

2. An examination of the pattern of development of similar mining situations suggests that a further expansion of the mill rate to offset the effect of a general decline in the grade of ore is a distinct possibility. As we have seen, some provision for this already has been made.

3. The price of metals will be an important consideration. Based on an annual output of 40 million pounds, the effect of each one-cent change in the price of copper would be equivalent to about \$0.10 per share in net profit. Each five-cent change in the price of contained molybdenum, assuming annual shipments of 12 million pounds, would affect earnings by roughly \$0.15 per share.

Future Dividends

It appears that all preproduction costs will be recovered within four years. Under normal circumstances, the payment of dividends is not possible while any debentures are outstanding. However, after the bank loan has been repaid -- about two years after start-up -- we understand that consideration will be given to the retirement of the income bonds with reborrowed money, thereby allowing an earlier initiation of dividends.

Future Developments

Reported reserves relate only to the presently designed operation. However, the walls of the pit will also be of ore grade so that its future enlargement is likely. Furthermore, surface diamond drilling holes show that comparable mineralization extends at least several hundred feet below the planned pit bottom and, although this is not ore by definition, further advancement of mining technology over the next fifteen years may permit profitable extraction.

Net revenue from metals is based on the following:

Copper: \$0.36 (U.S.) per lb., less \$0.075 (U.S.) for smelting and transportation costs. This is equivalent to \$0.30 (Cdn.).

Molybdenum: Current market price, less roasting expenses and handling charges.

A provision for deferred interest charges has been included in the \$53 million estimate of capital cost, which will be written off for income statement purposes over the fifteen-year life of the designed pit.

Under existing tax laws, the availability of \$53 million in capital cost allowances should offset the payment of federal income taxes entirely until the eighth year of operations. Provincial taxes, at current rates, are not a significant factor in the overall projections.

Table I

Possible Range of Annual Operating Results

	<u>Mining of the High Grade Pit</u>			
	<u>24,000 t. p. d.</u>		<u>30,000 t. p. d.</u>	
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
	millions		millions	
Annual Tonnage	8.4	8.4	10.8	10.8
Copper Production (lbs.)	35.8	37.0	44.7	47.6
Molybdenum Production (lbs.)	11.0	12.0	13.8	15.3
Net Revenue	\$ 29.9	\$ 31.7	\$ 37.8	\$ 40.8
Cost	<u>12.2</u>	<u>11.5</u>	<u>15.7</u>	<u>14.8</u>
	17.7	20.2	22.1	26.0
Interest	<u>4.4</u>	<u>4.4</u>	<u>4.4</u>	<u>4.4</u>
Cash Flow	13.3	15.8	17.7	21.6
Depreciation and Amortization	<u>3.4</u>	<u>3.4</u>	<u>3.4</u>	<u>3.4</u>
Earnings	<u>9.9</u>	<u>12.4</u>	<u>14.3</u>	<u>18.2</u>
Cash Flow Per Share	\$ 3.18	\$ 3.78	\$ 4.23	\$ 5.15
Earnings Per Share	\$ 2.36	\$ 2.98	\$ 3.42	\$ 4.35

Evaluations A and C are based upon costs of \$1.45 per ton and recoveries of 87% and 82% for copper and MoS₂ respectively. Evaluations B and D assume costs of \$1.37 per ton and recoveries of 90% for each metal.

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prior to the start of production at AMAX's huge Henderson Mine, which will almost double the company's current annual output of 58 million lbs., it now seems clear that the critical shortage of recent years has been overcome.

Operations

Production is scheduled for early 1969. This means that Brenda will qualify for an initial 3-year tax-free period under the terms of the interim decision that any Government implementation of the Carter Report's recommendation to eliminate this concession will not apply to income earned before January 1, 1974. To take advantage of the tax-exempt period and allow for a rapid pay-back of costs, Brenda has planned a "three-year" pit in the center of the orebody, where the average grade is 0.245% copper and 0.128% MoS₂ (4.9 lbs. and 2.5 lbs. per ton respectively). It is expected that this phase of the operations will, in fact, last close to four years, during which time a large amount of low grade material will be removed and stockpiled, to be milled later when the average grade of ore mined is expected to be 0.21% copper and 0.108% MoS₂.

It now is anticipated that an initial milling rate of close to 30,000 tons per day will be achieved. The former plan for a 24,000 ton capacity, with provision for expansion, has been modified, and the mill will be equipped for the higher rate at the outset. In fact, the ore crushing and grinding capacity will be such that, with the installation of additional flotation cells and other related units, the mill would be capable of handling a substantially larger tonnage.

Metallurgical tests in the pilot plant have indicated that recovery of both metals may be as high as 90%.

Projections - Discussion

Total operating cost, exclusive of transportation and concentrate handling charges, is estimated by Chapman, Wood & Griswold Ltd., consulting engineers, at \$1.37 per ton of ore milled, which compares with a realizable value per ton of roughly \$3.75. These figures were based on the feasibility study recommendation of 20,000 tons per day, and there is the possibility, therefore, of some improvement through the higher rate now envisaged. However, there can be some disparity between pilot plant results and those actually achieved -- particularly in the first year of operation -- so in the following table we have shown additional calculations which assume costs some 6% higher, or \$1.45 per ton. We followed the same reasoning with regard to the rates of recovery and have provided calculations which employ recoveries of 87% and 82% respectively for copper and MoS₂, against an indicated 90% or better.

Results are shown for mill rates of both 24,000 and 30,000 tons per day.

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operation until all costs are recovered and, in return, will receive as a bonus sufficient Brenda stock to bring its total holdings to at least 1.9 million, or 45.3% of 4.19 million shares expected to be outstanding.

Richardson Securities of Canada also provided early assistance through purchase of 100,000 shares at \$8, and Nippon Mining, who will receive a 40,000 share bonus under the financing agreement, already owns 350,000 through its participation in the mining syndicate which preceded the formation of Brenda Mines in November, 1965.

Marketing Agreements

Nippon Mining Limited will purchase the entire output of copper concentrate for an initial five-year period, and has the right of first refusal on subsequent shipments. Sales will be based on the E&MJ export refinery price, less normal smelting charges. Noranda will market the molybdenum on a commission basis; price, as usual, will be the American Metals Climax quotation, f. o. b. the plant site. Roughly 25% of the molybdenite concentrate will be roasted to the preferred form of molybdic trioxide (MoO_3) which commands a substantial premium, and the remainder probably is destined for overseas markets where protective tariffs limit sales to molybdenite.

Metal Prices

Our projections of operating results are based on copper at \$0.36 (U.S.) per lb., a price which seems to make fairly substantial provision for the statistical oversupply which seems to be shaping up for 1968-69, once the immediate shortages arising from the current strike are overcome. Currently, the E&MJ export refinery price, which is a weighted average of almost all free-world sales of copper destined for markets outside the United States, is \$0.57 (U.S.) per lb. This compares with an average of \$0.46 during 1967.

The use of current molybdenum prices (\$1.74 Cdn. per lb. of molybdenum contained in MoS_2 , and \$1.96 for that in MoO_3) as a basis for future projections seems to be justified by the price history of the metal. The dominant position of American Metals Climax (AMAX), which accounts for about 70% of the United States production, has resulted in an orderly price structure with relatively infrequent changes. Since the early 1930's, when molybdenum first gained significant acceptance as an alloying element by steel makers, the long term pattern shows remarkable price stability until after World War II, when seven successive increases in 19 years resulted in a doubling of the price. AMAX foresees an annual compound growth in consumption of 7%, but it now appears that the long term supply of molybdenum will be adequate to meet this demand. Although there could be some cycles of shortages in the next three years or so

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- 2 -

Past experience with comparable mining issues such as Cassiar, Geco, Craigmont, Bethlehem Copper, and more recently, Endako, indicates that investors have been prepared to pay at least 8 times tax-free earnings during the early years of production. Should Brenda be accorded anything like this rating, the capital gain potential from the current \$8.95 level would be considerable.

* * * *

Introduction

Brenda's molybdenum-copper property is located in southeastern British Columbia, within 20 miles of major highway and railroad facilities. Proven ore reserves are close to 150 million tons, grading 0.21% copper and 0.09% molybdenite (MoS₂), and are sufficient for over 15 years at the scheduled rate of production. Since these amounts of contained metal -- 4.2 lbs. copper and 1.8 lbs. MoS₂ per ton -- would almost individually bear the entire cost of extraction, the combination of the two and the improved technology of large-scale open-pit mining, plus the added fact that some 60% of revenues will be derived from molybdenum, should ensure a highly profitable operation, even in the face of a major decline in the price of copper from current levels.

Financing Agreements

Capital costs are estimated at \$53 million, and financing has been arranged as follows:

7.5 % bank loan	\$ 21,000,000.00
7.0 % bank loan	4,000,000.00
7.2 % Income bonds	27,500,000.00
7.3 % Income bonds	7,500,000.00
	<hr/>
	\$ 60,000,000.00

The bank loan, which provided \$4 million for working capital and \$21 million for general expenditures, was contingent upon a guarantee by Noranda Mines that the property would be equipped for production at the latest by July 1, 1969. This money is on a last-in, first-out basis and recent revaluations of costs suggest that all of it may not be required. The Income Bonds have been subscribed for by Nippon Mining (\$7.5 million) and Noranda (\$27.5 million).

Previously, Noranda had agreed to purchase up to 1.1 million shares of Brenda at \$8 per share, with the bulk of the option to be exercised if and when Noranda decided to proceed to production. Prior to modification of this plan, 160,000 shares had been subscribed for to supply funds for general preproduction activities and preparation of a feasibility report. Noranda will manage the

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SPECIAL SITUATION REPORT — designed to provide a vehicle for industry specialists to comment on stocks of companies which because of their size or other factors appear to have more risk than the type of security ordinarily recommended in our investment reports.

January 16, 1968

BRENDA MINES

Vancouver

Price: Stock Exchange

\$8.95

1967-68 Range

\$9.35 - \$4.75

JOHN BISSETT
BAKER, WEEKS & CO.
635 DORCHESTER BLVD. W.
MONTREAL 2, CANADA
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Recommendation

We recommend the purchase of Brenda shares for their intermediate and long term capital appreciation potential. Undervalued in relation to the high earnings expectancy from proven ore reserves, the shares provide a relatively rare opportunity for early investment in a developing situation with strong sponsorship, which holds promise of becoming one of Canada's largest molybdenum and copper producers. Additional speculative appeal is provided by the good possibility of significant expansion of reserves inherent in the future exploration of the company's extensive property.

Summary

Scheduled for production in early 1969, Brenda's \$53 million project will rank with Endako Mines as one of the two largest producers of molybdenum in Canada. (Endako, which now is in production, is the world's third largest producer.) Brenda also will be the west coast's foremost shipper of copper. Noranda Mines has undertaken to supply roughly half the funds and will manage the property until all costs are recovered. At start-up, Noranda will own at least 45% of the 4.19 million shares expected to be outstanding.

Using a \$0.36 (U.S.) copper price, which is substantially lower than the current E&MJ level of \$0.53 per lb., we project annual cash flow at \$16-17 million, or roughly \$4.00 per share, during the first three or four years when ore grade will be maximized to provide a rapid pay-back of capital. Earnings should be around \$3.25 per share, with the exact level depending on the rate of depreciation and pre-production write-offs. In subsequent years, when the grade of ore treated will approximate that of the reserves, earnings could be as low as \$1.50 per share. On the other hand, the treatment of stockpiled ore and a possible further expansion of the mill rate could result in an earnings level not far removed from that of the initial years. Proven reserves indicate a mine life of 15 years, at 30,000 t.p.d.

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BRENDA MINES LTD.NORANDA MINES LIMITED

NEW FINANCING AGREEMENT - Last week, Brenda Mines Ltd. announced that a new financing agreement had been entered with Noranda Mines Limited to bring the property into production. The only condition of the contract that prevents an immediate start on construction is the doubt about the continuation of the three year tax free period created by the Carter Commission recommendations.

Under the new financing agreement, if Noranda takes the property to production and exercises its share purchase options, then Noranda will own 1,900,000 of the 4,150,000 common shares of Brenda Mines Ltd. which will be outstanding. Under the original agreement, Noranda had the option to purchase 1,000,000 shares of Brenda Mines at \$8.00 per share with 100,000 of these shares to be purchased to provide funds to complete the feasibility study. When additional financing was required for the feasibility study, Noranda obtained an option on a further 100,000 shares at \$8.00 per share for a total 1,100,000 shares. To date, Noranda has purchased 160,000 shares of Brenda at \$8.00 per share from the company treasury. There remains 940,000 shares under option to Noranda Mines Limited.

The new part of the financing agreement is that Noranda has agreed to purchase an issue of Brenda Mines Ltd. income debentures in the amount of about \$20,000,000 when the property is taken to production and, as a bonus for purchasing these debentures, Noranda Mines is to receive a further 800,000 shares of Brenda Mines Ltd. at no cost. This would therefore bring Noranda's holdings to 1,900,000 shares or 45.8% of the total 4,150,000 shares to be issued.

The second change in the agreement is that, by the original agreement, Noranda was to buy the 1,000,000 shares of Brenda for cash to the treasury. Under the new agreement, Noranda will buy a debenture issue and have the right for 10 years to convert to the shares at \$8.00. That is Noranda has the right to either take its money back or convert to shares.

BRENDA MINES LTD.

NORANDA MINES LIMITED

* Terms Upon Which Major Company Will Put Brenda's Moly Mine on Production Agreed Upon

* Noranda Says Implementation Will Depend on Continuance of 3-Year Tax Free Period

Conclusions drawn by GCNL from apparently contradictory statements by Brenda and Noranda regarding production decisions at Brenda's molybdenum property are: 1. If production goes ahead Noranda gets an additional 940,000 shares. 2. It will go ahead if and when federal action on the Carter recommendations is clarified. Such clarification is expected in the reasonably near future.

Statement by B. Brynelsen, President Brenda Mines Ltd.

Noranda Mines Limited and Brenda Mines Ltd. have arrived at an agreement for the construction of a mill and the development of Brenda's massive copper-molybdenum orebody near Penticton, B.C. The terms for the development of the 169 million ton orebody were agreed upon in Toronto last week. The agreement was ratified by the board of directors of Brenda Mines Ltd. in Vancouver on Thursday (April 27, 1967). It was ratified by the board of directors of Noranda Mines Limited in Toronto this morning (April 28, 1967), in Toronto and the decision was announced at the Noranda annual shareholders' meeting in Toronto today (April 28, 1967).

Noranda and Brenda will seek clarification of the implications of the recommendations of the Carter Commission report as they relate to the three-year tax free period.

B.O. Brynelsen reported that he and M.E. Davis, vice-president of finance for Brenda Mines Ltd., had talked to officials in Ottawa last week, and had discussed the implications of the Royal Commission report with respect to the development of new mines.

Mr. Brynelsen reported that he and Mr. Davis were "very encouraged" by the reception in Ottawa, and that the officials spoken to were sympathetic to the suggestion that some statement of government attitude would go far in the direction of removing the uncertainty that now prejudices the development of new mines. Given minimum assurances from the government of Canada, work will begin immediately on the construction of a 24,000 ton mill on the Brenda property, said Mr. Brynelsen. Mr. Brynelsen expressed confidence that necessary assurances would be given.

Mr. Brynelsen noted that the minister of finance had invited presentations with respect to investment plans. Brenda Mines Ltd. will be immediately preparing a brief for presentation to Mr. Sharp. "This involves a 57 million dollar investment in the Okanagan Valley and it is obviously in the public interest that it should proceed without delay," he said.

The Chapman, Wood & Griswold feasibility report said: "The great profitability in mining and concentrating very large quantities of low grade ores has been clearly demonstrated in recent years. We conclude that the results of the engineering studies, the sampling, the pilot mill operation, the cost estimation and the economic analysis reported in detail in this report show that exploitation of the Brenda deposit is both technically and economically feasible." Under the agreement, the mine will be put into production with a total of 3,210,000 shares issued and, under the agreement, Noranda will have rights to convert within 10 years a debenture for 940,000 shares at \$8.00 a share," said Mr. Brynelsen. If Noranda exercises its right to convert, the total shares issued, after conversion would be 4,150,000.

Statement of R.V. Porritt, President of Noranda Mines Ltd. to Annual Meeting

Production decisions on Brenda Mines Ltd. molybdenum deposit, and on Noranda's Babine Lake, B.C., Newman Copper deposit involving a total investment of approximately \$90 millions have been deferred pending clarification of the continuation of the 3-year exemption from income tax for new mining operations. R.V. Porritt, president, told the annual shareholders' meeting of Noranda in Toronto, April 28. He said the report of the Carter Commission threatened to destroy the great potential of the Canadian mining industry. The uncertainty it had created had already stopped some projects of other companies. The Babine Lake project would involve some \$30 million and Brenda close to \$60 million.

Mr. Porritt said that under present tax laws Brenda's Okanagan area molybdenum deposit could be placed in production on an economic basis at the \$60 million figure but that Noranda's participation must be contingent of the federal government's policy decision regarding the Carter Commission recommendations.

WESTERN CANADIAN INVESTMENTS

BRENDA MINES LIMITED

- * Large Profitable Mine Indicated by Feasibility Study
- * Final Decision by Noranda Required in 30 Days to Maintain Agreement
- * Several Alternative Senior Financing Sources Available to Brenda

B.O. Brynelsen, President of Brenda Mines Ltd., made the following remarks to the annual meeting, March 14:

"The feasibility report from Chapman, Wood & Griswold Ltd. was received March 13, 1967. It showed the complete feasibility of bringing a large new mine into production. Directors feel the Brenda property should be brought into production at the earliest possible date.....The final report will consist of two large volumes. It is within a few days of being bound into volumes and being forwarded to Noranda Mines Limited.It must be confidential for the time being.....All indications tend to confirm that they will proceed on the basis of it....."

"Brenda is satisfied that there will be enough water for the mill operation.... Licenses are held on Peachland and MacDonald Creeks and are applied for on an alternative source at Pennask Lake...."

"Total ore was increased by computer assessment. Brenda is one of the first computerized mines. Using conventional methods of calculation, our consulting geologists confirmed total reserves of 148,160,300 tons of ore grading 0.19% copper and 0.087% MoS₂. However, the subsequent application of the computer increased the reserves by 13.0% and our total reserves are, in fact, 167,498,900 tons. The average grade is unchanged at 0.19% copper and 0.087% MoS₂...."

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Remarks
"The three year pit is in better grade ore and in the three year pit the average is 0.245% copper and 0.128% MoS₂. The feasibility report is based on a 20,000 ton per day mill. It is very likely that this mill may be capable of handling as much as 24,000 tons per day. There will be provision for the expansion of milling capacity to 30,000 or more tons per day."

"The maximum cost, from the beginning of the feasibility to the completion of the construction of the mill is estimated by the consultants at some \$55 million. This would include all costs -- mill costs, mine equipment, pre-production expense, working capital and costs incurred to date. On the basis of the Noranda agreement, approximately \$45 million of this amount will be debt financing....A base price of 36 cents per pound copper and \$1.74 per pound molybdenum (both in Canadian funds) have been used in all calculations and, at these prices, and on a 20,000 ton a day throughput, the debt will be paid back in the tax free period or very shortly thereafter. If higher prices are realized and/or there is a greater daily throughput, the pay back will, of course, be accelerated. Copper prices can vary. A higher price over this period would improve our total earnings, as our calculations assume 36 cents a pound (Canadian funds) for copper and approximately 60% of our income is derived from molybdenum. Market projections anticipate a strong molybdenum market: on balance, Brenda therefore is in an excellent economic position with the two metals that are in such great demand.... Under the agreement with Brenda Mines Ltd., Noranda Mines Limited has 30 days from the receipt of the feasibility report to confirm its intention of taking up its option and participating according to the terms of the agreement. The feasibility report will be officially delivered to Noranda Mines Ltd., Toronto, within a few days."

"I consider it highly probable that we will develop this mine with Noranda Mines Limited. In the unlikely eventuality that, for some wholly unpredicted reason, Noranda did not proceed, we have been contacted by alternative sources of capital, available and adequate to bring the Brenda mine into production."

"Nothing has come to my attention that would lead me to anticipate any slackening of interest of Noranda Mines Limited in joining with us in bringing our mine into production."

"Certainly the most significant single point is that we are going to have a large and profitable mine on the Brenda property. This is the essential single fact that assures the prospects of the company."

"In the very short run we propose to apply for the listing of Brenda Mines Ltd. on the Toronto Stock Exchange. We have not by any means completed the drilling of promising areas on the Brenda Mines property. We will be engaged in drilling and we expect to prove up additional ore reserves in the future."

"The timetable is not dependent upon the decision of Noranda Mines Limited. No serious delay should result in the event Noranda should decide not to participate. We would in that event proceed at full speed to finance, design and construct the mill and bring the mine into production."

GCNL NO. 52 (MARCH 15, 1967)

BRENDA MINES LTD.

ANNUAL REPORT - B.O. Brynelsen, president of Brenda Mines Ltd., reviews the agreement with Noranda Mines Limited in the recently issued Brenda annual report. The agreement gives Noranda the right to purchase 1,100,000 shares of Brenda at \$8.00 per share and to place the Brenda property in production with Noranda providing all of the debt financing and working capital required. When Noranda has purchased the 1,100,000 Brenda shares, it is entitled to three men on the Brenda nine man board of directors. Noranda shall be responsible for the management of the property and shall be given the marketing responsibility for all the ore and minerals produced, except copper concentrates on which Nippon Mining Ltd. has the right of first refusal.

The reasons that the feasibility study was not completed at the end of 1966 and is now scheduled for completion by March 14, 1967, are: a recent I.P. survey located an anomaly in the pit area which requires drilling to determine if a new and larger pit design is justified; It is advisable to continue the operation of the pilot mill for an additional few weeks to determine further details of the metallurgical techniques for recovery of the minerals from the ore and separation of the copper and molybdenum.

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About ore reserves, the annual report states: Estimated total content of ore body:

Computer Method-Tripolynomial system				Conventional Method- Drill Hole Vertical Sec.			
Grade	Tons	Copper	MoS2	Grade	Tons	Copper	MoS2
Grades 1 and 2	114,552,100	0.21%	0.103%	Grades 1 and 2	89,548,700	0.22%	0.108%
Grade 3	52,946,800	0.14	0.052	Grade 3	58,611,600	0.15	0.055
Total	167,498,900	0.19	0.087%	Total	148,160,300	0.19	0.087

Calculating the tonnages and grades incorporates the following constants: Grade 1 - \$3.00 plus; Grade 2 - \$2.00 to \$3.00; Grade 3 \$1.25 to \$2.00. Copper recovery 90%; Molybdenum recovery 85%, copper value 36¢ less 7.4¢ per pound; molybdenum value \$1.74.

"The lower grade category is ore by virtue of the fact that it must be mined and stockpiled in the normal course of mine development. The cost of mining this material is written off against the higher grade and thus it only needs to pay the trucking and milling costs plus a reasonable profit margin to become ore in the accepted sense.

"An initial three year pit has been planned in the centre of the orebody. Mining will begin in this area and it is estimated that 21,000,000 tons grading 0.245% copper and 0.128% MoS2 will be removed in the first three years. At the same time, a stockpile will be created of approximately 11,000,000 tons grading 0.15% copper and 0.05% MoS2 which will eventually be milled in conjunction with the ore from the 20 year pit."

The president stated that the objective is to put the largest justifiable mine into operation as soon as possible in order to take advantage of current metal prices and other favourable factors in the present market.

He states that, while final decision awaits the feasibility study, present reserves justify a 20,000 ton per day plant and the design will permit expansion at reasonable costs, and power water supplies are being planned with expansion in mind. This provision for expansion is necessary because of the possibility that more ore will be developed nearby and because continued high metal prices may up-grade material considered uneconomic in the feasibility study.

Arrangements have been completed for enough water to serve a 30,000 ton per day mill by construction of a major dam and drilling of standby wells. A new road, which will reduce the distance to Peachland to 16 miles, has been planned in the final design.

Management of Brenda has taken on the direction of several small and promising mining companies.

The notes to the Nov. 30, 1966, balance sheet bring out that \$1,800,655 has been spent on the property and that \$29,074 was earned on short term deposits. Of the 5,000,000 shares authorized, 2,250,000 shares are issued and 940,000 shares are under option. In addition, 75,000 shares had been paid for at \$8.00 per share but had not been issued at the year end. If all the shares under option were issued, there would have been 3,350,000 shares issued. To date, Noranda has paid for 160,000 shares at \$8.00 per share for a total consideration of \$1,280,000.

NO. 47 (MARCH 8, 1967) + GEORGE CROSS NEWS LETTER + TWENTIETH YEAR OF PUBLICATION +

anda's enviable sales position in world metal markets.

Early in December, your directors approached Noranda with respect to operating capital to finance the additional work required for the feasibility study. Noranda immediately agreed to take a further 100,000 shares at a price of \$8.00 a share, 60,000 being paid for at the time and the other 40,000 being optioned and subject to call for payment at any time by Brenda upon approval by Noranda of planned expenditures. After Noranda exercises all its options, Noranda will have purchased from the treasury of your company a total of 1,100,000 shares at \$8.00 per share out of a total of 3,350,000 issued shares, leaving in excess of \$7,000,000 in the treasury for use in the interests of the shareholders.

Proposed Annual Meeting and the Board of Directors

Your Board of Directors has decided to call the annual meeting on or about February 15, 1967, near completion of the feasibility study. All shareholders will be advised as soon as possible of the exact date. Your Board of Directors now consists of B. O. Brynelsen, president; M. M. Menzies, vice-president; M. E. Davis, vice-president, finance; A. W. Fisher, secretary, and Mr. Hidemasa Kubo and Mr. Munemasa Shinjo, of the Nippon Mining Company in Tokyo. Upon acceptance of the feasibility report, Noranda will place three directors on Brenda's board of nine. Mr. A. G. Thompson of Richardson Securities of Canada continues as special advisor to the Board of Directors.

Dates of Importance to Shareholders

During early 1967, dates of importance to Brenda shareholders will be the completion of the feasibility study by mid-February, the holding of the annual meeting on or about February 15, the delivery by the consulting engineers of the finished feasibility report to the directors of Brenda, by the end of February and, during the month of March, a final decision by Noranda as to whether or not Noranda will exercise its option to finance the project.

General Comments

The technical assessment at this date indicates that the directors will achieve their objective of bringing into production an economic mine. Ore reserves are up to expectations and today are sufficient to justify a large mill, even if further ore were not discovered. Metallurgy has presented no unforeseen problems and recovery and concentrate quality appear to be most favourable.



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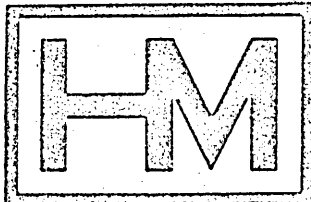
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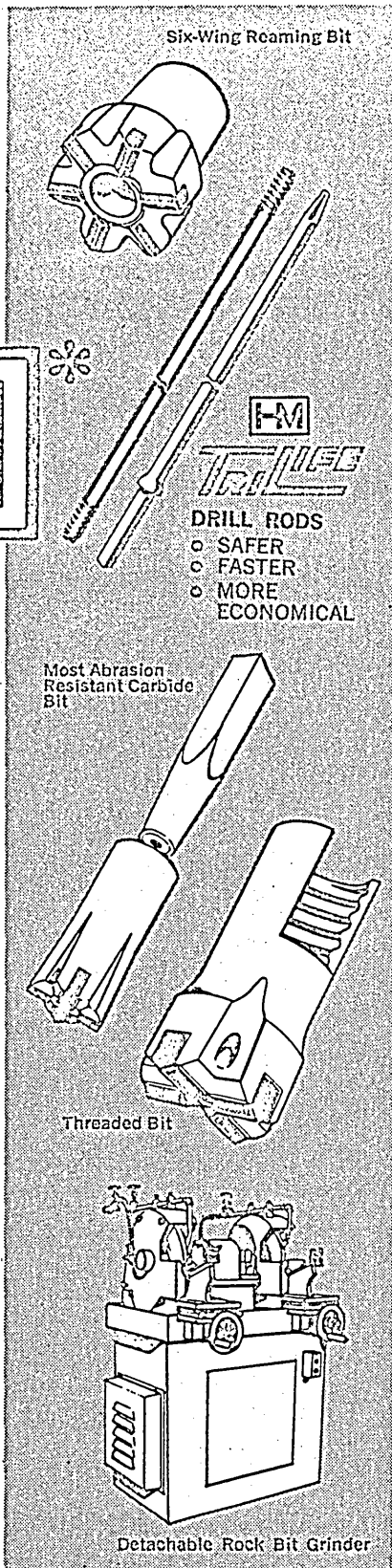
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000 came from Richardson Securities of Canada in return for 100,000 shares, \$1,280,000 from Noranda for 160,000 shares, and the remainder from sales on the market to the public and sales to the original mine developers.

Production Planning

In planning the Brenda project, your Directors intend to put the largest justifiable mine into operation as soon as possible in order to take advantage of current metal prices and other favourable factors in the present market. Although the decision concerning the size of operation and other features of the project must be based on the current feasibility study, it appears that the ore reserves proved up to date are quite adequate to justify construction of a 20,000-ton plant. The plant will be designed to permit expansion at reasonable cost, and water and power supplies are planned with the same expansion in mind. This provision is necessary because of the possibility that more ore will be developed nearby and because continued high metal prices may upgrade material considered uneconomic in the feasibility study.

Completion of Feasibility Study

The original objective was to complete the feasibility study by the end of 1966. For two reasons, it has been agreed by the Board of Directors that the completion date should be postponed, but that under no circumstances should the feasibility study extend beyond February 1967. The reasons are:

- (a) That the drilling results of the anomalies located in the recent I.P. survey may justify a new and larger pit design, and
- (b) That it is advisable to continue pilot mill operations for an additional few weeks to determine further details of the metallurgical techniques for recovery of the minerals from the ore and separation of the copper and molybdenum.

Relationship with Noranda Mines

As previously announced, the original arrangement with Noranda Mines Limited was that Noranda would purchase 100,000 shares of Brenda Mines Ltd. at a price of \$8.00 per share, which purchase was completed in November, and would hold an option on a further 900,000 shares at a price \$8.00 a share. This option would be exercised when Noranda decided to finance the construction of a mill and mine, following completion of the feasibility report. Another provision of the agreement is that Brenda would continue to benefit from the wealth of experience and technical knowledge of the Noranda staff and from Nor-



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studies related to the provision of services necessary for the mine.

During the past year, Brenda's administration group has developed under J. Stathers and S. Slym, C.A., and is now housed in new offices at 1111 West Hastings Street, Vancouver. At present, our accounting is done in Penticton and our purchasing in Vancouver by Noranda, on a fee basis, but these and similar functions may be moved to the new head office in the future. The organization now taking shape under Brenda's name will be the nucleus of the organization required to construct and operate the Brenda project, and personnel are chosen with this in mind.

Recently, Brenda's administrative staff has taken on the management of several small and promising mining companies. In this way, Brenda can remain in the forefront of mining exploration activity without becoming involved financially at this time. Your Board of Directors hopes and expects that this policy will lead to future opportunities for Brenda to share in the most encouraging projects these companies are developing.

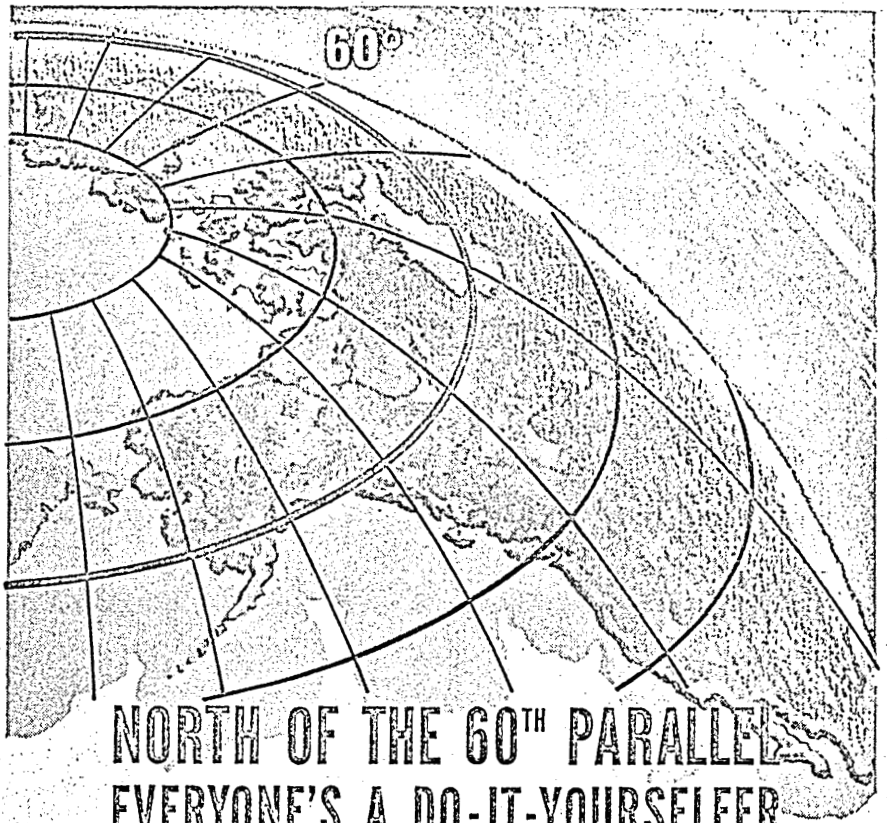
Engineering for production is well advanced. The pit plan for the first years of operation is essentially complete, and most of the pit area has been cleared of bush and is ready for development. A good mill site has been located adjacent to the pit, preliminary design of the plant and tailings disposal system is going ahead and construction can begin soon after the production decision is made.

After eight months of design and investigation, Brenda has completed arrangements for enough water to serve a 30,000-ton mill. The study involved a major dam and the development of supplementary water from wells and is now ready for incorporation in the feasibility report, complete with cost estimates.

B.C. Hydro is well advanced in the design and planning of a 50-mile transmission line that will bring power from the Highland Valley sub-station to Brenda. In order to have power available when required, clearing of the right-of-way will proceed this winter and construction will start next spring.

A 10-mile access road has been located and construction will start this winter. The new road will reduce the distance to Peachland to 16 miles. At the same time, a modern microwave communications system will be installed to serve the construction project and the mine.

In doing the work described above, your directors have spent close to \$2,700,000 in proving up a mine on the Brenda property. Of this total, \$800,-

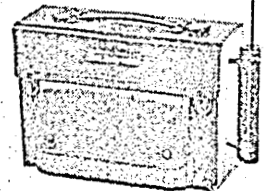


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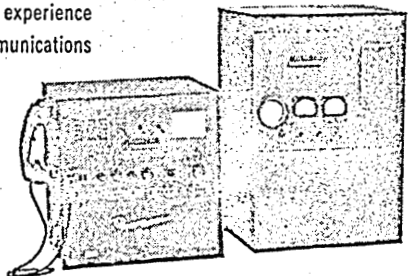
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By B. O. BRYNELSEN
President, Brenda Mines Ltd.

BRENDA PURSUES PRODUCTION OBJECTIVE

Summary Comment

As this release indicates, to this point all information obtained from the feasibility study is favourable. This includes the ore reserves and grade, the data gained from the drilling and underground bulk sampling programme, the results of metallurgical tests and the availability of water, power and transportation. The Board of Directors is satisfied that the current studies will lead to the development of an economic mining operation at Brenda.

Ore Reserves

The orebody is now estimated to contain a total of approximately 150,000,000 tons in all categories based on conservative metal prices to establish cut off grades. The proposed 20-year pit is estimated to contain 136,845,100 tons in all categories, of which 118,449,300 tons are drill indicated and only 18,395,400 tons are inferred. Of the pit ore, 86,757,000 tons grade 0.22% Cu. and 0.108% MoS₂ and 50,088,100 tons grade 0.146% Cu. and 0.055% MoS₂. The lower grade category is ore by virtue of the fact that it must be mined and stockpiled in the normal course of mine development. The cost of mining this category is written off against the higher grade and thus only needs to pay trucking and milling costs plus a reasonable profit margin to become ore in the accepted sense.

Planning is well advanced on the initial three-year pit which will be developed in the centre of the orebody. During this initial period, we will mill about 21,000,000 tons grading 0.245%

copper and 0.128% MoS₂. In addition, 11,000,000 tons grading 0.15% copper and 0.05% MoS₂ will be taken out of the three-year pit and placed in a stockpile to be milled in conjunction with the ore from the 20-year pit. Any additional ore resulting from the drilling programme now in progress adjacent to the pit would add to these totals.

Continuation of Drilling

We now have 68 diamond drill holes completed in the main ore zone and on adjacent geophysical-geochemical anomalies, for a total of 39,629 feet. A rotary percussion drill was used for fill-in drilling on the proposed pit area and 19 holes were drilled for a total of 7,323 feet. Our underground workings include 1,884 feet of drifting and crosscutting and 802 feet of raising which confirmed the drill grade and provided 15,000 tons of ore for the pilot mill.

An induced polarization survey was recently completed beyond the borders of previous surveys. This I.P. survey indicated an additional area adjacent to the pit worth drilling and if ore grade mineralization should be found, the economic way of mining would be to increase the pit size to include the additional territory. It was decided that this area should be drilled and two diamond drills are now working. Results are not yet available.

It is expected that drilling on the Brenda claims will continue for a very considerable period of time; a number of interesting targets have not yet been drilled.

Pilot Mill Operation

A 100-ton-per-day pilot mill as installed in the summer of 1966 for the



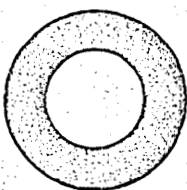
B. O. Brynelsen

purpose of determining metallurgical recoveries and product specifications. This mill has been in operation on a more or less continuous basis since mid-October. All phases, including bulk concentrate recovery, separation of copper and molybdenum into cleaned, separate concentrates of good grade, and the final recoveries of both metals are encouraging. It is anticipated that final results of mill performance will be available during January.

Work and Expenditures to Date

During the past summer, the combined activities of pilot mill construction, underground bulk sampling, diamond and rotary percussion drilling, pit clearing and camp expansion required a labour force at the property of about 110 men. Most of the work was done by contract and very few men were on the Brenda payroll. Currently, with winter weather curtailing activities, the labour force is down to about 65 men. All work at the property has been supervised by P. Stym, P.Eng., under the direction of Chapman, Wood and Griswold Ltd., our consulting engineers. Pilot mill construction and operation has been in the hands of Wright Engineers Ltd. K. Douglass, P.Eng., has directed all

A report to shareholders dated January 3, 1967.



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THE NORTHERN MINER

Jan 12 '67

Feasibility Study Awaited By Brenda Noranda Adds Funds

VANCOUVER, B.C. — Present calculations indicate that Brenda Mines could come into production during the summer of 1968, Morris M. Menzies, vice-president-operations, stated. A feasibility study is scheduled for completion by Feb. 28.

The concentrator would have a minimum daily capacity of 20,000 tons but could be revised upwards. Easily available water supply is ample for the 20,000-ton plant, particularly as it is planned to reclaim all the used water possible by recirculation. Keith Douglas, manager of engineering services, told the press that close investigation is being made in this regard. For a higher tonnage, it may be necessary to pipe in water from some distance.

Anomalous conditions disclosed through a recent induced polarization survey could lead to changes as to the boundaries of the big open-pit mining area planned. Value of ore in the "3-year pit" would be close to \$4 per ton and that at 34¢ copper and \$1.67 molybdenum the value for the 136 million tons in the "20-year pit" would be \$2.90 per ton. Cost of mining, milling and shipping is estimated at \$1.25 per ton, Mr. Menzies said.

Reserves Estimate

The Brenda deposit is estimated to contain a total of approximately 150 million tons in all categories, based on conservative metal prices to establish cut-off grades. The proposed 20-year pit is estimated to contain 136,845,100 tons in all categories, of which 118,449,300 tons is drill indicated and 18,395,400 tons is inferred. Of the pit material, 86,757,000 tons averages 0.22% copper and 0.108% molybdenite (MoS_2) and 50,088,100 tons grades 0.146% copper and 0.055% MoS_2 . The lower grade material is deemed ore grade as it must be mined and stockpiled in the normal course of mine development. Costs of mining this category will be written off against higher grade material, requiring only that it bear trucking and milling costs plus a reasonable profit to become ore in the accepted sense, B. O. Brynson, president, states in an interim report.

Planning is well advanced for the initial 3-year pit to be developed in the centre of the deposit. During this period, it is planned to mill about 21 million tons grading 0.245% copper and 0.128% MoS_2 . In addition, 11 million tons grading 0.15% copper and 0.05% MoS_2 will be mined and placed in the surface stockpile, to be milled with material from the 20-year pit. (J.M.S.)

A total of 68 drill holes, totalling 30,620 ft. has been completed. Underground workings include 1,884 ft. of drifting and crosscutting and 802 ft. of raising, which confirmed drill-indicated grade and provided 15,000 tons of material for pilot plant testing. There are two diamond drills at work testing an area in which induced polarization work indicated an additional zone adjacent to the pit. It is expected that drilling will continue for some time as there are a number of interesting targets to be tested.

Financial Position

To date Brenda has expended \$2,700,000 on exploration, development and feasibility studies. Noranda Mines has provided \$1,280,000 through the purchase of 160,000 shares at \$8 per share and is under commitment to supply a further \$320,000 by purchasing another 40,000 shares of Brenda on demand.

Reviewing the financing agreement with Noranda Mines, Mr. Brynson states: "The original agreement with Noranda Mines was that Noranda would purchase 100,000 Brenda shares at \$8 per share, which purchase was completed in November. Noranda would also hold an option on a further 900,000 shares at \$8 per share. The option would be exercised when Noranda decided to finance construction of a mine and mill, following completion of the feasibility study. In December, Brenda approached Noranda with respect to operating capital to finance additional work required for the feasibility study. Noranda agreed to buy a further 100,000 shares at \$8 per share, 60,000 being paid for at the time and the other 40,000 shares subject to call for payment at any time by Brenda upon approval by Noranda of planned expenditures. If Noranda exercises all its options, it will have purchased a total of 1,100,000 Brenda shares at \$8 per share out of a total of 3,350,000 issued shares."

Feasibility Study

The feasibility report is being prepared by Chapman, Wood & Griswold, consulting engineers, and must be completed by Feb. 28. Mr. Menzies said he expected it would be available by Feb. 15. Noranda will have a month after receipt of the report to exercise its option to finance the project through to production. The cost of an "open-end" 20,000-ton mill is estimated at \$35 million.

B.C. Hydro & Power Authority has awarded a \$181,000-contract to Geddes Contracting Co. of Prince George, B.C., to clear a 57-mile right-of-way for a transmission line from the Highland Valley to the Brenda property south of Penask Lake and 14 miles northwest of Peachland on Okanagan Lake.

Morris M. Menzies resigned as assistant manager of the western division of Noranda Exploration Co. at the end of 1966 to devote his full time to Brenda Mines. In addition to directing Brenda's own operation he will take charge of exploration by several other companies, for whom Brenda has contracted to supply management. These include: Inland Copper, Inland Copper Mines of

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Following is an up to date report on the activity at Brenda Mines Ltd. property, located 15 miles west of Peachland, B.C. The information was gained from a recent trip to the property and discussions with the, officers, directors and management at the mine.

UNDERGROUND BULK SAMPLING - Approximately 2,000 feet of lateral work has been completed as have been three of the four raises planned. The fourth raise will be completed by Oct.19,1966, and the underground program will then be finished. Assay results from all of the workings have not been compiled but are expected to average better than the drilled grade of 0.24% copper and 0.07%Mo. There is a minimum of 700 feet of these workings that are at least twice the drilled grade and a portion of this 700 feet is over three times the drilled grade.

The significance of this appears to be the availability of better than average grade ore that can be mined and milled in the tax free period.

PILOT CONCENTRATOR - The 100 ton per day pilot concentrator cost \$250,000 and went into operation in August and has produced better than expected results to date. A bulk concentrate of copper and molybdenum is being produced with a recovery of over 90% of the copper and the molybdenum. The earlier bench tests indicated a recovery of 85% of each. The bulk concentrates are being shipped to potential customers for smelter tests and to research facilities for separation tests.

The pilot mill is currently working on the separation of the bulk concentrate into copper and molybdenum concentrates. Bench tests at the plant on the bulk concentrate have given satisfactory results.

The separation of the bulk concentrate is apparently the last crucial test for the property. The management is confident that the separate concentrates will be produced in the near future particularly since the bench tests were satisfactory.

Brenda Mines Ltd. intends to retain the pilot mill indefinitely as a test plant even after the production plant has been constructed and is in operation.

ORE RESERVES - There has been no official ore reserve estimate since May 31,1966, when the estimate was 50,000,000 tons of possible and probable and 55,000,000 tons of geologically inferred. In July 1966, the unofficial estimate by the company officials was approximately 150,000,000 tons in total. Since then, drilling has been continuing mostly to the northern end of the zone and this work has added appreciable amounts to unofficial estimates. The way it looks now the reserves are more than adequate for a generously designed 20,000 ton per day operation with a crushing capacity of 2,000 tons per hour and making use of equipment such as 100 ton capacity trucks and 10 yard shovels for the pit.

Stripping ratio is expected to be 0.3 tons of waste to 1 ton of ore and low grade stockpile material.

MAJOR OPERATION PREPARATIONS - The company currently has a number of preproduction activities underway including the clearing of an area 2,800 feet by 2,400 feet, approximately 160 acres. This area is 80% cleared and burned with approximately 20 acres yet to be started. Drill testing of the areas to be used for the mill, waste disposal, tailings pond and low grade stockpile are either underway or to start shortly. Power contracts have been negotiated with B.C.Hydro for transmission lines and power supply at the projected start up date of the mill. Drilling has been completed for the dam foundations for the water supply system for the mill. New access road has been surveyed and construction and clearing is to start in two to three weeks as the equipment can be assembled.

EXPLORATION CONTINUING - Drill testing of a large soil sampling anomaly to the north of the main ore zone is to start in a week. The soil sample anomaly has an I.P. anomaly over it and it is of a size that could produce twice the tonnage of the existing ore zone. Management is most optimistic about the potential of this northern zone.

In addition to this property, Brenda Mines is participating in the exploration of a copper property in Northern Washington State where preliminary work is encouraging.

the same grade. The reserves and the grades were contained in a report dated May 31, 1966, and will be revised in the near future.

The bulk sampling resulting from the underground work has "at least" maintained the average grade assumed in the reserve estimate. Indeed it is apparent that in more than one instance a much higher concentration of molybdenum has been found, particularly in the area of the portal. One fact became apparent: the mine is emphatically a molybdenum venture with copper furnishing only one-third of the metal value. Mr. Wood said it was likely there would be some 15c in precious metals and that possibly one-half of that would be recoverable. He said that the value of copper in the ore has been raised to 34c per lb. after working on the basis of 32c in the past; the value of molybdenum is calculated at \$1.67 per lb. "Those of us who are familiar with the project are confident a mining operation will result," he said. Mr. Wood added that the minimum projection was at a rate of milling 20,000 tons a day. Mr. Brynelsen is confident the operation will not commence at less than 30,000 tons a day and he hopes to start right out at 50,000 tons; in fact, he is convinced Brenda will warrant smelter

construction from the outset and that its proximity to the Merritt and Highland Valley areas could lure other sources of smelting ore if required.

The No. 1 zone, now known locally as the main target zone, is expected to contain an estimated 150 million tons of reserves of at least the same grade as that assigned in the past.

A feasibility study of the Brenda project is being carried out by a computer at the University of California in Berkeley, California.

Although mention has been made of production of a 54% Mo concentrate containing less than 0.2% Cu, Mr. Wood and Morris M. Menzies, vice-president of Brenda, were of the opinion that a large part of the ultimate production would be in the form of molybdc oxide, for which there is a strong demand and good price. A copper concentration of 100 to 1 is envisioned to produce a 25% concentrate. The ore is predominantly chalcopyrite.

A minimum of stripping will be involved in early operation. This will extend from 15 to 45 feet and the actual depth will probably depend on an "assay roof" where the weathering diminishes to the point that sufficient metal is recoverable to justify treatment.

The underground development is planned to consist of 2500 linear feet. This will include further main-tunnel extension, 400 feet of crosscutting and the driving of three raises to surface following diamond-drill holes. This is expected to provide an airtight check on assays. A further check is being made by percussion drilling with a six-inch bore hole.

A tentative mill site has been selected at a considerably lower elevation than the mining area. This will permit down-hill transportation of ore to the mill for the next 20 years at 50,000 tons a day. Water supply is not seen as a major problem. Power can be obtained through an extension of the lines of West Kootenay Power & Light Co. Ltd. from the Okanagan Valley or through a comparatively short connecting line to the Westcoast Transmission gas line.

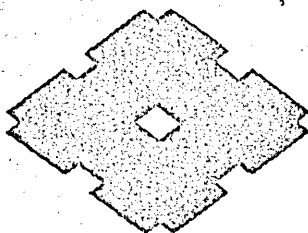
Senior operating staff of Brenda Mines Ltd. includes Peter Szym, mine superintendent; Keith Douglass, manager of engineering services; Jack Stathers, manager of administration and planning; Ross Vogan and Harold Jones, geologists; and Don Sinclair, accountant. A complete engineering staff is also maintained at the property by Chapman, Wood & Griswold Ltd. Mine address is Peachland, B.C.

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By B. O. BRYNELSEN, P.Eng.
President, Brenda Mines Ltd.

NORANDA TAKES POSITION in BRENDA MINES FINANCING



Brenda Mines Ltd. has recently received a number of offers with respect to financing of the Brenda property. The Board of Directors is most anxious to put Brenda into production as soon as possible to reduce pre-production and overhead expenses and to take advantage of favourable metal prices. In order to devote their full time and attention to this end, the Directors have made firm arrangements for financing, subject only to the successful conclusion of the technical and economic feasibility study now in progress. The agreement is also subject to Noranda Mines Ltd. being satisfied as to our titles and existing commitments.

Of the offers received, the Noranda proposal has been accepted since it contained the greatest immediate and long term benefit to Brenda shareholders. Under the agreement, Brenda will remain as an independent company with control remaining in the hands of present shareholders. This will allow Brenda to develop as a strong company in its own right. Noranda has offered interim financing to complete the feasibility study, technical and managerial assistance and sufficient capital to finance the recommended size project.

Noranda has agreed to purchase 25,000 unissued shares of Brenda at \$8 per share to provide \$200,000 to complete the feasibility study. Noranda will purchase an additional 75,000 unissued shares of Brenda at \$8 per

share, if they deem additional capital is required for the completion of the feasibility study.

Noranda's offer to finance the Brenda project is subject to its acceptance of the feasibility study in which case Noranda will purchase an additional 900,000 unissued shares at \$8 per share, to complete the maximum commitment of one million shares.

Noranda will also undertake to arrange all funds required by Brenda, which will be debt returnable out of 80% of the net income. Noranda will supply management and technical help and will act as agent in arranging sales of products. This in no way supersedes Brenda's existing agreement with Nippon Mining Company regarding copper concentrates. Noranda will place three directors on the Brenda Board out of the total of nine, after their acceptance of the feasibility study and commitment to provide all funds required by Brenda.

It is to be noted that our major financing may thus be completed with a minimum issue of treasury stock. Of a total five million shares authorized, it would now seem that we could be fully financed with a maximum of 3,300,000 shares issued. A shareholders' meeting to report to you in greater detail is planned for the near future.

At the property, everything is progressing very satisfactorily. It is expected to have the pilot mill in pro-

duction approximately the 20th of August. Drilling and underground work for the bulk sampling are close to schedule. Detail drilling on our No. 1 target area should be completed around the end of August and then further drilling will be started on other anomalous areas. Our consultants are working on a revised ore reserve estimate which should be brought out soon.

Brenda Mines Ltd.

"Target for production of Brenda Mines Ltd. is December 1967," B. O. Brynelsen, president, advised Western Miner July 26 on a visit to the property, 14 miles northwest of Peachland, B.C. A great deal of work has been done since commencement last December. This includes some 44,000 feet of diamond drilling in 44 holes, an underground adit now 650 ft. in length, a large bulk-sampling plant, and erection of a building to house a 100- to 150-ton-per-day concentrator which is expected to provide adequate information by November 1, 1966, as to the recoverability of the molybdenum and copper metal in the mineralization.

John Wood of the consulting engineering firm of Chapman, Wood & Griswold, Ltd., reported probable and possible reserves of 50 million tons grading 0.24% Cu. and 0.07% Mo. He stated that on the basis of present exploration it would not be possible to estimate reserves in a higher capacity. He also assessed geologically inferred reserves at 55 million tons of

R. F. FRY and ASSOCIATES (WESTERN) LIMITED

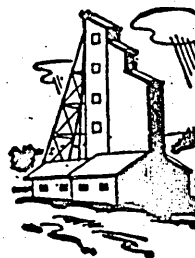
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BRENDA MINES LTD. (G.C. May 24 '66)

PROGRESS REPORT - The following is the text of a report from B.O. Brynelsen, president, dated May 19, 1966, covering the operations of Brenda Mines Ltd.:

"To date results have been very encouraging and up to expectations. A new ore reserve estimate by the consulting firm of Chapman, Wood & Griswold will not be available until assay results are complete. Our own assay lab is now in operation and the back log of material is being processed as fast as possible.

"In the April 7 report of Chapman, Wood & Griswold ore reserve estimates were given as 86,000,000 tons at 0.25% copper, 0.073% Mo (0.12% MoS₂). Of this 86,000,000 tons approximately 30,000,000 tons was classified as probable and possible and 56,000,000 tons as geologically inferred. These were calculated on a vertical thickness of 362 feet. Within our No. 1 target area of the IP anomaly where all the drilling is now being done, deeper and more closely spaced drilling is in progress and to date no waste holes within this area have been encountered. This means that our inferred tonnage and also the probable and possible tonnage will be substantially increased. Visually the grade appears to be comparable with the drill holes from which full information has been obtained.

"Further drilling outside the confines of No. 1 target area and on other anomalies is planned. A new type rotary percussion drill is being added to the drilling equipment to expedite our program.

"At the property in addition to the drilling program, a contract for 2,650 feet of underground tunneling and raising has been awarded to Cameron, McMynn Limited to commence about June 8. This will provide bulk sampling material for metallurgical tests and confirmation of drill hole values.

"Wright Engineers are engineering and supervising construction of a sampling plant in which all material will be crushed and sampled and a 100 ton pilot mill for metallurgical studies which will be incorporated in the feasibility report. All equipment has been ordered and confirmed so that the pilot mill will be constructed and in operation by early September.

"The Brenda permanent staff is now being assembled and Mr. Peter Stym, formerly of Gaspe Copper Mines Ltd., has been appointed as mine superintendent and Mr. Keith Douglas as planning engineer to assist Chapman, Wood & Griswold in completing their feasibility report.

"In summary, the expedited work program is on schedule, results of drilling are up to expectation, and it is hoped to have the completed feasibility report by December of this year. There is approximately \$1,300,000 in the treasury. This should be sufficient to complete the program of drilling, bulk sampling, pilot mill and feasibility study in preparation for a production decision".

WESTERN CANADIAN INVESTMENTS

BRENDA MINES LTD.

- + Underground Program To Start In June With 100 ton per Day Pilot Plant
- + If Present Schedule is Met, And It Might Not, Feasibility Will Be Completed Dec.
- + "With Hard Work and A Bit of Good Luck It Looks As Though It Might Make a Mine"

E.P.Chapman, Jr., senior geological engineer of the firm of Chapman, Wood and Griswold Ltd., spoke to the Vancouver Branch of the C.I.M. on Brenda Mines Ltd. His firm has been doing the consulting and has been directing the drilling program. The information given below is taken from a text of his remarks to the meeting.

It is too early to predict the type, size and earning capacity of the Brenda Mines Ltd. property, which is located 15 miles west of Peachland, B.C. But one thing is certain if it does make a mine it will be a big one, he stated. The property elevation ranges from 4700 to 6100 feet and is one of the finest spots in Canada for a mining operation. This is evident by the number of persons who have expressed an interest in working there.

"I wish that I could give a more recent compilation of results than our April 7, report in which the estimate was 30,000,000 tons of 0.24% copper and 0.78% Mo ore probable plus possible ore. These figures were based on results from 10 BQ diamond drill holes. To date 28 holes have been completed and two additional holes are nearing completion. Assays are complete for both core and sludge for 14 holes, four of which, all exterior holes, are considered to be waste or sub-marginal. While scattered assays have been received, complete assays for no holes have come in since the April 7, report."

To improve the assay returns the company has set up an assay plant at the property. This is expected to reduce the backlog in the near future.

"In evaluation of any relatively large low grade deposit, metallurgy is, of course, a very important factor. Using core rejects from the H hole test program, Britton Research laboratories of Vancouver demonstrated that on bench scale tests over 90% of the copper and molybdenum present can be recovered in a bulk sulfide concentrate. When drilling results continued to indicate the presence of sufficient tonnage at a suitable grade to profitably support a large scale operation, Britton was instructed to start research into separation of the copper and the molybdenum into separate marketable products. The first stage of this work is nearing completion. Since heads are very low, a large number of bulk tests are required to furnish sufficient bulk concentrates for the subsequent step of separation. It is unwise to comment before assays of the numerous products involved are received, but Mr. Britton has advised me this morning that visual inspection of final concentrates look promising.

"Obviously a great deal remains to be done on the Brenda prospect. Drilling is continuing on a 400 by 400 foot sample grid with two diamond drills active. A percussion drill for fill in drilling is scheduled to start drilling next week. To provide bulk samples both to check drill results and for comprehensive pilot plant concentration tests, some 2,000 feet of adit and 750 feet of raising are scheduled to start June first. A sample plant is to be installed to crush all of the more than 15,000 tons of material extracted and to split representative samples."

The adit level will have an average back of about 250 feet and each of the three raises planned will come to surface along diamond drill holes.

"Installation of the smallest pilot plant concentrator which will permit continuous flow through both copper and molybdenum cleaner sections is scheduled to start in June, be completed in August and in operation in September. We are hoping that all of the necessary data will be in hand on time to permit completion of a final feasibility report before the end of 1966."

Bids for underground work have been received and a contract will probably be let before the end of this week. Arrangements have been made to have the drill hole evaluation, ore reserve calculations and pit design computerized on a continuous basis."

BRENDA MINES LTD.

PROGRESS REPORT - Following is the text of an April 15,1966, progress report from B.O. Brynelsen, president of Brenda Mines Limited.

"An expedited programme of diamond drilling has given encouraging results at Brenda Mines property. As a result of exploration from December, your consulting engineers, Chapman, Wood & Griswold Ltd., have now recommended that we proceed with the advanced stages of their earlier recommendations and these should now be implemented with the utmost dispatch. They have outlined a proposed programme leading to completion of feasibility studies toward the end of 1966. This consists of continued drilling, physical opening of underground headings to provide material for bulk sampling, operation of a pilot mill to confirm metallurgical tests, opening of a small surface pit, site surveys and engineering studies. The estimated project expenditures will be between \$1,100,000 and \$1,300,000.

"Our initial programme was estimated to cost approximately \$700,000 and to be completed some time during August. Results to date have been very encouraging, consequently

FURTHER NEW FINANCING

By an agreement dated April 14,1966 James Richardson & Sons have underwritten 100,000 treasury shares of Brenda Mines Ltd. at \$8.00 per share.

This brings the issued shares of Brenda Mines to 2,250,000 of the 5,000,000 shares authorized.

out of a 5,000,000 share authorized capital. There are no outstanding stock options.

our programme has now been advanced by several months. To insure adequate financing for this expanded project your directors have authorized the issuing of an additional 100,000 shares which has been underwritten by James Richardson & Sons at a price of \$8.00 per share net to the treasury. This will give us approximately \$1,300,000 in the treasury with a total of 2,250,000 shares issued

"As of March 31 almost 12,000 feet of diamond drilling has been completed. Of 25 holes complete assay data is available from 12. Assay results are still lagging behind but it is hoped to have our own assay office in operation within two weeks. The initial programme was on a 400 foot grid to indicate a minimum tonnage within the confines of the No. 1 I.P. anomaly. Drilling is now being done with closer spacing on a 200 foot grid to complete the box.

"Ore reserves as at March 31 totalled approximately 86,000,000 tons at 0.25% Cu, 0.073% Mo)0.12% MoS₂). Of this 86,000,000 tons, approximately 30,000,000 tons has been classified as probable and possible, and 56,000,000 tons as geologically inferred. It must be noted that the above estimates are only calculated to an average vertical thickness of 362 feet. Two drill holes however have been drilled 800 feet apart to a vertical depth of at least 800 to 900 feet in the central part of the principal target zone. Although no assays have been received, visual inspection indicates that significant copper-molybdenum mineralization extends to at least this vertical depth. There is a reasonable possibility, therefore, that the core of the deposit extending to a considerable depth will add a substantial tonnage to the total target amount. Present observations indicate that this zone could be mined by open pit mining methods to approximately 800 or 900 foot depth.

"All drilling to date has been confined to the principal target area, generally defined by a broad, low order induced polarization anomaly. A grid type pattern has been employed to control all hole locations. Our expedited drilling programme during the summer months will be done outside the present boundaries and will extend to other anomalous areas."

BRENDA MINES LTD.

- + Recent Drilling Improves Tonnage Estimate In Both Total and Possible-Probable Class
- + Bigger Sample From Percussion Hole Gives Higher Grade Assays

Given below is the text of a March 18,1966, news release from B.O.Brynelson, president, of Brenda Mines Ltd.

"Approximately 7,000 feet of diamond drilling has been completed. Chapman Wood and Griswold, consultants, have indicated a total of approximately 82,000,000 tons of inferred, possible and probable ore. Combined probable and possible is approximately 12,000,000 tons grading 0.26% copper and 0.081% Mo(0.13% MoS₂) with a net realized value per ton of \$3.23 in Canadian funds. This, as were earlier estimates, is based on 32¢ per pound copper Canadian and \$1.55 per pound Mo Canadian, less smelter deductions of 7¢ per pound on copper and based on 85% recovery of both copper and molybdenum.

"In estimating tonnage the principal target area is controlled generally by the stronger area of the induced polarization survey. The area of the No.1 target zone is approximately 2,800,000 square feet.

" The average vertical thickness of ore sections is only to a depth of 350 feet. Drilling has intersected mineralization to a depth considerably in excess of the 350 feet. Assays are still approximately one month behind the drilling. The company is now installing an assay lab at the mine to speed core evaluations.

"A test hole using rotary percussion equipment was drilled to a depth of 120 feet. This test, although not entirely satisfactory, due to inadequate equipment, served to demonstrate that a desired rate of advance would be possible with properly engineered equipment. Probably the most significant aspect of the test is the indication of higher metal content in the larger diameter hole.

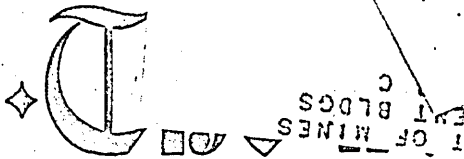
"This hole was drilled 8 feet from the diamond drill core hole and the comparison of sampling results for the entire length of the hole is shown herein:

<u>Interval</u>	<u>Rotary Percussion</u>	<u>BQ Combined Core and Sludge</u>
10 to 120 ft.	0.28% copper 0.097% Mo	0.22% Copper 0.075% Mo

"There is a possibility that, since the percussion hole yielded a higher volume of sample than did the diamond drill hole, the sample may have been more representative of the true metal content.

"A program of open hole drilling is to be inaugaurated for fill in drilling within the No.1 target area.

"Work is progressing satisfactorily and all results to date have been up to expectations."



TWO SECTIONS — SECTION ONE

Million Tons Per Hole N.M. Feb 24th '66 ①

Initial Holes At Brenda Mines Confirming Tonnage, Grade

VANCOUVER (Staff) — Initial drilling has enabled Brenda Mines to increase substantially the tonnage estimates for its large, low grade, copper-molybdenum property, about 14 miles west of Peachland in the Okanagan Valley, British Columbia.

Based on the first five drill holes from which complete assays have been returned, a total of 5,703,000 tons averaging 0.25% copper and 0.08% molybdenum (Mo) has been indicated, according to a report by the company's consultants, Chapman, Wood and Griswold. Average vertical depth of the five holes is 383 ft. Each hole represents over one million tons.

In addition, an inferred tonnage of 65 million tons has been estimated to a depth of 400 ft.

With two machines engaged in the present program, drilling three shifts per day, some 200-250 ft. of drilling is completed daily. By last weekend, another seven holes had been completed from which assays were not available. Visually, these holes are estimated to be in similar material.

Initial estimates, based on former drilling, suggested 14 million tons grading 0.26% copper and 0.07% molybdenum.

The inferred tonnage underlies the heart of an induced polarization anomaly, covering an area some 2,000 ft. in length and 1,200 ft. wide. This central core is surrounded by considerable widths of less intense readings in which it has yet to be determined just what the metal content may be.

Present initial objective of Brenda is to outline a sufficient tonnage to a depth of 400 ft. to warrant operation of a plant capable of handling at least 10,000 tons per day. Think-

ing, though, is that open pit mining could be conducted to much greater depths, say to 1,000 ft., and that if suggested larger tonnages are available, a much larger plant would be justified.

On the basis of average grade of the first five holes, the consultants estimate that a net smelter return of \$3.19 per ton would be possible. This estimate is conservative and is based on 32¢ per lb. for copper and \$1.55 per lb. for molybdenum. To

See BRENDA CONFIRMS Page Five

Brenda Confirms

(Continued from Page One)

arrive at the net smelter return figure, a recovery of 85% for both metals has been assumed. In addition, 7¢ per lb. has been deducted from the price for copper for smelting and refining charges.

On an assumption that total operating costs of less than \$1.50 per ton could be achieved in an operation of the projected scale, it can be seen that a high rate of operating profit could result.

Metallurgical test work has indicated that a clean separation of the copper and molybdenum bearing constituents of the material can be achieved. The copper occurs as chalcopyrite and the molybdenum as molybdenite. Each occurs, in typical hand specimens and core viewed by The Northern Miner at the company's Vancouver offices, in relatively coarse crystals with little or no other sulphides. Separation appears likely to be simple and initial metallurgical test work confirms this. Values occur in a large mass of fractured granodiorite.

The present anomaly is only one of a number to be tested. It is located in the south central part of the 63-claim property. An area to the south of the main anomaly will be investigated later in the program and there are two anomalies near the north boundary of the property which also are considered promising. These latter anomalies extend onto the adjoining Noranda Mines ground where drilling is getting under way.

It is planned to complete the testing of the main anomalous areas before extending drilling to the fringes. These will then be investigated before moving to test the two northerly anomalies. It is expected that the two machines now in service will continue until at least after all the snow goes.

Drilling requires recovery of all of the core possible. In addition, very careful collection and sampling of the sludges from drilling is practiced. The latter are carefully weighed and assayed with the results calculated into the overall drill averages.

Drill holes are spotted on a systematic grid pattern at 400-ft. intervals. From each of 45 locations, two holes are to be put down, one N30°W and one S30°E, at dips of minus 63° and to depths of 450 ft. This pattern covers a horizontal distance for each hole of 200 ft. and a vertical depth of 400 ft.

Not New Discovery

The Brenda area of mineralization has been known for many years. Earlier work by previous operators was confined largely to quite shallow holes. It is the finding of the current program that surface leaching reduced values in the uppermost 20 ft. or so and that grades

below this depth are standing up to average.

Overburden ranges from 0-50 ft. and is estimated to average about 10 ft. Together with the 20 ft. of low grade surface capping, it is not expected that stripping of more than 30 ft. will be required for open pit operations, resulting in an overall low waste to ore stripping ratio.

Has Ample Funds

Under a recent financing agreement, Brenda received \$700,000 from the sale of 700,000 shares. This sum equals the estimated cost of the currently proposed drilling program. Of the 5,000,000 authorized shares, 2,150,000 shares have been issued, of which 750,000 shares are escrowed. In an earlier program, while Brenda was still a private company, \$140,000 was spent on the property, raised through the sale of 700,000 shares at 20¢ per share.

N.M. Mar. 24th - 82 mill indicated

BRENDA MINES LTD.

* Drill Results to Date Prove Inferred Tonnage and Grade Up to Expectations

* Mineralized Body Still Open for Exploration Laterally and at Depth

A review of recent progress at Brenda Mines Ltd. property west of Kelowna, B.C., signed by B.O. Brynelsen, follows:

"Diamond drilling has been in progress for a short period and almost 5,000 feet of drilling has been completed.

"Results to date are gratifying as both inferred tonnage and grade have been up to expectation.

"In the original prospectus an inferred tonnage of 14,000,000 tons based on three B.H. holes, geological and geophysical information was indicated by consultants, Chapman, Wood and Griswold. As of their February 15 interim report, drilling to date has strengthened and supported the geological and geophysical information and an inferred reserve of 65,000,000 tons has been calculated within the confines of the I.P. 10 + zone to a depth of 400 feet.

"It is further stated that the potential target deposit may be greater since drilling to date has indicated no limit of mineralization or established any lateral limits.

"Each drill hole indicates a more confirmed tonnage and an upgraded classification. The consultants have given a classification of possible ore of approximately one million tons per drill hole. On a large mineralization area of this Brenda type, the wide spaced drilling indicates inferred ore and closer drilling which will follow, would upgrade the ore reserve category.

"Assaying and calculations are approximately three weeks to a month behind the drilling. Values from the results to date compare favorably with estimates as indicated in the prospectus. Values from five holes average 0.25% copper and 0.08% molybdenum (0.133% Molybdenite (MoS₂)).

"It is to be noted that the realized value per ton at the mine is based on a realistic value of copper at 32¢ per pound Canadian and molybdenum at \$1.55 per pound Canadian with deductions of seven cents per pound for copper and based on an 85% hydrometallurgical recovery for both metals.

"Diamond drilling and other exploration work is continuing on the property and further reports will be forwarded to the shareholders as results are obtained."