INTRODUCTION

Bethlehem Copper Corporation is located in the Highland Valley of British Columbia approximately 90 kilometers southwest of Kamloops. The elevation of the property is 5,000 feet.

In 1899 mineral discoveries were encountered in the Highland Valley and up until 1919 sporadic small, high grade mining operations were carried out. The area laid dormant from 1919 until 1942 at which time one of the major mining companies in Canada did limited exploration work. In 1954 a syndicate composed of Spud Heustis, Pat Reynolds and the McLallan Brothers sponsored a prospecting examination of the Highland Valley area and approximately 100 mineral claims were staked. In February of 1955 Bethlehem Copper Corporation was incorporated.

The results of exploration programs which were conducted from 1954 to 1960 indicated large tonnages of low grade copper ore. In 1960 the Sumitomo Metal Mining Company entered into an agreement with Bethlehem Copper Corporation that provided financing the property into production at a rate of 3,000 short dry tons per day. The plant commenced operations in December of 1962.

GEOLOGICAL DESCRIPTION OF MINERAL OCCURRENCES

The Jersey orebody occurs in three rock types: Bethlehem quartz diorite, Guichon quartz diorite, and breccia. The deposit roughly falls on the irregular contact between the Guichon and Bethlehem quartz diorite.

The deposit is roughly circular and exhibits many features of a typical porphyry copper deposit. It contains a weak pyrite halo, periphoral propylitic alteration and an inner zone of quartz-sericite alteration.

The main copper minerals are chalcopyrite and, to a lesser extent, bornite. Molybdenite also occurs in minor amounts in the Jersey orebody.

The Iona orebody is continued to a northerly trending pear-shaped breccia zone. This is a true breccia pipe deposit, as it exhibits vugs, mushrooms near the surface and narrows with depth, and contains fragments of most major rock types found on the property.

The mineralization mainly consists of bornite and chalcopyrite in varying ratios along with minor amounts of moly and chalcocite. The deposit also contains a very extensive oxide zone which reaches depaths of over 200'.

The irregular occurrence of the breccia zone is reflected by the erratic outline of the orebody, which as previously mentioned, is confined mostly to the breccia.

MINING METHOD - OPEN PIT

The blast hole spacing is 21' X 25'. Blasting methods employ both bulk slurry for wet holes and ANFO for dry holes. The holes are primed with procore primers connected by primacord down lines and E cord string lines. Bench height is 33 feet and berms vary from 30 feet to 60 feet, depending on ground conditions. The design width of pit roads is 80 feet with a grade of 10 per cent in the Iona and Jersey Pits. Overburden and waste rock removed amounted to 14,895,616 tons in 1977 for a stripping ratio of 2.43:1 W/O. During the year three 50-ton trucks and nineteen 100-ton trucks were maintained in operating condition.

CRUSHING

Three-stage crushing operation consisting of a 42" x 65" CAC Gyratory crusher followed by a 7' standard cone crusher, and two 7' short head cone crushers. The circuit is usually closed with 5/8" or 3/4" x 3 1/2 slotted screen clots. Plant operates 90 per cent of possible time and produces 20,500 S.D.T. per calendar day.

MILLING

GRINDING PLANT

Two-stage grinding operation consisting of Rod Mills, Ball Mills, and Pebble Mills with 13,750 connected H.P. Capacity is 20,500 S.D.T. per calendar day.

FLOTATION PLANT

Rougher flotation, followed by separate scavenging, after a slime split. Rougher and scavenger concentrate is upgraded by regrinding and three stages of cleaning. Reagents in use are sodium ethyl zanthate, potassium amyl zanthate, polypropylene glychol and MIBC, plus lime.

A new molybdenum circuit is scheduled to be in full operation by August 1978. Bulk copper-molybdenum concentrate will be pumped at a rate of 200 tpd to an existing 35-ft thickener, and then fed to ten No. 36 Agitair flotation cells from two stock tanks. Cleaned copper concentrate will be fed to a 48-ft thickener and back to the main concentrator at a rate of 197 tpd. The molybdenum will proceed to eighteen No. 15 Denver cells for cleaning. Fuel oil, NaHS, NaCN, Vanol and H_2SO_4 will be employed. The first cleaner concentrate will be reground in a Sala ball mill, and then pumped to successive cleaning stages. Final concentrate will go to a Denver 4 by 3 disc filter, and a Lockhead Haggerty drier.

GENERAL (As of July 1978)

Reserves and grades: Ore 49,500,000 Cut-Off .20 (% Cu)

(S. Tons) Waste 50,000,000 Cut-Off

PIT PRODUCTION:

TONS MINED PER DAY

Ore 23,070 Cutoff .20

Waste 26,820

TPD

Pit Ore to Stockpile: 4,400 Cutoff .20

Stockpile to Crusher: 1,830

TONS MILLED PER DAY

Tons 20,500 Grade .40

WORK SCHEDULE

Days worked per week:		Shifts worked per day:	
Pit	7	Pit	3
Mill	7	Mill	3
Pit Maintenance	7	Pit Maintenance	3

PIT CONFIGURATION

Size of pit:	Jersey Pit	Ultimate	2600' X 2800'
	Iona Pit		1700' X 2000'
Depth of pit:	Jersey Pit	Ultimate	800'
	Iona Pit		600'

Age of pit: Years Jersey Pit = 14 yrs.

Iona Pit = 5 yrs.

Bench Height 33'

Berm width 30' - 60'

Berm Interval 66' - 67'

Overall Slope 38 - 45°

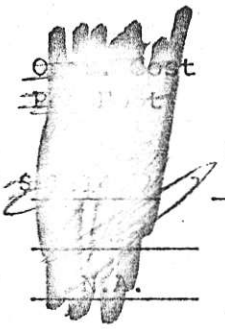
Road Grade 10% Width: 80 ft. minimum

Weather: Winter-Summer -5° C to 12° C Precipitation 57 cm

MINING EQUIPMENT

DRILLS

Made and Model	Number Avail.	Number Used	Hole Diam.	[illegible]	Compressor	Year	% Oper.
Bucyrus-Erie	2	2	9 7/8"	$ [illegible]	Allis Chalmers Rotary	1967	53.46
45 R Diesel					Model 12-L	1968	
Gardner Denver	1	1	2 1/4"	[illegible]	Gardner Denver	1967	
Air Trac					Sp 900 CFN Compressor		



ENGINES

Make	Number	HP	Inframe Service
Cummins NTA-380-1P (B & E)	2	320	5000 HR
Cat D343 (Air Trac)	1	335	

Penetration Rate 70.5 ft/hr.

Bit Life 7500 ft.

Pull Down 45,000 - 55,000 lbs.

Operating Rpm 50 - 55

Hole Depths: Without Subgrade 33'

Subgrade 0 - 7'

Pattern Size 50 holes : 21' X 25' or 24' X 28'

Explosives: [illegible] Powder Factor 0.49 lb/ton

Type ANFO & SLURRY

Drill Shifts: Per Day 3 Per Week 18

[illegible]

LOADING

Make and Model	Number Avail.	Number Used	Bucket Size $(Yd)^3$	Tons Per Hour	[redacted]	Year	%Avail.
B & E 195B Elec.	3	3	13	1357	[redacted]	1974,5 1976	74.6
Darts D600	2	2	15	1040	[redacted]	1975	67

ENGINES

Make	Number	HP	Overhaul Life
G E 800 Series (195B)	3	600-1200	10,000 hrs.
D 348 Caterpillar (Dart)	2	670	7,000 hrs.

TIRES

Make	Size	Life	[redacted]	Ply
Bridgestone	37.5 X 39"	1500 hrs.	[redacted]	36

Shovel Cable Life

Hoist	400	hours
Crowd	500	hours
Retract	1200	hours

Shovel Bucket Life

Make	Esco & Hans Co.
Life of Lip	4500 hrs.
Liners Used	4500 hrs.
Teeth	50 hrs.

Average number buckets per load 5 1/2

Cycle time per load 3 1/2 min.

Automatic Lubrication: Make Lincoln Model 81713A

Loading Shifts: Per Day 3 Per Week 21

[redacted]

TRUCKS

Make and Model	Number Avail.	Number Used	Capacity (Tons) Rated	Capacity (Tons) Actual	Year	% Avail.	% Oper.
Lectra Haul M100	19	9	100	92	75	79.2	32.0

TIRES

Make	Size	Life	Ply
General	27 X 49	2500 hrs.	36-42

Engines

Make	Number	HP	Overhaul Life
Detroit Diesel 149TT	19	1200	12,000 hrs.

Electric Wheel Motors and Accessories

Wheel Motor Type	GE 776 F2 (Deep Pit)
Cost Per Hour	N/A
Availability	N/A
Turnaround In Repair	3 weeks
Exchange Availability	3 spares in stock
Cost of Exchange	N/A
Overhaul Life of Motor	10,000 hours

	JERSEY PIT	IONA PIT		JERSEY PIT	IONA PIT
*Average Ore Haul Distance	0.75 mi	1.90 mi	Time	2.25 min.	5.7
Stockpile Haul Distance	0.80 mi	1.85 mi	Time	2.40 min.	5.55
Waste Haul Distance	0.5 mi	0.5 mi	Time	1.5 min.	4.5

(min.)

Tons Per Cycle 92 tons

Hauling Shifts: Per Day 3 Per Week 21

* PLEASE NOTE THAT PIT CONFIGURATION IS A CONSTANTLY CHANGING VARIABLE WHICH IN TURN DIRECTLY AFFECTS HAULAGE TIME.

ANCILLARY EQUIPMENT

Make and Model	Number Avail.	Number Used	Engine	Year	Operating Cost ($)
Wabco 50 Ton	5	5	Cummins 635HP	67-72	N/A
B & E 88B Diesel 5 1/2 yd.	2	2	Cummins	62	N/A
Michigan 475 8 1/2 yd.	1	1	Cummins	70	N/A
Cat D8 Dozer	4	4	Cat D342	75	N/A
Cat 824 R.T. Dozer	2	2	Cat 343	73	N/A
Cat 16 G Grader	1	1	Cat 343	75	N/A
Cat 14 E Grader	1	1	Cat D333	72	N/A
P & H 17 1/2 ton Crane	1	1	Chrysler 218TC	62	N/A
P & H 35 Ton Crane	1	1	Detroit Diesel 6453N	74	N/A

[redacted]

PIT SHOP

Bays: Number 10 Size 30' X 55', 30' X 65'

Type: Tire 2 Welding 1 Electrical 1

Heavy Equipment Servicing 5

Light Equipment Servicing 1

Other & 1 small Gas Bay

Definition of Availability (Total Time minus Down Time)/Total Time

Maximum number of working hours available per shift:

Drills	7.5
Loaders	7.5
Haulage	7.5

MANPOWER - GENERAL

		Staff	Hourly	
Total Mine Operations Employees		25	124	
Mill Operations Employees		17	99	
Accounting Employees		7		
Warehousing Employees		5	6	
Others	Property Engineering	2	12	
	Management	3		
	Personnel & Safety	5		
	TOTAL	64	241	305

MANPOWER - PIT

Manager - Pit Production

Manager Engineering

Production

1	Pit Superintendent
1	Asst. Pit Superintendent
5	Pit Foremen
1	Asst. Pit Foremen
1	Clerk
8	Drillers - Oilers
	Front-End Loader Operators
9	Shovel Operators
4	Shovel Oilers
31	Truck Drivers
9	Cat Operators
4	Grader Operators
4	Water-Sand Truck Operators
4	Fuel Truck Operators
3	Dumpmen
3	Blasters
1	Crane
1	Airtrac
1	Others JANITOR

Maintenance

1	Maintenance Superintendent
1	Asst. Maintenance Superintendent
2	Maintenance Foremen
1	Mech. Planning Eng.
8	Journeyman Mechanics
7	Journeyman Welders
5	Mechanics
2	Welders
12	Apprentices
2	Labourers
3	Tiremen
2	Service Vehicle Mechanics
11	Lead Hands
1	Others CLERK*

Engineering

1	Senior Mining Engineers
1	Pit Designers
2	Draughtsman
	Head Surveyors
3	Pit Surveyors