

REPORT on the
BRALORNE PIONEER MINE

by: J.J. Crowhurst, P.Eng.

673007

June 15, 1973

BACON & CROWHURST LTD.
CONSULTING ENGINEERS

June 15th, 1973.

Mr. F.W. Fitzpatrick,
Bralorne Resources Limited,
1005 - 555 Burrard St.,
Vancouver, 1, B.C.

Dear Mr. Fitzpatrick:

Pursuant to your request, we are pleased to submit herewith a report on the Bralorne Pioneer Mine in the Bridge River district in southwestern British Columbia.

The Bralorne-Pioneer group of orebodies has been one of Canada's major gold-producing sources, yielding close to 8 million tons of ore containing an average of 0.522 ounces of gold per ton, and 0.120 ounces of silver per ton. The controlling structure has been productive over a vertical range of 6500 feet, and a horizontal distance of 3 miles. More than 24 veins have been exploited.

The Bralorne Mine, which was the last surviving producer in the Bridge River area, was closed in mid-1971 because slowly rising operating costs finally met revenues at the then \$38.50 price per ounce of gold, despite the Canadian Government E.G.M.A. assistance plan. The mine and mill were all but stripped of equipment and supplies, and the crew dismissed.

The recent drastic increase in the price of gold (currently over \$100 per ounce) has prompted a searching re-evaluation of the possibilities regarding re-initiating production.

Exploration at the lowermost levels on the '77' vein in the Bralorne Mine has not indicated any change in the geological environment, i.e. any reason to anticipate a "bottoming" of the ore-bearing quartz vein, either structurally or mineralogically. In addition, many blocks of low-grade material were discovered and left untouched and one major vein, the '51', was only partially explored at depth.

It is recommended, as a result of this re-evaluation, that the sum of \$1,663,100 be provided immediately for on-site funds to carry out a first-phase of exploration, directed at the discovery of 500,000 tons of ore grading about 0.50 ounces of gold per ton. This exploration would take place underground in the Bralorne section of the structure, and would require an estimated 12 to 13 months to complete. It is considered that the chances are excellent that this program would meet with success.

Should the results of this first phase so warrant, a second phase, consisting of firming up the ore estimates and partially developing the stoping areas by more underground work, should be immediately undertaken. It is estimated that this second phase will cost a further \$912,000 and will take place during a 6-month period subsequent to the first phase. By its completion date, a final feasibility study will have been prepared so that production plans can be initiated.

It is further estimated that an additional \$3,175,000 will then be required to place the property in production by mid-summer of 1975, at the rate of 500 tons of ore milled per day, or 175,000 tons of ore per year. This sum will include the costs of completing the mine development, re-equipping and reconstructing the cyanide concentrator, and providing the necessary plant

facilities. No allowance is included regarding supplying inventory and working capital. A six to eight month period is envisaged.

Should good results be encountered during the exploration phases, it will of course be possible to compress the anticipated time schedule and achieve an earlier production.

In light of the general geological environment, it is confidently expected that not only will the anticipated ore tonnage be indicated by the first phase of exploration, and proved up during the second phase, but also that substantial additions, sufficient to keep the mine in operation for many years, can be found on a progressive basis.

The total amount to be expended on-site in three stages, as noted above, is therefore estimated at \$5,750,100 during the next 2 to 2½ years. The anticipated mine operating profit is estimated to be as follows:

Canadian price of gold per oz.	Tons milled	Grade of ore fed to mill - Oz/ton Au	Ounces Au fed to mill	Ounces Au sold @ 97% mill recovery	Revenue \$000's Can.	Operating costs \$000's Can.	Operating profit \$000's Can.
\$70	525,000	0.485	254,800	247,155	17,301	14,700	2,601
80	525,000	0.485	254,800	247,155	19,772	14,700	5,072
90	525,000	0.485	254,800	247,155	22,245	14,700	7,545
100	525,000	0.485	254,800	247,155	24,716	14,700	10,016
110	525,000	0.485	254,800	247,155	27,187	14,700	12,487

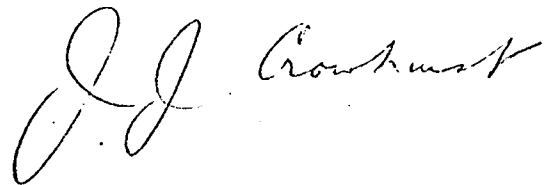
The operating profit shown is before head office costs, financing charges, Municipal, Provincial and Government of Canada taxes, and write-offs for depreciation and depletion, etc.

As detailed in this report, it will be noted therefore that the property is viable at an average price of about \$85 per ounce for gold. At a

price of gold of \$100 per ounce or better, it is considered that the economics are extremely attractive.

Respectfully submitted,

BACON & CROWHURST LTD.

A handwritten signature in cursive script, appearing to read "J.J. Crowhurst". The signature is written in dark ink and is positioned to the right of the typed name.

J.J. Crowhurst, B.A.Sc., P.Eng.

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TERMS OF REFERENCE

The authority for the preparation of, and the terms of reference for this report were given verbally on May 11th, 1973, and by letter dated May 22nd, 1973, to Mr. J.J. Crowhurst of Bacon & Crowhurst Ltd., by Mr. F.W. Fitzpatrick, President of Bralorne Resources Limited, Vancouver, B.C.

SCOPE OF REPORT

This report consists of, and considers the following:

(1) GENERAL PLAN

The Bralorne Mine workings have been selected for the initial exploration work as constituting the best target for finding ore. These workings are separated for the purposes of this report into the 'Upper Mine', which is located above the 26 level, and the 'Lower Mine', which is below 26 level.

A three-stage program, culminating in ore mining and milling at the rate of 500 tons per day, or 175,000 tons of ore per year, is contemplated herein.

The first stage exploration would consist of completing underground diamond drilling to test the downward extension of the '77' vein structure at the bottom of the Lower Mine, and to carry out similar drilling, plus a small amount of confirmatory drifting and crosscutting, in the 'Upper Mine'. The 'Upper Mine' work would be largely directed at the '51' vein between 20 and 26 levels, but would include other possibilities.

During the second stage, additional diamond drilling and drifting and crosscutting would test potential ore shoots in detail on the working levels. Openings made could comprise part of the eventual mining plan.

The third stage would constitute pre-production. Sufficient stoping areas would be developed to permit continuous production

at the target rate, the concentrator would be re-built and re-equipped, plant facilities established, and arrangements made for crew housing.

(2) ECONOMICS

A study of the economics of bringing the property into production and the expected revenue vs. operating costs to produce an operating profit is presented.

It must be noted that due to the short time available to prepare this report, the accuracy of the estimates must be in question for the second and third stages. It is felt, however, that the costs stated for the first stage can be achieved within the time shown, providing that no serious obstacles presently unknown are encountered during de-watering and rehabilitation of the two major internal shafts, the Crown and the Queen. This is an essential part of the program and the contingencies involved could add an unknown quantity, of course, to such an estimate, and hence cannot be completely ignored.

(3) PHASE 1

A report dated June 12th, 1973, by Dr. W.R. Bacon, Ph.D, P.Eng., to Mr. F.W. Fitzpatrick, President of Bralorne Resources Limited, concerning recommendations for the preliminary exploration, is submitted herewith. The procedures and estimated expenditures for 'Exploration - Phase 1' are detailed separately.

Electrical and mechanical cost estimates and time schedules have been prepared by Mr. M. Brodie, P.Eng., of M.A. Thomas and Associates, Vancouver, B.C., for the initial rehabilitation. These have been used where applicable in this report.

(4) MILL AND SURFACE PLANT

An estimate has been prepared by Mr. G.W. McCool of Grizzly Mine-Mill Equipment Ltd. concerning the rehabilitation, reconstruction and re-equipping of the surface plant and mill. These figures have been studied and included where considered appropriate in this report's estimates.

(5) MINING

Estimates of mining costs are included. These are based on cut & fill (and perhaps shrinkage stoping) using both track and trackless equipment, and have been largely prepared by Mr. J.S. Thomson, P.Eng., of Bralorne Resources Limited, formerly Resident Manager at Bralorne.

(6) GEOLOGY

A short description of the regional and local geology and mineralization have been included, to supply broad background material.

ACKNOWLEDGMENTS

Acknowledgment is made to the following, all of whom contributed valuable assistance in the compilation of this report:

(1) Bralorne Resources Limited Staff

J.R. Croll, C.A., Vice President, Finance

J.S. Thomson, P.Eng., Executive Assistant to the President

C. McQuarrie - Accounting staff

(2) M. Brodie, P.Eng., M.A. Thomas & Associates Ltd., Vancouver, B.C.

(3) G.W. McCool, President, Grizzly Mine-Mill Equipment Ltd., Vancouver, B.C.

ECONOMICS

SUMMARY - ESTIMATED CAPITAL REQUIRED

The following table shows the total estimated expenditure concerning the two exploration phases and the amount estimated to place the property in production at the rate of 500 tons milled per day or 175,000 tons of ore milled per year.

It should be specifically noted that these costs do not include any Vancouver Office costs, such as senior accounting, legal, insurance and other such costs, nor do they include financing charges, taxes, or other Government levies.

Stage 1 includes 10% contingencies but it is considered that the accuracy of estimating for the succeeding expenditures does not warrant such an inclusion at this time.

	<u>Estimated Cost</u>
Stage 1	\$1,663,100
Stage 2	912,000
Mine Preparation & Plant Construction	<u>3,175,000</u>
	\$5,750,000

ANTICIPATED PRODUCTION

<u>Year</u>	<u>Source of Ore</u>	<u>Tons Milled</u>	<u>Grade Ozs. Au/ton</u>	<u>Ounces Au Fed to Mill</u>	<u>Ounces Au Recovered @ 97%</u>
1	Lower Mine	35,000	0.700	24,500	23,765
	Upper Mine	<u>140,000</u>	<u>0.378</u>	<u>52,920</u>	<u>51,332</u>
	Totals	175,000	0.442	77,420	75,097
2	Lower Mine	70,000	0.700	49,000	47,530
	Upper Mine	<u>105,000</u>	<u>0.378</u>	<u>39,690</u>	<u>38,499</u>
	Totals	175,000	0.507	88,690	86,029
3	Lower Mine	70,000	0.700	49,000	47,530
	Upper Mine	<u>105,000</u>	<u>0.378</u>	<u>39,690</u>	<u>38,499</u>
	Totals	175,000	0.507	88,690	86,029
TOTALS		525,000	0.485	254,800	247,155

TARGET ECONOMICS

<u>Place</u>	<u>Expected Tons in Place</u>	<u>Tons to Mill after 20% Mining Dilution</u>	<u>Grade Ore in place - Ozs. Au/ton</u>	<u>Ounces Au in place</u>	<u>Grade Ore Fed to Mill</u>	<u>Ounces Au Fed to Mill</u>	<u>Ounces Au Recovered @ 97%</u>
<u>Lower Mine</u> 77 Vein below 45 Level	150,000	180,000	0.840	126,000	0.700	126,000	122,220
<u>Upper Mine</u> 51 Vein - 20 to 26 Level	200,000	240,000	0.500	100,000	0.417	100,000	97,000
Other Veins	<u>100,000</u>	<u>120,000</u>	<u>0.360</u>	<u>36,000</u>	<u>0.300</u>	<u>36,000</u>	<u>34,920</u>
Sub-totals - Upper Mine	<u>300,000</u>	<u>360,000</u>	<u>0.453</u>	<u>136,000</u>	<u>0.378</u>	<u>136,000</u>	<u>131,920</u>
TOTALS	450,000	540,000	0.582	262,000	0.485	262,000	254,140

ESTIMATED OPERATING PROFIT

<u>Price Au</u> <u>\$ Can./oz.</u>	<u>Year</u>	<u>Revenue/yr.</u> <u>\$000's Can.</u>	<u>Operating Costs</u> <u>Per Year</u> <u>@ \$28/ton Milled</u> <u>\$000's Can.</u>	<u>Operating Profit</u> <u>Per Year</u> <u>\$000's Can.</u>
\$70.00	1	5,257	4,900	357
	2	6,022	4,900	1,122
	3	<u>6,022</u>	<u>4,900</u>	<u>1,122</u>
	Totals	17,301	14,700	2,601
\$80.00	1	6,008	4,900	1,108
	2	6,882	4,900	1,982
	3	<u>6,882</u>	<u>4,900</u>	<u>1,982</u>
	Totals	19,772	14,700	5,072
\$90.00	1	6,759	4,900	1,859
	2	7,743	4,900	2,843
	3	<u>7,743</u>	<u>4,900</u>	<u>2,843</u>
	Totals	22,245	14,700	7,545
\$100.00	1	7,510	4,900	2,610
	2	8,603	4,900	3,703
	3	<u>8,603</u>	<u>4,900</u>	<u>3,703</u>
	Totals	24,716	14,700	10,016
\$110.00	1	8,261	4,900	3,361
	2	9,463	4,900	4,563
	3	<u>9,463</u>	<u>4,900</u>	<u>4,563</u>
	Totals	27,187	14,700	12,487

SUMMARY - ESTIMATED COSTS - EXPLORATION PHASE 1

(Before head office costs, e.g. insurance, taxes, legal, consulting, etc.)

<u>Date</u>	<u>Direct Costs</u>	<u>Indirect Costs</u>	<u>Mine - General & Overhead</u>	<u>Capital</u>	<u>Totals</u>
<u>1973</u>					
To date	25,500	-	-	-	25,500
June	11,200	16,500	11,300	51,700	90,700
July	12,900	8,000	11,200	87,900	120,000
August	27,700	8,900	11,200	46,000	93,800
September	39,700	14,100	13,300	30,900	98,000
October	79,800	15,200	14,400	26,300	135,700
November	50,700	19,300	15,100	35,400	120,500
December	<u>33,900</u>	<u>23,300</u>	<u>14,500</u>	<u>44,700</u>	<u>116,400</u>
Sub-totals 1973	281,400	105,300	91,000	322,900	800,600
<u>1974</u>					
January	72,800	30,600	19,200	58,800	181,400
February	76,000	30,500	18,700	42,500	167,700
March	36,900	30,600	15,700	20,000	103,200
April	46,900	24,500	14,700	-	86,100
May	48,500	24,600	14,200	-	87,300
June	<u>46,900</u>	<u>24,500</u>	<u>14,200</u>	<u>-</u>	<u>85,600</u>
Sub-totals 1974	328,000	165,300	96,700	121,300	711,300
Totals	609,400	270,600	187,700	444,200	1,511,900
+ contingencies @ 10%	<u>60,900</u>	<u>27,100</u>	<u>18,800</u>	<u>44,400</u>	<u>151,200</u>
	670,300	297,700	206,500	488,600	1,663,100

BRALORNE MINE
TIME SCHEDULE AND GENERAL PLAN

EXPLORATION PHASE 1

	1973							1974					
	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>
800 level - rehabilitation													
Surface transmission lines													
Trolley - 800 level													
Transmission line to Crown hoist													
Crown hoist - electrical													
Crown hoist - mechanical													
Rehabilitate Crown shaft													
Remove & re-install Empire hoist at Queen shaft													
Rehabilitate 26 level													
Rehabilitate Queen shaft													
Rehabilitate 43 level													
Repair old compressors													
Diamond drilling Upper Mine													
Drifting Upper Mine													
Diamond drilling Lower Mine													

GEOLOGY & ORE RESERVES

GEOLOGY

The Bridge River environment which contains the Bralorne and Pioneer gold-quartz veins, is 3 miles in length by 1200-2100 feet at the surface. It trends NW-SE and is lenticular in shape; it is characterized mainly by the presence of a distinctive rock type, soda granite, that is intrusive into the Mesozoic sediments and volcanics that constitute the remainder of the lens.

Transversely, the margins of the ore-bearing environment are marked by the Fergusson sediments on the northeast and by a serpentine belt on the southwest. These formational contacts are also fault planes, i.e. the Fergusson Thrust and the Cadwallader Fault Zone. As the former dips northeastward, and the latter southwestward, the environment widens with depth. Nothing of consequence has been found in either the Fergusson sediments or the serpentine.

The layered rocks of the environment are the Hurley-Noel and the Pioneer Greenstone. The former consists of argillites, tuffs, limestones and conglomerates whereas the Pioneer Greenstone, as the name suggests, is composed of green volcanics of flow and pyroclastic origin.

The Pioneer greenstone is confined to the vicinity of the Pioneer Mine. The Bralorne diorite is unique to Bralorne but it may very well be the recrystallized equivalent of the Pioneer greenstone.

The aforementioned soda granite is intrusive into both the Bralorne diorite and the Pioneer greenstone. As the name implies,

the soda granite is unusually rich in albite. The rock varies considerably in grain size and appears to grade into aphanitic dykes of albitite.

The soda granite imposes restrictions on the ore possibilities by virtue of the fact that it is not a host rock. The veins "make" in the diorite and the greenstone; although they are not commercial in the soda granite, proximity to this rock type is significant. Likewise, proximity to the serpentine has always carried a lot of weight with Bralorne operators.

Where the veins rake, they rake northwesterly; they dip northerly, less commonly are vertical (e.g. lower part of '77').

The better veins are remarkably persistent; particularly noteworthy is their vertical range. The '51' vein was productive from surface to the Bralorne 20th level (and hopefully deeper), a vertical distance of 2700 feet. The '77' vein is even more remarkable; it was traced from the 20th level up to the 14th and mined down to the present bottom of the mine (where it still averages better than 1 oz. Au/T. across 6.8 feet), a vertical distance of 4600 feet.

MINERALIZATION

The Bralorne veins are composed of white quartz and minor carbonate with sparse pyrite and arsenopyrite. Visible gold is not uncommon.

Fine banding (fracturing) is a feature of the more productive parts of the veins. Thus the gold distribution may vary markedly across the breadth of a single vein. Moreover, a high-grade band may wander from wall to wall of a vein.

It has been pointed out above that the diorite (Bralorne) and the greenstone (Pioneer) are the principal host rocks, that proximity to the soda granite is important and that this may also be the case with the serpentine.

ORE RESERVES

At the time of closing the mine down, Bralorne recorded sub-marginal tonnage reserves as shown in the following table:

<u>Vein</u>	<u>Tons</u>	<u>Grade - ounces/ton</u>		
		<u>+0,25</u>	<u>+0,30</u>	<u>+0,35</u>
Upper Mine 51	27,000	27,000	27,000	19,000
Lower Mine 51	95,000	53,000	37,000	19,000
55	89,000	37,000	25,000	21,000
59	8,000	6,000	6,000	5,000
73	48,000	15,000	10,000	5,000
75	27,000	13,000	9,000	9,000
Upper Mine 77	107,000	72,000	51,000	25,000
Upper Mine 79	31,000	17,000	15,000	10,000
Lower Mine 77	168,000	65,000	36,000	29,000
Lower Mine 79	<u>69,000</u>	<u>14,000</u>	<u>12,000</u>	<u>11,000</u>
Totals	669,000	319,000	228,000	153,000
 <u>Distribution</u>				
Upper Mine	432,000	240,000	180,000	110,000
Lower Mine	237,000	79,000	48,000	43,000

These reserves are to be re-investigated and re-appraised. Many of these blocks may be inaccessible at the present time. It is expected, however, that some portion of these reserves (indeterminate at the present time) can be included in future projections.

EXPLORATION - PHASE 1

III

SUMMARY AND RECOMMENDATIONS

There were 4 veins that contributed 4 million tons of Bralorne's 5,500,000 tons production:

77	-	2,100,000 T.
51	-	1,075,000 T.
53 (faulted segment of '77'?)	-	520,000 T.
55 " " " '51'?)	-	330,000 T.

The 55 vein was weak on 20 level, similarly on 24 level. The 53 vein contained short shoots of ore on the 20 level, was split on the 24 level. Neither of these veins is considered to have prime potential below the 24 level.

The exploration program recommended herein is directed largely to finding more ore in the '77' and '51' vein structures, and to a lesser extent in a search for new veins. Exploration between Bralorne and the King has been reviewed and is not considered favourably.

The program outlined below is largely a drilling program and, in addition, provision is allowed for at least 1000 feet of drifting in the upper mine where interesting drill intersections are obtained.

LOWER MINE

The objective is to develop tonnage on the 77 vein and, to a lesser extent, to explore the hangingwall and footwall of the 77 for other veins.

Drill from the 43 level - 79 station

1. Drill a 5-hole fan of -60° holes to intersect the 77 vein at a depth of 400 feet below the 4577 decline. Allow additional 2500 ft. for wedging these holes to provide further vein intersections.

Should this drilling outline an ore shoot in depth similar to that on the 4577 decline (6.8' x 530'), the new probable ore outlined would be 120,000 tons, with a further possible 30,000 tons, making a total of 150,000 tons in both categories - to a depth of 500 feet below the 4577 decline.

Footage - 8000 feet.

2. (1) Test E end of 77 vein with a 500 ft. flat hole to a point 100 feet E (beyond) the drift face.
(2) If (1) is successful, drill 600 ft. up-hole above (1) - $+25^\circ$
(3) If (1) is successful, drill 600 ft. down-hole below (1) - -25°

Footage - 1700 feet.

3. Drill 2 flat holes from 79 station south to investigate stringers cut in shaft XC - 103?

Footage - 400 feet.

4. Drill long flat hole S from shaft area towards the serpentine, looking for vein(s) in the footwall of 77-79 system.

Footage - 2000 ft.

5. Drill long (?) flat hole N from 77 vein drift, looking for vein(s) in the hangingwall of the 77.

Footage - 1000 ft.

Total footage, Lower Mine - 13,100 feet

UPPER MINE

1. Concentrate on the 51 vein, the most productive (westerly) of its ore shoots, on the levels between 20 and 26.

Do this by diamond drilling flat holes from existing workings and by drifting on best indications.

21 level	-	9 holes	(100' spacing)	-	2500 ft.
22 "		8 "	200' "	-	1970
23 "		13 "	100' "	-	2970
24 "		10 "	200' "	-	2670
25 "		9 "	100' "	-	<u>1750</u>
			Total		11,860 ft.

Drifting 1,000 ft.

2. 51 vein, 16 level. At the far east end of the level there is an ore shoot, 4.5' x 450' - 0.68 oz. Au/T. It has been mined above the level but not below. It could be mined without drifting - ramp down on it - or could be drilled first from a XC driven 150 feet into the hangingwall.

3. 52 vein, shoots located at the east end of 20 level and 26 level.

On 20 level - 5.8' x 240' - 0.55 oz. Au/T. Already mined to the 19 level and then raised upon to the 18.

On 26 level - 4.2' x 100' - 0.51 oz. Au/T. Only the sill was taken down.

The 52 vein could be ramped down from the 20 level and possibly drilling could be undertaken between the 26 and 20 levels, from the 26. This would entail some crosscutting south from 2652 Dr. E to get in position for drilling - say about 300 feet of crosscutting.

RECOMMENDATIONS

	<u>Drifting</u>	<u>X-Cutting</u>	<u>Diamond Drilling</u>
Lower Mine			13,100 ft.
Upper Mine	1000 ft.	450 ft.	<u>11,860</u> ft.
			24,960 ft.

This recommended work is predicated on access to the working places noted in the foregoing and may have to be modified in detail to suit actual conditions.

A thoroughly competent geologist is to be employed to supervise and adjust the program as required.

TIME SCHEDULE AND GENERAL PLAN

Phase 1 is to be completed in 13 months, i.e. by June, 1974.

Rehabilitation of about 5500' of the 800 level, or mill haulage adit, has already commenced. Underground access to the Crown hoist station and the Empire shaft station will be established by the end of June, 1973.

It is planned that the lengthy surface and underground electrical transmission lines will be back in service, and the double drum 72" x 60" Crown hoist will be serviceable by the end of June, 1973. Power will be supplied by the British Columbia Hydro Authority. Extensive substitution of the electrical controls, as required by modern practice, and some mechanical clean-up is required.

Skips and man-cages already at the property will be re-installed in the Crown shaft and the shaft placed in working order down to the 26 level (a vertical distance of 2700' - levels are at 150' intervals) by the end of September. It is believed that the water level in the mine is not more than 150' above the 26 level, i.e. at the 25 level or lower.

It is assumed in the accompanying cost estimates that the shaft signal system will have to be replaced in its entirety. Debris in the sump at the bottom of the shaft will be cleaned out, and a complete pumping system re-established. The purchase of new larger

pumps is contemplated to handle more efficiently and quickly the dewatering later of the Lower Mine via the Queen shaft.

During October, 1973, access will be gained to the Queen shaft hoist station, a distance of about 1000 feet, along 26 level from the Crown shaft.

The double drum 72" x 58" Empire shaft hoist, presently at the top of the Empire shaft close to the surface will have been dismantled and removed during mid-July and August, ready for transport down the Crown shaft. It is planned to install this hoist, complete with the necessary underground power supply and electrical controls, during November and December of 1973.

Rehabilitation of the Queen shaft will take place during the first two months of 1974. It has been assumed that none of the present shaft facilities will be serviceable because it is believed the shaft is full of water and it is known that the rock conditions are heavy and may require new support.

Access to the proposed 79 diamond drill station on the 43 level (2550' below the 26 level), about 900 feet from the Queen shaft station, will be established during March, 1974. The diamond drill station will be slashed to permit setting up two diamond drills for deep drilling. The broken rock will be transported to the surface.

Diamond drilling in the Upper Mine will be initiated in mid-September, 1973, and an estimated 11,850' completed by mid-November using 2 machines, 3 shifts per day.

Results obtained will dictate the position of the 1450 feet of crosscutting and drifting planned to confirm the validity of the drilling results. The latter will be commenced in mid-November and completed by the end of February. It is planned to contract this work on the levels; Bralorne will hoist the broken rock up the Crown shaft and haul it to the surface for disposal.

Diamond drilling in the Lower Mine will commence in April, 1974, and be finished by the end of June, 1974. Two machines, working 3 shifts, will be used. 13,100' will be drilled.

Ventilation, an important part of all of the above program, will be re-established throughout the mine workings affected. The presently installed fans, 120,000 cu. ft. per minute capacity, will be re-started. These deliver fresh air down through a main bore hole which extends from surface down to the 25 and 26 levels. This air then will pass down the Queen shaft to the 43 level, along to the 79 diamond drill station and back up through old stoping areas to the surface.

Exploration crews will be housed and fed in a temporary trailer camp, now established.

BRALORNE MINE

ESTIMATED COSTS - EXPLORATION PHASE 1

	1973						1974						Total	
	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May		June
CAPITAL COSTS														
Buildings		3,500												3,500
Mobile Eqpt.			5,000											5,000
Compressed Air	14,500	7,000	2,000											23,500
Shop Eqpt.	500	500	500	100	100	100	100	100	100	100				2,200
Transm. Lines														
-Surface	13,900	23,000	10,400											47,300
-Empire Sh.	2,000	3,400												5,400
Crown Shaft														
Electrics	8,000	14,200	3,700	9,400										35,300
26L-trans. line				10,000	10,000									20,000
Queen Shaft														
Electrics							25,000	42,800	34,600	12,300				114,700
Undergrd. Eqpt. incl. electrics	4,400	11,300	11,400	11,400	11,200	21,800	9,600	12,800	7,800	1,000				102,700
<u>Crown Hoist</u>														
Electrical	1,600	7,600												
Mechanical	<u>3,200</u>	<u>6,400</u>												
Sub-total	4,800	14,000												18,800
<u>Queen Hoist</u>														
Electrical	1,600	8,000												
Mechanical	<u>1,600</u>	<u>8,000</u>	<u>10,000</u>		<u>5,000</u>	<u>12,500</u>	<u>10,000</u>							
Sub-total	1,600	8,000	10,000		5,000	12,500	10,000							47,100
Ventilation		1,000	3,000			1,000		3,100		6,600				14,700
Temporary Inst.	2,000	2,000												4,000
Total Capital	<u>51,700</u>	<u>87,900</u>	<u>46,000</u>	<u>30,900</u>	<u>26,300</u>	<u>35,400</u>	<u>44,700</u>	<u>58,800</u>	<u>42,500</u>	<u>20,000</u>				<u>444,200</u>

ELECTRICAL AND MECHANICAL (PART OF ESTIMATED COSTS)

The following estimate was prepared by M.A. Thomas & Associates Ltd. of Vancouver, B.C., and represents most of the capital mechanical and electrical costs to be expected in Phase 1 of the program.

<u>Acct. No.</u>	<u>Description</u>	<u>Labour</u>	<u>Supplies</u>	<u>Sub-Totals</u>	<u>Totals</u>
3310	<u>Existing Compressors</u> incl. mechanical repair	9,000	3,000		12,000
3510	<u>Surface Power Lines</u> Empire portal to mill area Mill area substation Mine substation (Empire junction) Mill area distribution clean-up Ventilation fans (surface)	7,200 5,800 6,400 4,800 <u>6,600</u> 30,800	2,500 9,000 2,000 2,000 <u>1,000</u> 16,500	9,700 14,800 8,400 6,800 <u>7,600</u>	47,300
3530	<u>Empire Shaft</u> Support cables @ 200 level Potheads and splices	1,600 <u>2,400</u> 4,000	400 <u>1,000</u> 1,400		5,400
3540	<u>Crown Shaft</u> 800 substation 480 volt cable 20 level substation Miscellaneous incl. lights	3,200 4,800 4,800 <u>4,000</u> 16,800	7,500 3,000 7,000 <u>1,000</u> 18,500		35,300
3550	<u>Queen Shaft</u> Power cable - 25 level to hoist Power cable - along 25 level & down Queen shaft Shaft substations - 4 @ 250 KVA Switchgear @ substations 600 v cable in shaft 600 v cable leads Miscellaneous incl. lights	10,000 25,000 12,500 4,000 6,000 2,200 <u>4,000</u> 63,700	10,000 25,000 12,500 8,000 12,000 2,500 <u>1,000</u> 71,000		134,700

<u>Acct. No.</u>	<u>Description</u>	<u>Labour</u>	<u>Supplies</u>	<u>Sub-Totals</u>	<u>Totals</u>
3600	<u>Underground Equipment</u>				
	Miners' cap lamps	-	2,000	2,000	
	Shaft pumps - electrical	6,400	4,000	10,400	
	M.G. set - prepare	1,600	-	1,600	
	8000' trolley wire	4,800	4,800	9,600	
	Loco. battery chargers	6,400	-	6,400	
	Loco. batteries	-	9,000	9,000	
	Shaft signals	14,000	19,200	33,200	
		<u>33,200</u>	<u>39,000</u>		72,200
3700	<u>Crown Hoist</u>				
	Clean-up and dry control equipment	7,200	2,000	9,200	
	Mechanical	9,600	-	9,600	
		<u>16,800</u>	<u>2,000</u>		18,800
3800	<u>Queen Hoist (Empire)</u>				
	Clean-up and dry control equipment plus conduit	9,600	-	9,600	
	Remove & re-install	35,000	2,500	37,500	
		<u>44,600</u>	<u>2,500</u>		47,100
3900	<u>Ventilation</u>				
	Fans - level	1,000	1,000	2,000	
	Switchgear & miscellaneous	3,200	4,000	7,200	
		<u>4,200</u>	<u>5,000</u>		9,200
4000	<u>Temporary Installations</u>				
	Lights in shops - temporary surface lines, etc.	2,000	2,000	4,000	
		<u>2,000</u>	<u>2,000</u>		<u>4,000</u>
TOTALS		\$225,100	\$160,900		\$386,000

EXPLORATION - PHASE 2

IV

SUMMARY

It is felt that further diamond drilling, crosscutting and drifting will be required after the results of the exploration work in Phase 1 have been evaluated, in order to justify a production decision. It is estimated that a period of six months will be required.

It is assumed, however, that nearly all of this work will be carried out in the Upper Mine, and that a decision regarding production in the Lower Mine will be largely based on the Phase 1 exploration diamond drilling results. Provision is made for a small additional amount of confirmation drilling below the 45 level on the '77' vein.

To determine the area of costs involved for this second stage of exploration, the following assumptions are made relative to the Upper Mine:

- (a) Ore shoots will be exposed by drifting every 3 levels and will be subject to diamond drill checks at the intervening level intervals.
- (b) A minimum of two orebodies with approximate length of 360' each and mining width of 8' will have been discovered between the 26 and 20 levels. This potential tonnage so discovered will have sufficient indicated grade to justify Phase 2.
- (c) The ratio of the lengths of ore on the levels to the lengths of barren or low-grade drift and crosscutting will be 25%.
- (d) The interval for diamond drill checking will be @ 50'.

ESTIMATED COST - PHASE 2 EXPLORATION

(1) Diamond drilling

Upper Mine

4 rings of holes, each 250' plus or minus,
at 50' centres - total of 10,000' @ \$10/ft.
- direct est. cost

\$100,000

Lower Mine

Total of 6,000' @ \$12/ft.
- direct est. cost

72,000

\$172,000

(2) Drifting - Upper Mine

Assume 4' of drifting in total per 1' of
ore. 720' of ore length drifting on each
of two levels will require $720 \times 2 \times 4 =$
5760', or say 6000' to allow for diamond
drill stations -
6000' @ \$80/ft. all inclusive direct cost

480,000

(3) Indirect and Overhead Costs

Estimated at 6 months x \$35,000/month
(general ratio established by Stage 1 figures)

210,000

(4) Feasibility Study

Total investigation costs

50,000

\$912,000

MINE PREPARATION & PLANT CONSTRUCTION

GENERAL

After the feasibility study has been concluded at the end of the Phase 2 exploration program and, assuming a favourable decision has been reached, it is estimated that an 8-month pre-production period will be required to develop the mine and rebuild the concentrator and related facilities. 500 tons of ore to be milled per day or 175,000 tons of ore per year is contemplated.

Discussions with the British Columbia Department of Mines have been held. The Empire shaft, as well as the Crown shaft, must be kept in service as an emergency exit. In addition, a second exit to the Queen shaft must be provided for the Lower Mine. It is proposed that a hoist be re-installed at the top of the Empire shaft, therefore, and a small man-hoist be placed at the top of the ventilation bore hole between 26 level and the bottom part of the mine. Both systems would be for auxiliary use only in the case of emergencies.

MINING PLAN

General

It is expected that the first and second stages of exploration at the Bralorne Mine will prove up sufficient ore to justify continuous production at the rate of 500 tons per day or 175,000 tons per year to be treated in the mill.

During the first year, it is contemplated that this tonnage will come from the Upper Mine at the rate of 2,800 tons per

week (or 560 tons per day x 5 days per week), and at the rate of 700 tons per week (or 140 tons per day x 5 days per week) from the Lower Mine.

During the second year and thenceforward, it is planned that the Lower Mine will produce ore at twice the above rate, or 1,400 tons per week (280 tons per day on a five-day week basis) and the Upper Mine production will decrease accordingly to 2,100 tons per week (420 tons per day on a five-day week basis).

Mining Conditions

Mining conditions in these two general areas differ in the requirements for support and ventilation and as such will be dealt with separately.

Upper Mine

The particular area of the Upper Mine considered for initial production includes the '51' vein between 16 and 26 levels, with the addition of lesser, but supporting production, possibly from the 77 and 52 veins. In order to mine these veins between 16 and 20 levels, it will be necessary to reinstitute the haulage system on the 8 level, the Crown hoisting system including pockets on 19, 20, 25 and 26 levels, and the ventilation system from the surface to 26 level.

Conditions will vary; it is felt, however, that a flat back cut and fill method, making use of mill tailings, will be used. It is proposed to offset the present high cost of timber by the use of footwall loading and haulage drifts in the underlying waste. The basic mining module will consist of three stopes as shown in the

accompanying plan. A 4' diameter 'bored raise' at one end of the module will provide ventilation and serve as access for the hydraulic fill. An average width of 8' has been used for estimating production requirements. At widths above this, ore movement will make use of auto loaders. At lesser widths small slusher hoists and scrapers will be used. Ore from the stope will be loaded either by machines or through standard chutes. The module will provide a flexible mining arrangement and it is anticipated that at least two of the three stopes will be in constant production. Cribbed manways and sectional steel mill holes will be considered as standard practice.

Lower Mine

The section of the Lower Mine to be considered initially includes that part of the '77' orebody below 45 level. The mining technique at this depth will provide for rock temperatures in excess of 130°F as well as severe rock pressures. Breaking the ore will present no problem. Maintaining a safe and comfortable mining environment, however, will require a closely-supervised detailed system of steps which must not be altered without due consideration. In brief, the ambient temperature must be kept below 82°F effective, and men must work under close support, particularly within the vein itself. No pillars or incipient pillars can be left because of their explosive characteristic, resulting from extreme pressures at this depth. An orderly mining sequence must be followed insofar as openings in one area will tend to affect working places at some distance away.

For the purpose of this estimate, it is assumed that a ventilation system will be carried downwards from the 25 to the 43 level, and that a decline of 10' x 10' in dimension will be driven down past the 48 level, providing access from the footwall to the 77 vein.

It will be necessary to renovate the Queen hoisting system, the 26 level haulage system, and establish a haulage system to the 43 level Queen Shaft pocket up the decline from the stopes. It is proposed that this be a trackless trolley system. Ventilation will be down through a new borehole drilled from the 43 level and down through the decline into the stopes, exhausting up boreholes to the Queen Shaft.

For mining purposes, a similar module to that in the Upper Mine can be used except that stopes will be lengthened to 150' and each of three stopes per module will have a manway, two mill holes and a bored 4' diameter raise.

The sequence to be followed is:

- (a) Drive a short manway raise from the decline to and into the vein.
- (b) Bore a 4' diameter hole from 43 level to the opening created above.
- (c) With ventilation thus established, sub-drift along the vein and subsequently establish the remaining manways, mill holes and raises.

ESTIMATED CAPITAL COST

(I) MINE

(A) Upper Mine

(a) Stope Preparation

Develop 14 stopes initially to allow for production @ 400 tons/day in first year.

Estimated cost (see 'Estimated Mine Operating Costs') -

14 stopes x \$19,250/stope - say \$269,000

(b) Mine Equipment

14 stopes @ \$10,000/stope 140,000

(c) Replacement for Empire Hoist

Estimated cost plus installation 75,000

(d) Haulage Equipment

800 level	\$50,000	
16-25 levels	70,000	
26 level	<u>50,000</u>	170,000

(e) Crown Shaft Pocket

Rehabilitate and hardware 50,000

Total - Upper Mine

\$704,000

(B) Lower Mine

(a) Ventilation borehole - 26 level to 43 level - 2700' - 7' diameter - @ \$150/ft. \$405,000

(b) Decline - 43 level to 46 level - i.e. 200' below 45 level - @ 15% estimated cost - 3200' @ \$150/ft. 480,000

(c) Emergency 'borehole' hoist 40,000

(d) Stope preparation & development - 3 stopes @ \$46,750 each (see 'Estimated Mine Operating Costs') - say 140,000

Estimated Capital Cost - Lower Mine (Cont'd.)

(e) Mine Equipment - 3 stopes @ \$10,000/stope	\$30,000	
(f) Decline Haulage Equipment - Trackless trolley equipment - estimated cost 2 units	50,000	
(g) Miscellaneous Equipment - Sundry - allow - say	<u>50,000</u>	
Total - Lower Mine		\$1,195,000

(C) Electrical & Mechanical

Shops, transmission lines and general		<u>100,000</u>
Total - Estimated Mine Cost		\$1,999,000

(2) CRUSHER & MILL

(A) Crushing Plant

(a) Building	\$68,000	
(b) Equipment	<u>183,000</u>	\$251,000

(B) Cyanide Plant

Renovate - purchase new equipment & install	<u>150,000</u>	
Total - Estimated Crusher & Mill		\$401,000

(3) COMPRESSED AIR

(a) Building	\$35,000	
(b) 2000 c.f.m. compressor (second hand)	<u>35,000</u>	70,000

(4) WATER SUPPLY

If unable to draw water from Cadwallader Creek adjacent to mill - allow for 7000' - 6" diameter line @ \$3.00/ft. installed = \$21,000		
Storage tanks	<u>4,000</u>	25,000

Estimated Capital Cost (Cont'd.)

(5) TAILINGS DISPOSAL

Site not determined - but allow \$300,000

(6) CAMP & OTHER PLANT BUILDINGS

Allowance 100,000

(7) OVERHEAD & ADMINISTRATION

8 months @ \$35,000/month 280,000

TOTAL ESTIMATED COST -
MINE PREPARATION & PLANT CONSTRUCTION \$3,175,000

SUMMARY - ESTIMATED OPERATING COSTS

Tons milled - 175,000 per year or 14,584 tons per month

MILLING

<u>Labour</u>	<u>Amt./month</u>	
1 Millwright		
1 Amalgam operator		
4 Solution operators		
6 men @ \$50/day x 21 days =	\$6,300	
2 Crusher operators		
4 Grinding operators		
1 Assay office & general helper		
7 men @ \$40/day x 21 days =	5,880	
1 Mill superintendent	\$1,500	
1 Foreman	1,200	
2 Assayers @ \$1000/mo. ea.	<u>2,000</u>	4,700
Total	\$16,880	
Plus fringe benefits @ 16%	<u>2,701</u>	
	\$19,581	
Supplies including repairs	<u>21,000</u>	\$40,581
Estimated Operating Cost/ton milled - $\frac{40,581}{14,584} =$		\$2.78

MINING

As per detailed estimate in 'Mining' section 281,307 19.29

POWER

250,000 Kw hrs./month @ 1.40¢/Kw hr. avg. 35,000 2.40

SURFACE CREW

Labour

Mechanical & electrical		
6 men @ \$65/day x 21 days =	\$8,190	
Equipment operators		
2 men @ \$50/day x 21 days =	2,100	
Labourers		
2 men @ \$40/day x 21 days =	<u>1,680</u>	
Total	\$11,970	
Plus fringe benefits @ 16%	<u>1,915</u>	
	\$13,885	
Supplies	<u>1,500</u>	15,385

Summary - Estimated Operating Costs (cont'd.)

Estimated Operating Cost/ton milled = $\frac{15,385}{14,584} =$ \$1.06

GENERAL SUPERVISION - OFFICE & ENGINEERING

1 Manager @ \$2000/month	\$2,000	
1 Chief engineer-geologist @1600/mo.	1,600	
5 Technicians @ \$1100/mo.	5,500	
1 Chief accountant @ \$1500/mo.	1,500	
4 Office staff & general @ \$1000/mo.	<u>4,000</u>	
	\$14,600	
Plus fringe benefits @ 20%	<u>2,920</u>	
	\$17,520	
Supplies per month	700	
Other expenses	<u>1,500</u>	\$19,720

Estimated operating cost per ton milled = $\frac{19,720}{14,584} =$ \$1.35

LIVING SUBSIDY

Including camp operation & general expenses - estimated at	<u>14,584</u>	<u>1.00</u>
	\$406,577	\$27.88

SUMMARY - ESTIMATED MINING OPERATING COST

	<u>Upper Mine</u>		<u>Lower Mine</u>		<u>Total</u>	
Tons mined per month	8,750		5,834		14,584	
	<u>Amount</u> <u>per month</u>	<u>Per ton</u> <u>Mined</u>	<u>Amount</u> <u>per month</u>	<u>Per ton</u> <u>Mined</u>	<u>Amount</u> <u>per month</u>	<u>Per ton</u> <u>Mined</u>
<u>DIRECT COSTS</u>						
Stoping	66,918	7.65	66,974	11.48	133,892	9.18
Stope preparation	14,052	1.61	15,810	2.71	29,862	2.05
Stope support	7,646	0.87	-	-	7,646	0.52
Level haulage	13,893	1.59	-	-	13,893	0.95
Ventilation	-	-	16,000	2.74	16,000	1.10
43 L - Decline haulage	-	-	12,500	2.14	12,500	0.86
Hoisting - Queen shaft	-	-	12,120	2.08	12,120	0.83
Haulage - 26 level	-	-	8,432	1.45	8,432	0.58
Supervision - Lower Mine	-	-	<u>2,784</u>	<u>0.48</u>	<u>2,784</u>	<u>0.19</u>
<u>Sub-total - Direct</u>	102,509	11.72	134,620	23.08	237,129	16.26
<u>INDIRECT COSTS</u>						
Hoisting - Crown shaft					12,120	0.83
800 Level haulage					8,432	0.58
Stope Dev. & Expl.					18,096	1.24
Supervision					<u>5,440</u>	<u>0.37</u>
<u>Sub-total - Indirect</u>					44,088	3.02
TOTAL ESTIMATED MINING COST					<u>281,217</u>	<u>19.28</u>

Estimated Mining Operating Costs - Direct Costs (cont'd.)

Supplies

Drill repair	- \$2,500
Bits and rods	- 2,500
Explosives	- 2,500
Timber, rock bolts, burlap, etc.	- 5,000
Sand preparation	- <u>1,800</u>

Total supplies \$14,300

Total Cost/month - Stopping, or
Estimated Operating Cost/ton = $\frac{66,918}{8,750} = \$7.65$

(c) Stope Preparation

Each stope averages $\frac{120' \times 8' \times 150'}{12} = 12,000$ tons

Therefore, must prepare - $\frac{8,750}{12,000} = 0.73$ stopes/month

1 manway - 30' @ \$50/ft.	= \$1,500
1 millhole - 30' @ \$50/ft.	= 1,500
150' footwall drift @ \$75/ft.	= 11,250
Proportion - 1/3 of borehole costs - 50' @ \$100/ft.	= <u>5,000</u>
	\$19,250 x 0.73 = \$14,052

Estimated Operating Cost/ton = $\frac{14,052}{8,750} = \$1.61$

(d) Stope Support Costs

Rehabilitation - 3 men	
Pipe & track - 1 man	
Labour cost - 4 men x \$60/day x 21 days/mo.	= \$5,040

Plus fringe benefits @ 16% = 806
\$5,846

Plus supplies per month = 1,800

Total \$7,646

Estimated Operating Cost/ton = $\frac{7,646}{8,750} = \$0.87$

Estimated Mining Operating Costs - Direct Costs (cont'd.)

(e) Level Haulage

One crew will service and maintain level haulage for each 3-stope block.

For 9 stopes, therefore - $3 \times 2 = 6$ men/shift - 12 men/day.

Labour cost - 12 men x \$40/day x 21 days/mo. = \$10,080

Plus fringe benefits @ 16% = 1,613

\$11,693

Plus supplies per month -
incl. batteries 2,200

\$13,893

Estimated Operating Cost/ton = $\frac{13,893}{8,750} = \$1.59$

(B) LOWER MINE

Monthly Production - $\frac{70,000}{12}$ tons/yr. = 5,834 tons

(a) Stoping

Cut & fill - horizontal benching.

It is anticipated that because the stopes are in a relatively remote location in the mine and operating conditions, such as temperature and rock conditions, will be more arduous, that the operating costs will require 50% more labour and supplies than those involved in the Upper Mine.

Estimated operating cost per ton, therefore = $1.50 \times \$7.65 = \11.48
or amount/month = $5,834 \times 11.48 = \$66,974$

(b) Stope Preparation

1 manway - 30' @ \$75/ft. = \$2,250
2 mill holes - 60' @ \$75/ft. = 4,500
1 borehole, equiv. of 400' avg./stope @ \$100/ft. = 40,000
\$46,750

Tons per stope - average - 17,500.

Estimated operating cost per ton = $\frac{46,750}{17,500} = \2.71

Amount per month = 5,834 tons x 2.71 = \$15,810

Estimated Mining Operating Costs (Direct Costs (cont'd.))

(c) Ventilation

$$\text{Estimated operating cost/ton} = \frac{\$16,000}{5,834} = \$2.74$$

(d) 43 Level Decline Haulage (trolley mobile unit)

$$\text{Labour cost} - 6 \text{ men} \times \$65/\text{day} \times 21 \text{ days/mo.} = \$8,190$$

$$\text{Plus fringe benefits @ 16\%} = \underline{1,310}$$

$$\$9,500$$

$$\text{Plus supplies per month} = \underline{3,000}$$

$$\$12,500$$

$$\text{Estimated operating cost/ton} = \frac{12,500}{5,834} = \$2.14$$

(e) Hoisting - Queen Shaft

$$\text{Labour} - 3 \text{ hoistmen @ } \$60/\text{day} \times 25 \text{ days/mo.} = \$4,500$$

$$- 3 \text{ skiptenders @ } \$50/\text{day} \times 25 \text{ " } = \underline{3,750}$$

$$\$8,250$$

$$\text{Plus fringe benefits @ 16\%} = \underline{1,320}$$

$$\$9,570$$

$$\text{Plus estimated supplies per month} = 750$$

$$\text{Plus estimated maintenance per month} = \underline{1,800}$$

$$\$12,120$$

$$\text{Estimated operating cost/ton} = \frac{12,120}{5,834} = \$2.08$$

(f) Haulage - 26 Level

See 'Indirect Costs - 800 Level Haulage' - same cost/month

$$\text{Amount/month} = \$8,432$$

$$\text{Estimated operating cost/ton} = \frac{8,432}{5,834} = \$1.45$$

(g) Supervision

$$2 \text{ shift bosses @ } \$1200/\text{month} = \$2,400$$

$$\text{Plus fringe benefits @ 16\%} = \underline{384}$$

$$\$2,784$$

$$\text{Estimated operating cost/ton} = \frac{2,784}{5,834} = \$0.48$$

Estimated Mining Operating Costs (Cont'd.)

(2) INDIRECT COSTS

$$\text{Ore hoisted/month} = \frac{175,000}{12} = 14,584 \text{ tons.}$$

(a) Hoisting - Crown Shaft

Crew - 1 hoistman and 1 skiptender on 3 shifts for 25 days/month.

Labour - 3 hoistmen @ \$60/day x 25 days/mo.	= \$4,500
3 skiptenders @ \$50/day x 25 days/mo.	= <u>3,750</u>
	\$8,250
Plus fringe benefits @ 16% =	<u>1,320</u>
	\$9,570

Supplies and maintenance per month	<u>2,550</u>
	\$12,120

$$\text{Estimated operating cost/ton} = \frac{12,120}{14,584} = \text{\$0.83}$$

(b) 800 Level Haulage

$$\begin{aligned} \text{Men required} &- 2 \text{ men/shift} \times 2 \text{ shifts on trains} = 4 \text{ men} \\ &\text{plus supply personnel - day shift} = \frac{1}{5} \text{ man} \\ &5 \text{ men} \end{aligned}$$

Labour cost - 5 men x \$50/day x 21 days/mo.	= \$5,200
Plus fringe benefits @ 16% =	<u>832</u>
	\$6,032
Supplies incl. repairs	<u>2,400</u>
	\$8,432

$$\text{Estimated operating cost/ton} = \frac{8,432}{14,584} = \text{\$0.58}$$

(c) Stope Development & Exploration

Labour cost - 8 men x \$65/day x 21 days/mo.	= \$10,920
Plus fringe benefits @ 16% =	<u>1,747</u>
	\$12,667

Supplies @ ratio of 30:70	<u>5,429</u>
	\$18,096

$$\text{Estimated operating cost/ton} = \frac{18,096}{14,584} = \text{\$1.24}$$

Estimated Mining Operating Costs (Cont'd.)

(d) Supervision

1 Mine superintendent @ \$1800/mo. =	\$1,800
1 Mine foreman @ \$1400/mo. =	1,400
2 Shift bosses @ \$1200/mo. =	<u>2,400</u>
	\$4,200
Plus fringe benefits @ 20%	<u>840</u>
	\$5,040
Supplies per month	<u>400</u>
	\$5,440

$$\text{Estimated operating cost/ton} = \frac{5,440}{14,584} =$$

\$0.37