W.A. No. .....

NAME ..... GEOL Rpt. .....

SUBJECT .....

.....

.....

LORNEX

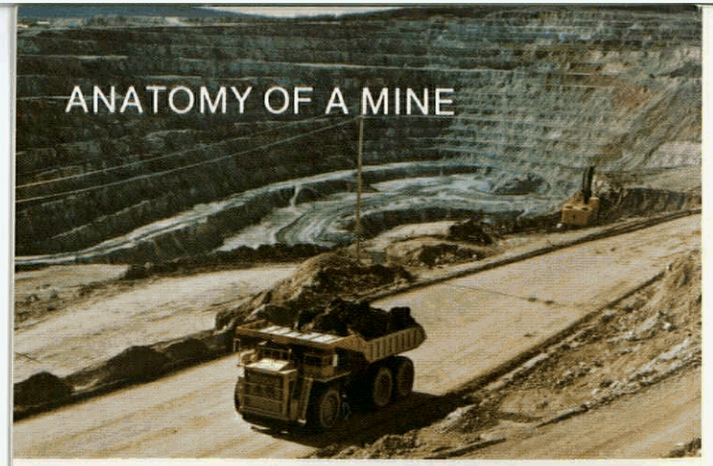
92ISW045-07

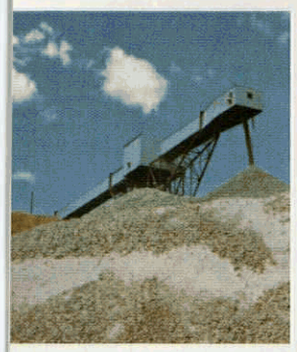
PROPERTY FILE

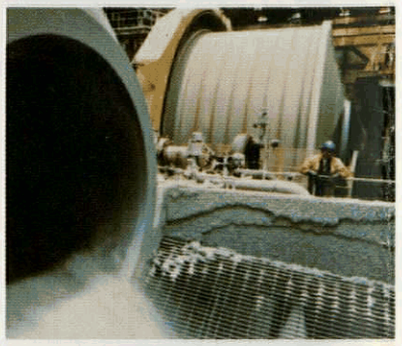
010927

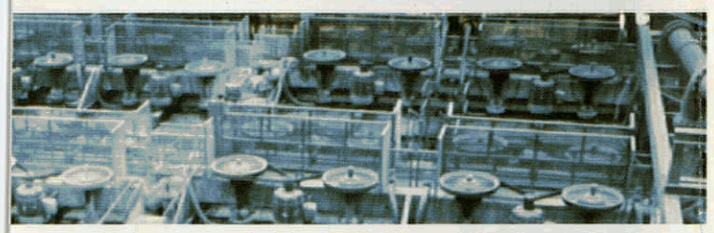
M28-1506

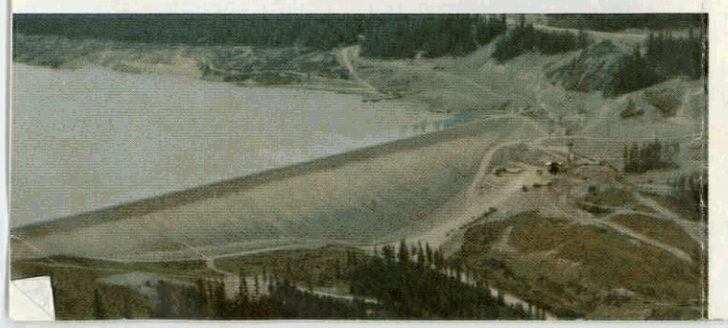
ANATOMY OF A MINE











Company Head Office-
580 Granville Street
Vancouver, B.C.
V6C 1W8

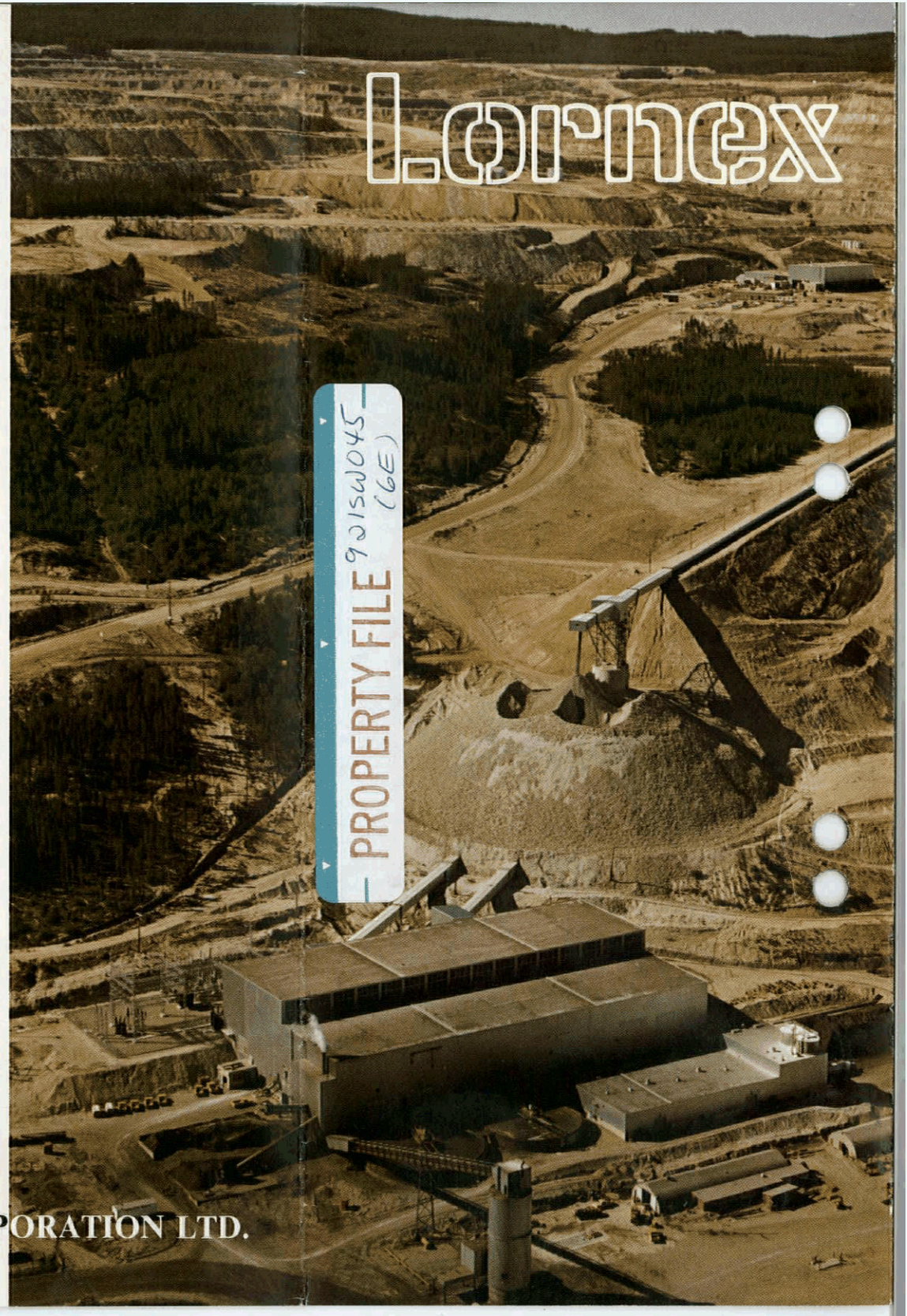
Company Mine Office-
P.O. Box 1500,
Logan Lake, B.C.
V0K 1W0

Group tours of the mine are available during tourist season, and are also available for student parties.

Telephone-
Logan Lake:
575-2443

Lornex
MINING CORPORATION LTD.

Lornex



A PLACE TO LIVE

Job satisfaction, Lornex has realized from the start, depends on more than good working conditions. It involves satisfaction in the home and recreational environment, factors that are often difficult to achieve, especially in mining.

For this reason, the community of Logan Lake, situated 11 miles east of the mine and the home of more than 60 percent of its employees, is an important part of the Lornex success story.

Lornex has been the primary developer of the town and has constructed 340 single-family units, townhouses and mobile homes, all individually owned, and 114 apartment units. Forty-four serviced lots were also made available to sell on the open market.

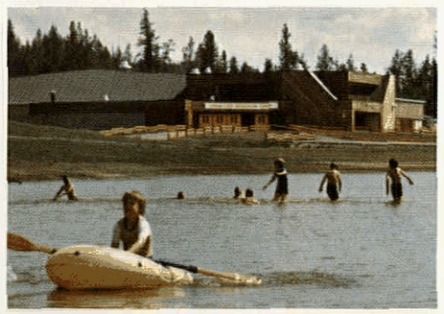
For those who enjoy outdoor living, it is surpassed by few regions in Canada, offering hunting, fishing in 20 nearby lakes, skiing, camping and hiking. Amenities within the community include a regional school, a shopping centre, library, hotel, service station and a variety of service outlets. The $1.2 million Logan Lake Recreation Centre provides full opportunity for skating, curling and hockey, social events, banquets and meetings. In late 1976, tennis courts were installed adjacent to the centre.

Continued growth of the community demonstrates that its acceptability continues and that efforts to develop a pleasing, attractive population centre have been successful.

▼ *A single family home*

▼ *Happy girls at play*

▼ *Logan Lake sports centre*



▼ *Apartment homes popular*

LOOKING AHEAD

Mining, like any other business operation, must plan ahead and be prepared to meet rising demand and favorable market conditions. Such development contributes materially to the national and regional prosperity, provides jobs and, through its mineral production, enhances the capability of our society to meet the needs of its people.

Lornex, with its employment above the 800 mark, channels more than $12 million annually into the Highland Valley and surrounding economies.

Development and improvement programs look several years ahead. Projects recently completed or underway include the construction of a new tailings pond dam, a major pit shop expansion, and a warehouse shop expansion in the mill area.

Lornex is studying the feasibility of installing a molybdenum leaching plant. Current daily production of up to 15 tons of molybdenum sulfide concentrate contains certain impurities that reduce marketability of the product. A leaching plant would provide a higher grade product and improve selling prices.

PROTECTING OUR WORLD

Environmental protection is a real concern of the staff of Lornex Mining Corporation. Lornex has paid particular attention from its earliest days to the need to avoid environmental damage.

Substantial expenditures have been directed to environmental protection since the mine commenced operation.

Included in the protective system are reclaim water installations, dust control systems, grounds maintenance and reforestation.

Reclaiming water reduces the amount of water pumped from the Thompson River to a fifth of the total plant requirements. The remaining water is recycled from the tailings pond, the long "lake" seen below the Ashcroft-Highland Valley road by the traveller as he approaches within several miles of the mine. Tests are regularly carried out to make sure no toxic substance is escaping into the valley streams.

▲ *Reclaim water barge*

▲ *Design, Planning Department*

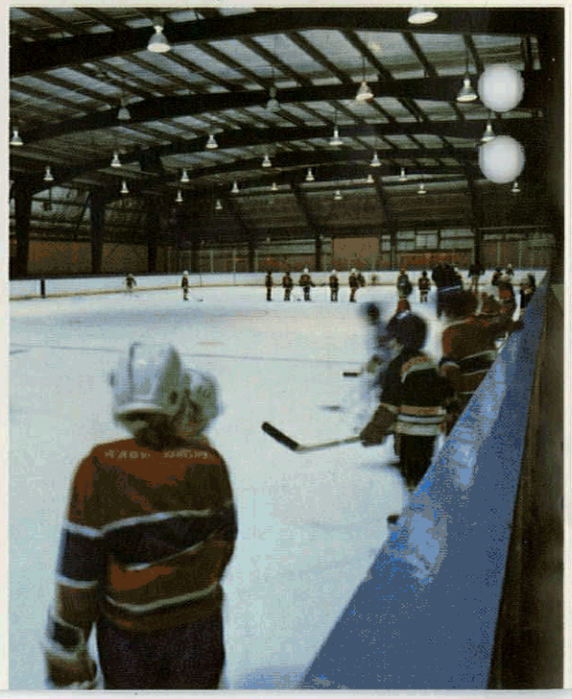
▼ *At work in the laboratory*

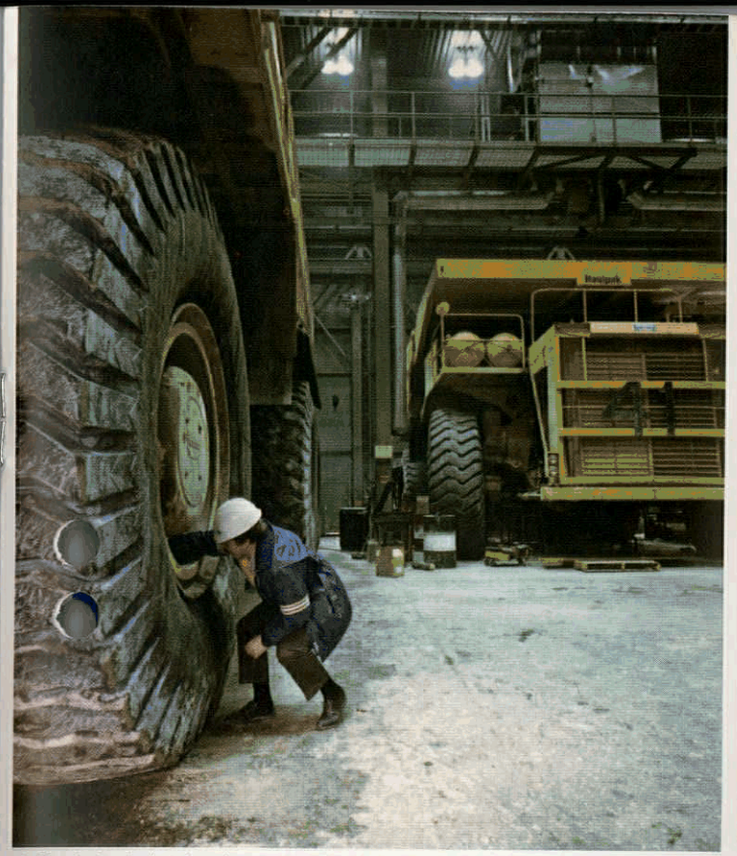
By an arrangement with Bethlehem Copper, operating on the north side of the valley opposite Lornex, and the as-yet undeveloped Valley Copper mine, the pond eventually may take tailings from all three mines.

The dumps of waste rock and overburden, as well as the tailings pond, will be replanted as they become inactive.

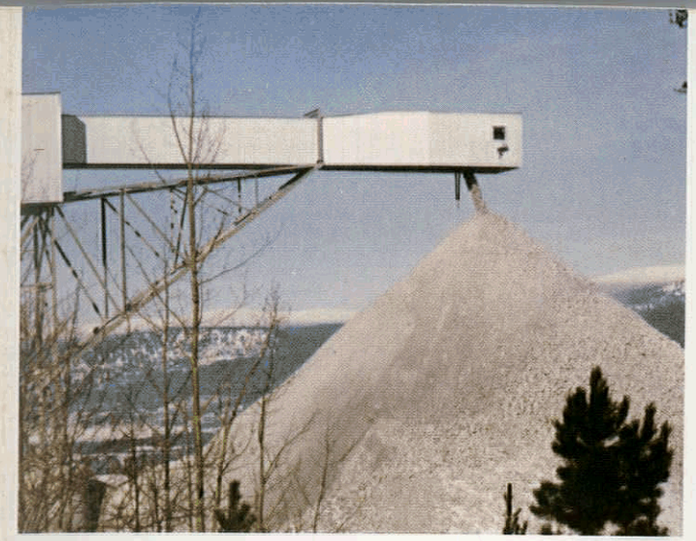
One of the most successful Lornex innovations has been the use of large plastic pipe to carry the tailings by gravity from the mill to the tailings pond. This 32-inch pipe can be seen where it crosses the Highland Valley road in two places.

▼ *The children love hockey*





▲ *Truck wheels dwarf workers*



▲ *A mountain of crushed ore*

▼ *Ore is dumped in the crusher*

▲ *235 tons on the move*

▼ *The flotation cells*

FACT SHEET

The Lornex mine is situated in the Highland Valley 27 miles southeast of Ashcroft and 48 miles southwest of Kamloops.

Logan Lake is a community of 1,500 located 11 miles east of the mine.

The area can be reached by road from Kamloops and Ashcroft, both located on the Trans-Canada Highway. Air access is through Kamloops airport. Trans-continental trains service the area.

The mine commenced pre-production stripping operations in September, 1970, and commenced production of concentrates in October, 1972.

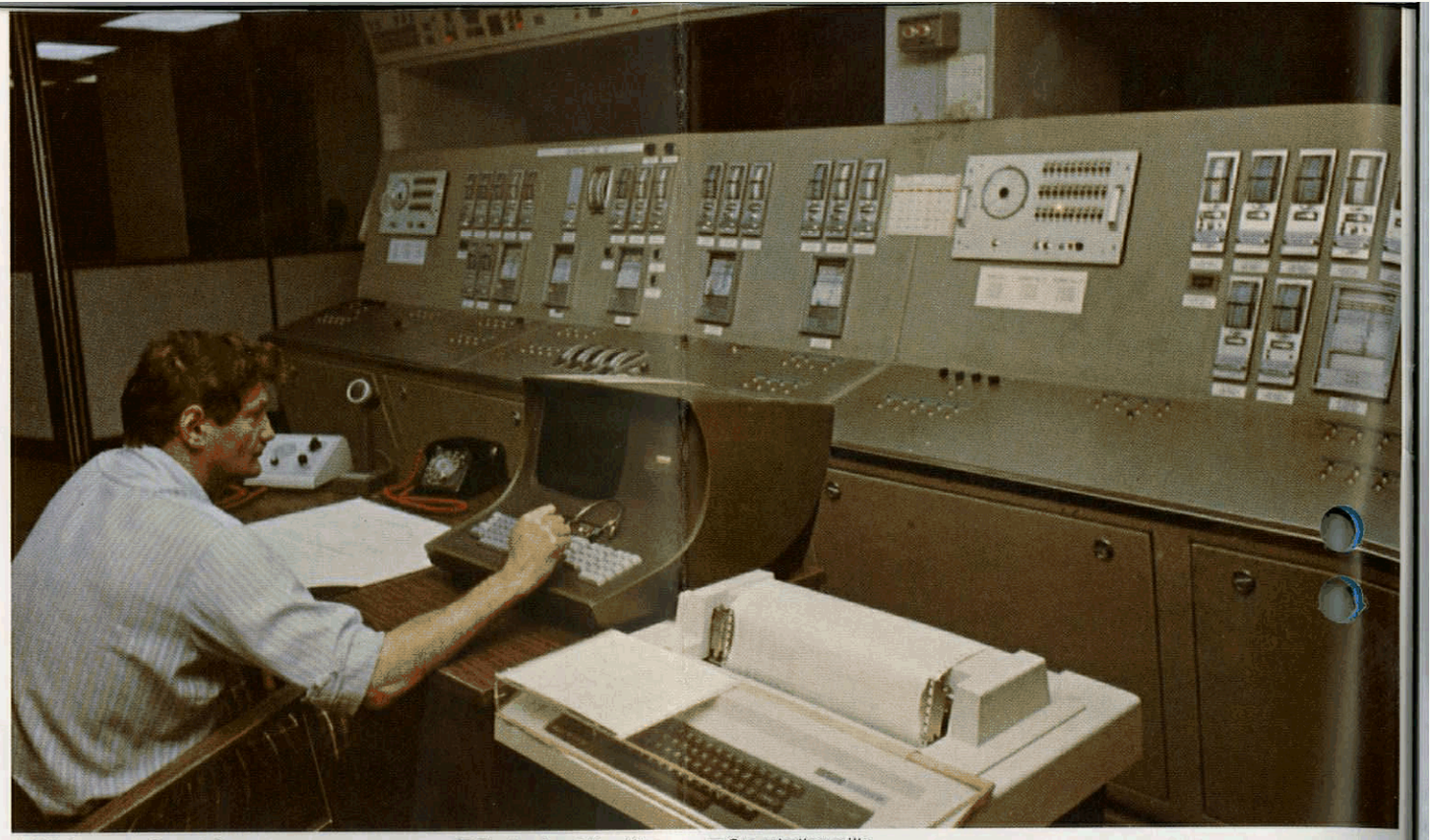
Daily ore production was planned to be 38,000 tons per day through the mill initially and has gradually been increased to approximately 48,000 tons per day.

Pre-production cost - $144 million
Minerals produced - copper, molybdenum and small amounts of gold and silver
Recovery rate - copper 88-90%; molybdenum 75%
Controlling Company - Rio Algom Limited
Type of operation - entirely open pit
Primary markets - Japan and the United States

A COMPUTERIZED SYSTEM

A computer is used to control the ore feed rate to the processing system. This unit can order instant adjustments in small, accurately measured increments or reductions beyond the capacity of a human operator. Instructions are fed into the machine by a group of operator specialists, instrument technicians, metallurgists and other Lornex experts. The computer has been shown to be a major additional information and control source that does not cost jobs but significantly increases speed and efficiency.

Coincident with the introduction of the concentrator computer system has been an expansion of computer operations in the accounting office, the warehouses and other sections of the plant. Lines to the warehouse will permit easier control and speedier replacement, and lead to some reduction in inventory in an operation that carries more than 24,000 items in stock.



▲ *Mill Computer Control Room*

▼ *Electronics aid in office*

▼ *Ore grinding mills*

235 TONS IN A LOAD

Nothing better symbolizes the Lornex operation than the roar of a 235-ton capacity truck rolling across the huge open pit. Nothing better reflects the company's confidence in the mine's future than its investment in this fleet of super trucks. Unmatched by any truck fleet in North America, the Wabco 3200's, as they are known, have added a new dimension to ore movement. Joining these trucks at Lornex early in 1977 was a new 22-cubic yard capacity electric shovel, at that time the largest shovel in use in metal mining in Canada.

New production records have been attained because of this new equipment and Lornex officials anticipate future new records will result from further use of this type of modern equipment. Lornex is particularly pleased with the 235-ton haul truck, for the mine played a major role in the development of the machine in conjunction with the U.S. manufacturer. These giants are powered by the same engines found in railway locomotives and each wheel stands some 12 feet high when fitted with enormous tires built to take up to 4,000 hours (or about eight months) of hard service. Despite its size, each truck is operated by a single operator who sits comfortably in a control cab a dozen steps above the ground. Facing him is an intricate control panel, resembling that of a small airplane and requiring a similar routine of "pre-flight" checks before use.

Lornex has maintenance shops that can handle almost everything except major overhauls of large engines and electric motors for the big trucks. The largest section of the Lornex workforce is employed in the open pit mining operations and maintenance of the mobile equipment.

Expanded ore reserves indicate that the life of the mine will be considerably extended, well into the next century, and that it will be possible to utilize the new truck fleet continuously for many years to come.

The original pit was designed for a life-term of 21 years at a rate through the mill of 38,000 tons per day, and total recoverable reserves were estimated at 292 million tons at an ore grade of 0.427 percent copper and 0.014 percent moly.

As the mine came into production, Lornex was able to do further exploration work, particularly to the south of the existing pit. As a result of a 1974 drilling program, ore reserves were increased by approximately 150 million tons and in 1976 another recalculation indicated a further 100 million tons available.

▼ *22-yard shovel and 235-ton truck in the pit*

OPERATIONS

Operation of a large open-pit mine calls for detailed planning and scheduling in which every portion of the system must be delicately meshed.

From a distance, the busy trucks and shovels, manned and maintained by skilled crews, resemble ants, relentlessly chewing into the hillside. The small pit of 1972 will eventually be expanded to 1,800 feet deep, two miles long and a mile wide.

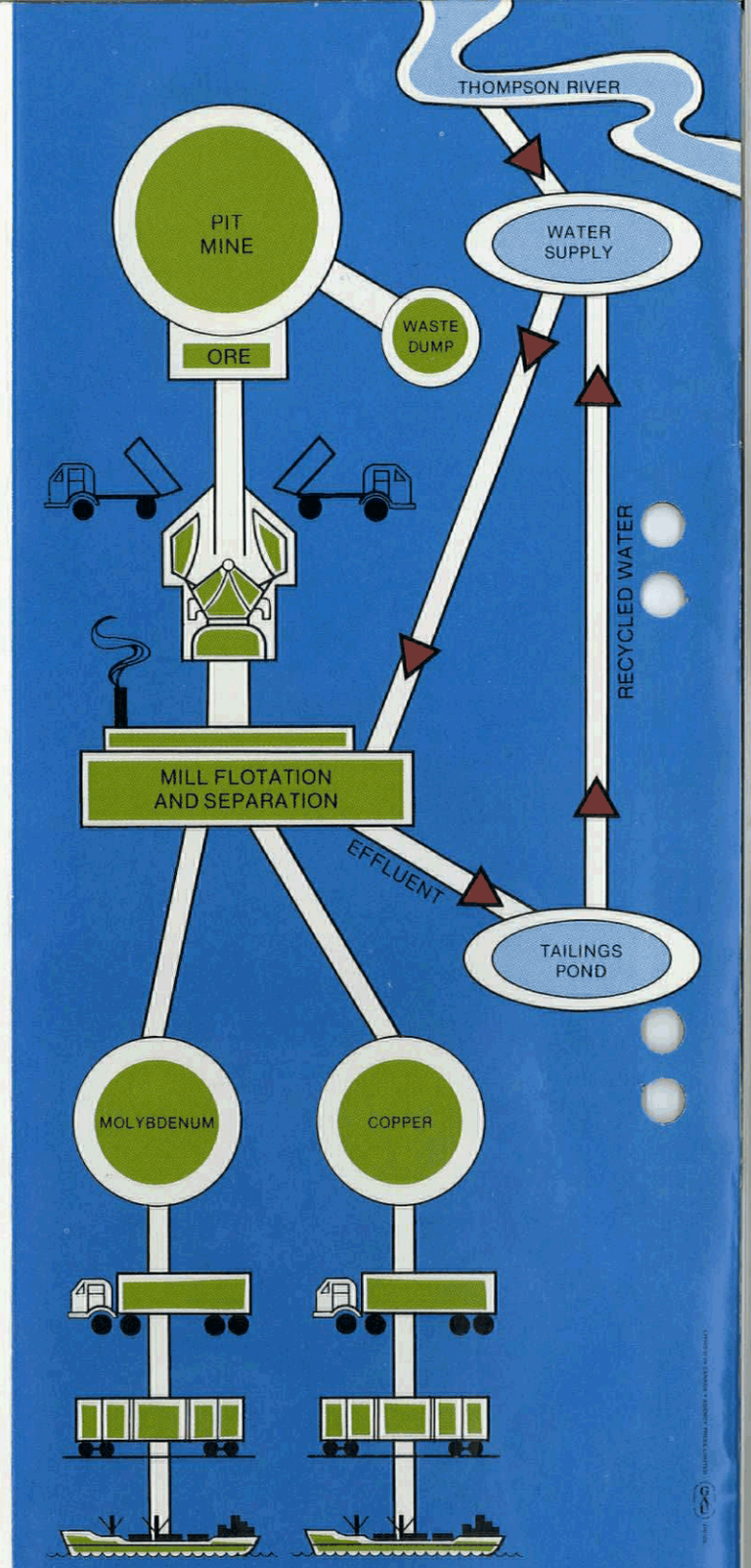
From this large open pit there now emerges, every 24 hours, 110,000 tons of rock and overburden, plus 48,000 tons of ore which flow continuously to the concentrating plant.

The ore is moved by truck to the crusher, then conveyed into semi-autogenous grinding mills where the mineral-bearing rock is reduced to ¾ inch size and smaller by abrasion and impact of one rock against another. The ore is further ground to a fine sand in large cylindrical mills in which cascading steel balls smash the rock, freeing the locked-in grains of copper and molybdenum minerals. This finely ground mixture of rock and ore minerals moves along in a water slurry from the grinding mills to the flotation section of the concentrator.

Here the feed is agitated and frothed, separating the grains of rock-forming minerals (quartz, feldspar, mica, etc.) which sink, from the ore minerals (chalcopyrite, bornite and molybdenite) which stick to the bubbles and rise to the top of the flotation tanks. The ore minerals are skimmed from the froth, drained and dried, and are now termed "concentrates". The grains of worthless rock-forming minerals, called "tailings", are carried in a water slurry through a large diameter plastic pipeline to the tailings pond.
Molybdenum content is permitted to fluctuate in grade, but copper grade is closely watched and held between 0.38 and 0.55 percent copper. Except for necessary maintenance, the crusher-concentrator process continues 24 hours a day, seven days a week.

Lornex produces large quantities of copper concentrate to fill major contracts with North American and overseas corporations. Molybdenum concentrate, which is the most important by-product, is also shipped to various markets around the world.

Lornex requires scores of skilled tradesmen, operators and professionals. They contribute in maintenance, warehousing, accounting, laboratories, engineering offices and security duty, as well as in the actual mining and milling of ore. The total workforce has risen significantly since the mine was first put into operation.



Lornex

This is your introduction and guide to the Highland Valley copper-molybdenum mine of the Lornex Mining Corporation Ltd. Associated with the mine is the attractive community of Logan Lake, 11 miles to the east, where two-thirds of the mine employees reside.

IN THE BEGINNING

The Highland Valley, some 45 miles southwest of Kamloops, British Columbia, is indeed a valley of copper. Here, millions of years ago, nature deposited her copper minerals in the then molten rock which now forms the surrounding hills. Much later in geological time, glaciers dumped hundreds of feet of clay, boulders and other debris over the land to form the overburden that completely masks many of the larger mineral deposits.

Presence of copper deposits here has been known for the past century, but full realization of their extent emerged only in the last 20 years. Traces of early Indian "mining" could be found on Lornex Mining Corporation property and settlers undertook some laborious and unrewarding extraction in the early 1900's.

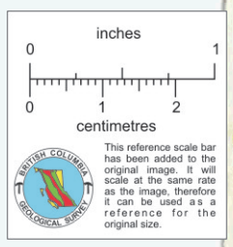
These first-discovered deposits were high grade, but they were small surface patches and most of the copper was locked in hard quartz porphyry rock, making recovery difficult and expensive. The settler-miners loaded their ore into horse-drawn carts and moved it 27 miles northwest to the tiny Thompson River community of Ashcroft, where it was crushed and processed. Only the high grade ore was mined as the remaining sparsely mineralized rock was unprofitable.

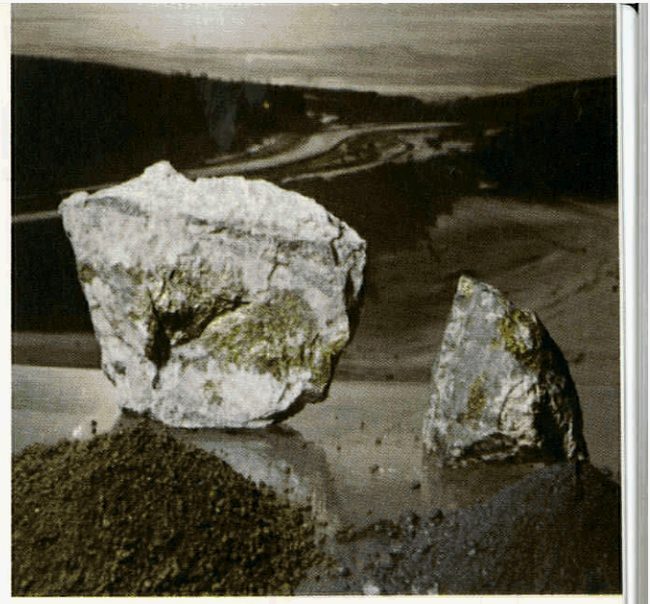
Through the distractions of two world wars and a depression, there was no real mining activity in the valley.

Then came the '50's, a decade of significant technological and economic progress. Metal markets were strong and prices good. Costs were lowered through the use of large shovels and trucks and inexpensive blasting systems were developed. Prospectors returned to the Valley looking for the now economic large low-grade deposits.

Among the prospectors was Egil H. Lorntzsen, who staked a number of claims over a 10-year period, and organized their development through the Lornex company, very properly named for the discoverer.

Lorntzsen and his associates soon realized that the deposit he discovered, while extensive, was mostly low-grade ore, topped by thick overburden in places. Development costs would be high, but they concluded that the extent of the mineralization would make the operation viable. The presence of molybdenum, widely used as an alloy in steel, added to its value.





▲ *Copper (left) and molybdenum ore*

More than one mining expert disagreed. Several major firms looked at the property and spurned an opportunity to join in its development until, in 1965, Rio Algom undertook to finance a comprehensive exploration program. It purchased $4.6 million worth of shares and sold 40 percent of them to Yukon Consolidated Gold Corp. Another $2 million was raised by a rights offering.

By 1968, some $6.8 million had been spent in exploration and in 1970 after thorough evaluation of the inherent risks in mining, the decision was made to commence immediately. Less than two years later, in October, 1972, after a capital expenditure of $144 million, the operation was officially in production.

Lornex subsequently became the largest open pit copper mine in Canada, using technology hardly dreamt-of when the valley was staked in the 1960's. It is now a world-scale operation, which has proven the judgement of its developers correct. The consistency and extent of the ore, mined in an efficient manner, more than compensates for its relatively low grade.

Lornex

Thursday September 14/78.

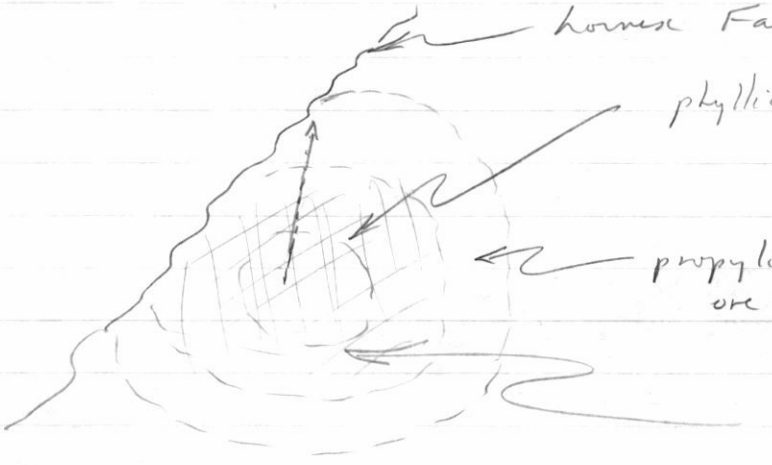
Lorne Hunter -
J. Don Graham - Chief Engineer
Matt W. Waldner - Geologist
Tom John - Planning Engineer
Mc Manus - Mill Superintendent
/ Chief Metallurgist

Geology -

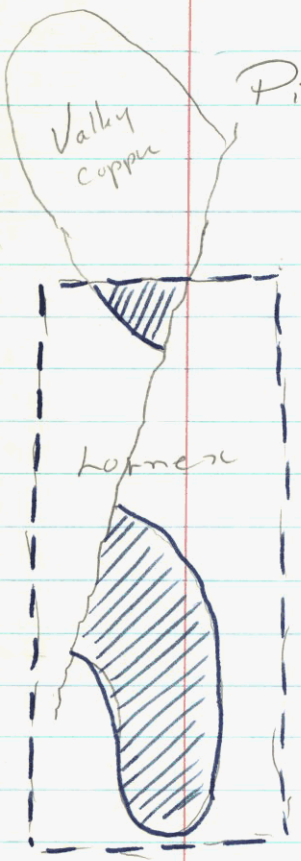
References.

M. W. Waldner *
G. D. Smith
R. D Willis
} Lornex - CIMM Special Volume # 15, Paper # 13.

A cylinder of min phyllic alteration surrounded by barren propylitic alteration as a result of emplacement of Granod Mtn Porphyry into Bethlehem (Skeena) rocks cut off by Lornex fault.



All mineral deposits in Highland Valley in Bethlehem - Bethsaida



Pit Size

Now: 4000 x 6000 /t

depth 200' to 800' (differences in topography around pit).
or 4400' elevation now.
will ultimately be 3500 /t elevation
or 900 /t to go to depth.

Some possibility of Valley Copper pit coming on Lornex Property -

55' toe to toe -
25' berm - lasts for short time then disappears.
40' vert bench to bench.
30' slough.
allow slope to move but not to fail.
Pit slope - E side 30° (eventually 34°)
W side 37° (eventually 39°)

Stripping -

Stripping Ratio - now 2:1 will be 1.6:1 over all.
Stripping is well ahead of mining -
a good cushion -

Ore

99% fracture controlled - quartz veins
1/4 to 1/2 inch thick (or less)
* Density of fracturing controls ore grade for the most part.
chalcopyrite, bornite, molybdenite

An intense argillic altn zone contains bornite .·. some lithologic control as well.

Mo is peripheral - leave in wall on east side
- pick up in south - Mo average 0.014 % Mo throughout

Lornex (2)

Reserves

Present Reserves – not published

483.7 m t of 0.411 Cu
0.015 Mo
@ 0.26 Cu equivalent cut-off.

Note Reference
quotes 484 metric tonnes
0.409 % Cu
0.015 % Mo

Note Mo grade x 3.5 = Cu grade equiv.
takes into account differences in recoveries.

There is possibly an additional 50 m t because of conservative method of calculating reserves.

End of 1976 Review of Ore Reserves –

Cut-off Cu Equivalent	Tonnage m t		Av. Grade.
0.26	407		.412
0.24	540		.400
0.22	573	Cu or Cu Equiv ??	.380
0.20	616		.370
0.18	649		.360

Additional Reserve Possibilities –

Tom John –

Possibly 200 m t below the pit of comparable grade – minable or no ?? Below NW half of pit.

Two holes tested @ 1400' & 2000 ft depth

Reserve Calculations

Computer program - takes structure into consideration - search directions defined by structure -

Cut offs 0.26% Cu or Cu equiv for No low grade Cu area at south end of deposit.

Complete reserve recalculations every two years - for publication, however, subtract what was mined from initial reserves.

- subtraction method not used at mine -

Note There is 148 m t low grade which will be mined eventually - in initial reserves 0.16 to 0.26 % Cu - Average 0.19 % Cu - will be stockpiled. Not published reserves

Lowering cut offs to 0.20 % Cu or (Cu equivalent) would effectively increase reserves by 79 million tons.

Tailings -

Joint tailings agreement - Lornex, Valley Copper Bethlehem.

No space problems.

Water from river(?) soon will be needed

Lornex (3)

Drilling -

Drilling done to limits of pit area - fault cut off or propylitic alteration.

Diamond drill pattern - 400' x 400' grid
- ~~total~~ 180,000 ft of core
90,000 initial
60,000 later
30,000 min -

Policy to drill on 1000 ft centres in areas of waste dumps - 400' to 500' foot percussion holes to check for mineralization.

Assays - In ore grade - tonnage calculations it was found ~~that~~:

Blast hole data 10% > mill heads.
Diamond drill data 10% < mill heads

Grade Control

No grade control problems - mainly because there is no internal waste. Dilution not a great factor - Mill feed rate controlled by hardness of rock -

There may be 50,000 tons out of a 3 million ton bench ~~that~~ is low grade - so there is low grade

stockpiling

Stockpile 0.16% to 0.26% Cu in low grade pile. Average grade in this is 0.19% Cu

There is 149 mt of this material to be stockpiled.

No ore in propylitic zone - but now gradual cut-off approaching it.

Lowest fault - cuts off ore - good grade control - minimum dilution.

Southern part of ore deposit bottoms out -

Mill Feed

Main concern is not grade blending so much as <u>blending for grinding rates</u>.

Milling rate ≈ 50,000 tons/day.

Market -

Cu concentrates 75% to Japan
25% spot market
Russia
Japan..

Mo concentrates - have a long term contract with Brokerage firm in New York - shipped to wherever they sell it - Europe, Japan

Kerr (4)

Production to date -

Waste and ore 150,000 tons/day at 2:1 stripping ratio - so ore is 1/3 of 150,000 or 50,000 t/day -

Production
17 m t/year × 6 years 85 to 100 m t

Mill - last month 48,383 tons/day average
ore - Can go up as high as 78,000 t/d depending upon grindability of ore. ie - 28 to 30,000 tons/shift

A poor day may result in 30,000 tons/day

1977 - Mo recovery 75.36%
Cu recovery 88.9%

Note - 3.5 m lbs Mo in molybdenum conc.
141 m lbs Cu in copper conc.

Hoping for 2% more Mo recovery and ≈ 1% more Cu recovery with addition of more flotation cells (costing $600,000.00)

Some silver recovered in smelter
Au get 0.4 g/tonne of Cu concentrate but need 0.5 g/tonne to get paid.

Lornex (5)

Government Role in Mining.

① Tax burden should be raised!

② Exploration -

i) regional mapping & subregional mapping

ii) geochemical surveys -

iii) research - eg very enthusiastic about a report by Tambor.

- future extension of orebodies

③ Production

- No role in producing metals itself! not involved in mineral exploration or production.
- Hand in control regulations

Mines Regulation Act etc

* cut changes or new proposals should be discussed with everyone concerned.

④ Marketing -

should not be involved with marketing - cut off strategy -

⑤ Reclamation & Environment.

Shouldn't allow mining companies to walk away - need regulations

Tendency to want to have things done too fast. Nature will allow recovery in many cases itself.

⑥ Resources -

Total resources

Exploration & Production information - reduce redundancy

Mineral Inventories - too many forces at play for the government to control it.

Resource information should not be used to direct policy.

Resource information for land use problems
— Yes — Gov't should be involved

MINERAL INDUSTRIES IN WESTERN CANADA

THE TENTH COMMONWEALTH MINING AND METALLURGICAL CONGRESS – SEPTEMBER 2-28, 1974

SPONSORED BY: THE CANADIAN INSTITUTE OF MINING AND METALLURGY

LORNEX MINING CORPORATION LTD.

(Latitude 50° 27'N., Longitude 121° 03'W., Elevation 4,600 feet)

LOCATION, ACCESS AND CLIMATE

The Lornex Mine is located on the southern slope of the Highland Valley at the western edge of the Interior Plateau.

Access to the property is by way of a 50-mile long partially paved road that joins the Trans Canada Highway at Kamloops or by a partially paved road 30 miles southeast of Ashcroft, British Columbia.

The ambient air temperature ranges from a mid-winter minimum of minus 29 degrees to a summer maximum of 85 degrees. Freezing conditions commence in late October and continue to early April. Snowfalls account for approximately one half of the 22 inches of annual precipitation, with the fallen snow cover reaching a maximum thickness of three feet during early March.

Lornex has developed its own townsite at nearby Logan Lake, which presently has a population of approximately 1,200 people. Most of the residents are employees of Lornex and have purchased their homes from the company.

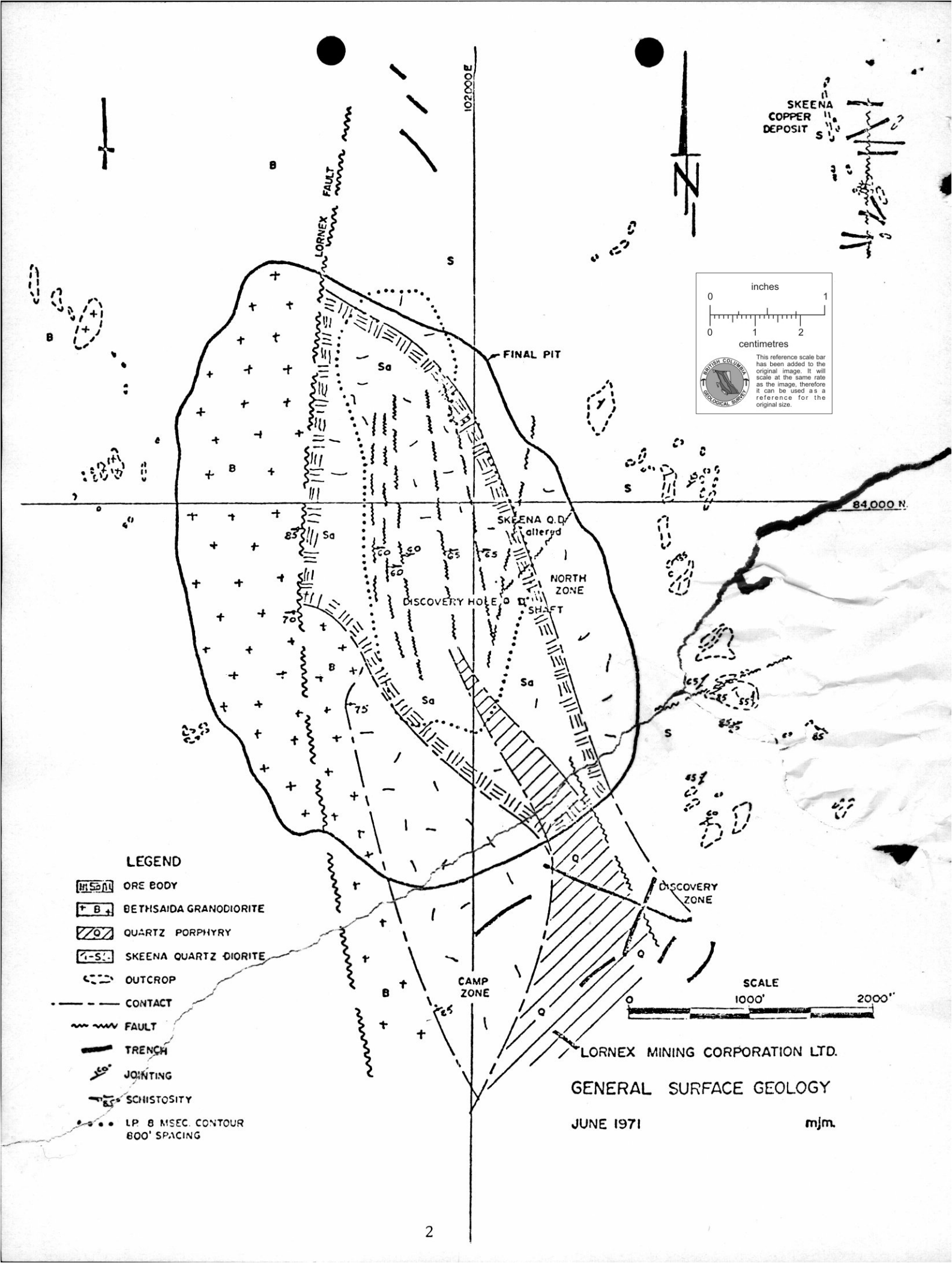
HISTORY AND OWNERSHIP

Extensive copper mineralization was discovered on the Lornex property by bulldozer trenching in 1964 by Mr. Egil Lorntzsen. Mr. Lorntzsen formed the Lornex Mining Corporation, and in 1965 under an agreement with Lornex, Rio Algom began an investigative program on the property. The program included geochemical sampling; induced polarization and magnetometer surveys; 86,000 feet of surface diamond drilling and 91,000 feet of percussion drilling. An underground bulk sampling program involving a 550 foot deep shaft and 2,618 feet of underground lateral development and a small open pit provided feed for a 100-ton per day pilot mill constructed on the property. Extensive use was made of computers to establish alternative open pit designs.

The Lornex orebody, as developed in the program described above, contains an estimated ore reserve of 293 million tons with an average grade of 0.427 percent copper at a nominal cut-off grade of 0.26 percent copper and 0.014 percent molybdenum.

The mine consists of a single large open pit and a mill originally designed to process 38,000 short tons per day, through its grinding and flotation sections.

The property is operated by Lornex Mining Corporation Ltd., which is 55 percent owned by Rio Algom Mines Limited of Toronto.


SKEENA COPPER DEPOSIT
102000E
LORNEX FAULT
FINAL PIT
84,000 N.
SKEENA Q.D. altered
NORTH ZONE
DISCOVERY HOLE
SHAFT
DISCOVERY ZONE
CAMP ZONE
inches
0 1
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centimetres
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LEGEND
ORE BODY
BETHSAIDA GRANODIORITE
QUARTZ PORPHYRY
SKEENA QUARTZ DIORITE
OUTCROP
CONTACT
FAULT
TRENCH
JOINTING
SCHISTOSITY
LP 8 MSEC. CONTOUR 800' SPACING
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LORNEX MINING CORPORATION LTD.
GENERAL SURFACE GEOLOGY
JUNE 1971
mjm.

GEOLOGY

The Lornex Copper-Molybdenum property is located in the heart of the Highland Valley in south-central British Columbia, adjoining Bethlehem Copper, Valley Copper and Highmont.

The deposit is classified as a complex porphyry type within the Guichon Granodiorite Batholith which forms a part of the interior plateau of British Columbia. The Batholith is elongated in a northwesterly direction and has a length of 40 miles by a width of 16 miles. It consists of a series of several major magmatic intrusives, in general having a concentric zonal arrangement and becoming younger inwards. The complex intrusive is of lower Jurassic age, approximately 198 million $\pm$ 8m. years old.

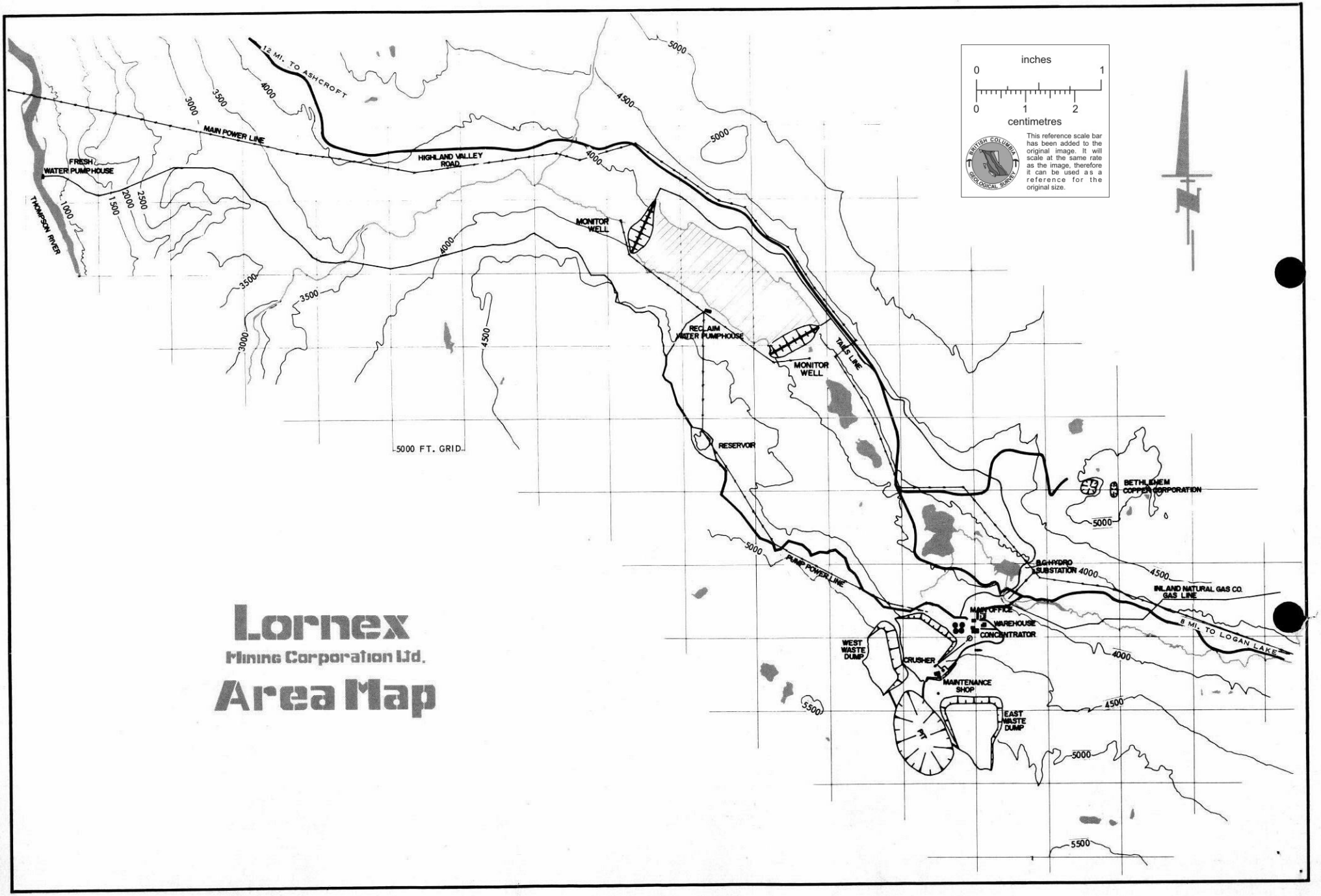
The Lornex orebody occurs in the Skeena Quartz Diorite or Bethlehem host rock, an intermediate intrusive phase of the Batholith at the contact of the Bethsaida Granodiorite, the youngest intrusive phase. The host rock is a medium to coarse grained equigranular rock distinguished by the interstitial quartz and the presence of moderate ferromagnesian minerals, mostly hornblende and biotite, averaging 15 percent of the total mineral content. The Quartz Diorite has been intruded by several younger dykes including a Quartz Diorite Porphyry, Bethsaida Quartz Porphyry and small basic to intermediate dykes.

A major north-south fault, steeply dipping west, called the Lornex fault cuts the orebody off to the west.

Several other parallel faults dip to the east at 60 degrees from the horizontal. The Lornex mineralized area is divided into three zones: the original Discovery Zone, Camp Zone, and the North Zone, or the main orebody.

The Lornex deposit is contained in a roughly elliptical area 4,000 feet in length, 1,600 feet in width and at least 2,000 feet in depth and still open. Its long axis trends northwesterly. The sulphide ore is comprised primarily of chalcopyrite, bornite and molybdenite with minor pyrite, magnetite, hematite, rhenium, asmium, gypsum, epidote, calcite and chlorite. An oxide zone up to 200 feet thick caps the orebody and is made up primarily of malachite with minor tenorite, chalcocite, covellite, azurite, siderite, cuprite and native copper. The mineralization occurs mainly as fracture fillings either in quartz carbonate veins up to a foot in width or along joints, slips and minute fractures and as sparesely disseminated mineralization generally replacing hornblende and biotite.

Fracture density and strong alteration appear to be keys to the higher grade copper-molybdenum values. The altered minerals include: Sericite, chlorite, clays and epidote.



Lornex

Mining Corporation Ltd.

Area Map

PROPERTY OPERATION

The surface layout of the Lornex Mine is shown in Figure 2, "Lornex Mining Corporation Ltd. Area Map". There are seven departments at the minesite, which function under the direction of the resident General Manager. As of December 31, 1973, the total company strength was 653 permanent people. This figure includes a small staff at the company's Vancouver office.

For the twelve-month period concluding December 31, 1973, Lornex mined and processed 14 million tons of ore grading 0.42 percent Copper.

MINING OPERATION

As of January 1, 1974, the open pit excavation encompassed an area of approximately three hundred and sixteen acres and extended to a depth of two hundred and eighty-five feet below the original surface. Waste dumps and stockpiles up to one hundred and fifty feet in height covered an additional four hundred and eighty-five acres.

Currently, weekly pit production, accounting for the removal of 733,000 tons of rock and scheduled over sixteen operating shifts, is achieved with the following design parameters:

Overburden Working Slope	20°
Bench Interval Height	40 feet
Safety Berms in Rock	between 10 and 100 feet
Working Space Slope	45°
Roadway Width	80 feet
Roadway Gradients	8%
Temporary Ramp Gradient	up to 10%
Minimum Pit Wall Curvature	radius not less than 80 feet
Blasthole Spacing	32 to 40 feet square pattern
Sub-grade Drilling	0 to 7 feet

Pit production equipment required for the removal of 29,000 tons of waste plus stockpiled material, and 17,500 tons of mill feed per shift, and the performance of that equipment, are presented by Table No. I "Mine Production Equipment".

TABLE NO. I

MINE PRODUCTION EQUIPMENT

FUNCTION	TYPE OF UNIT	NO. OF UNITS	SCHEDULED PER SHIFT	SHIFTS PER OPERATING DAY	OPERATORS PER UNIT	UNIT PERFORMANCE PER SHIFT
Blast Hole Drilling	Electric powered Rotary Drills 45-R Bucyrus-Erie	3	2	2	1	520 ft. of 9 7/8 ins. diameter hole
Rock Loading	Electric powered 15 cubic yard shovels					
	2100 B - P & H	4	4	3	1	16,400 tons
	280 B Bucyrus-Erie	1				
Rock Haulage	Diesel electric 120 T Rear dump trucks	23	17	3	1	3,200 tons
	Rear dump truck 3200 Wabco	1				
Dump Maintenance	Tracked dozers					
	D-8 Caterpillar	2	2	3	1	
	D-9 Caterpillar	2				
Shovel Cleanup	Tired dozers 280 Michigan	4	3	3	1	
Road Maintenance	Graders					
	14-E Caterpillar	3	3	3	1	
	16-E Caterpillar	1				
	Front-end loaders 5 - 5 cubic yard 988 Caterpillar	2	1	1	1	
	Tracked dozers D-8 Caterpillar	2	2	1	1	
	Watering or Sanding trucks 769 - 35 T Caterpillar	4	2	3	1	
Blasting	Explosive supply trucks	2	1	1	1	
	Dewatering truck	1	1	1	1	

Tabulation of Mine Operating Statistics:

Production

1. Pre-production Phase.

Overburden & Waste Rock	60.9 million tons
Stockpiled Ore	0.7 million tons
Mill Feed (Mill Tune-up)	2.7 million tons of .423 Copper

2. Production Phase (October 1972 through December 1973).

Overburden & Waste Rock	28.7 million tons
Stockpiled Low Grade	1.2 million tons
Mill Feed	16.9 million tons of .423 Copper

3. Production for Year Ending December 31, 1973.

Overburden & Waste Rock	23.3 million tons
Stockpiled Low Grade	1.2 million tons
Mill Feed	14.0 million tons of .422 Copper
Total Mined	38.5 million tons

Consumed Supplies for Year Ending December 31, 1973

1.	Blasting -	
	ANFO	0.5 million pounds
	Slurry	5.0 million pounds
	Primers	19,734
	Detonating Cord	1.3 million feet
2.	Diesel Fuel	1.8 million gallons
3.	Tires 30.00 x 51	189
4.	Electric Power	362.1 million Kilowatt hours.

The Pit Equipment Servicing and Mine Warehouse Facility, housed in a totally enclosed, heated structure 36,000 square feet in extent, is located adjacent to the open pit. This facility is equipped to provide the complete range of repair and maintenance requirements of the pit production equipment and the fleet of mine service vehicles.

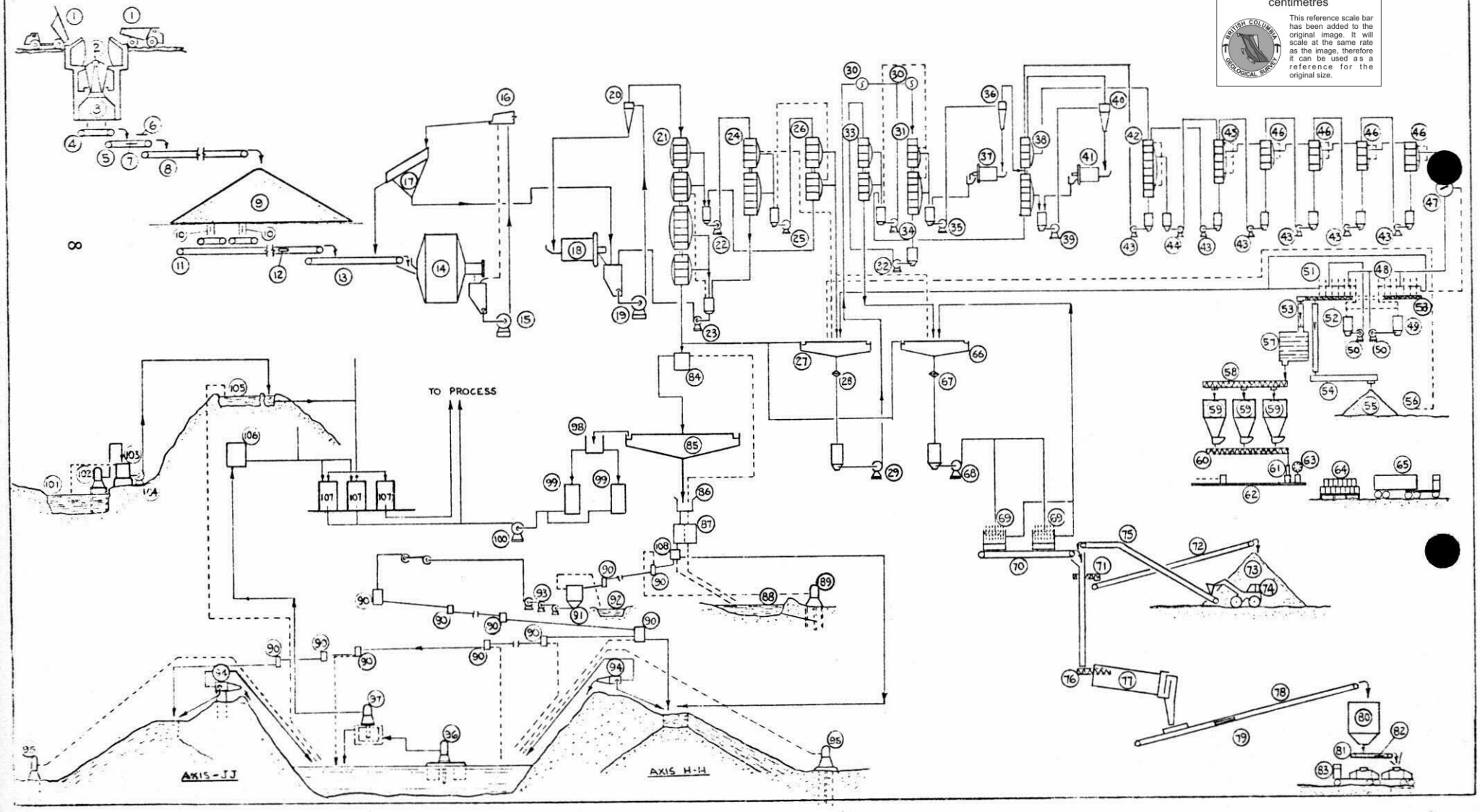
The Total Mining Crew Strength, of 251, (including maintenance, supervision and engineering control personnel) for the 17 shift per week operation is distributed as follows:

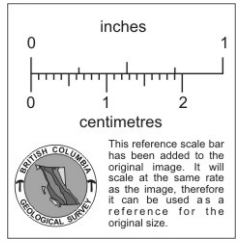
	PRODUCTION		MAINTENANCE	
	Hourly	Staff	Hourly	Staff
Drilling	4	1		
Blasting	4		17	4
Loading	15	7		
Hauling & Service Vehicles/Cats/Electrical	88		71	8
Apprentices	-	-	12	
Surveyors		4		
Engineers/Geologists/Planning/Clerical		9		3
Superintendents		3		1

LORNEX MINING CORPORATION LTD.

CONCENTRATOR DEPARTMENT - GENERAL PLANT AREA - PICTORIAL FLOWSHEET

(See Index, Pages 1 and 2)





1.	-	120 Ton truck, WABCO, Model 120A, Haul Pack, Rear Dump.
2.	ONE	60 x 89 ALLIS-CHALMERS Superior Gyratory Crusher, 700 HP
3.	ONE	Ore Pocket, 300-Ton Capacity.
4.	ONE	96" LINK BELT Apron Feeder, Manganese Pans.
5.	ONE	72" Belt Conveyor No. 1
6.	ONE	Metal Detector, RAMSEY, Model 30 - 24 TMD.
7.	ONE	Belt Scale, RAMSEY, VEY-R-WEIGH, Model 10-11.
8.	ONE	60" Belt Conveyor No. 2
9.	ONE	Ore Surgepile, 150,000 Ton Live Cap.
10.	EIGHT	48" FORANO Apron Feeder, Carbon
11.	TWO	42" Belt Conveyors Nos. 3A, 3B.
12.	TWO	Belt Scales, RAMSEY, VEY-R-WEIGH,
13.	TWO	48" Belt Conveyor Nos. 4A, 4B.
14.	TWO	32' DIA. x 15-1/2' LONG Semi Autogenous Mill, DOMINION ENGINEERING, each driven by twin 4,000 HP QUADRA Torque Motors.
15.	FOUR	G.I.W. 16 x 16 SRT 44 Screen Feed Pump.
16.	TWO	Splitter Box.
17.	FOUR	8' x 20' TYLER Vibrating Screen, 4-Mesh Screening Dec.
18.	FOUR	16-1/2' Dia. x 23" long BALL MILL DOMINION ENGINEERING, each driven by One 4,000 synchronous Motor.
19.	FOUR	G.I.W. 16 x 16 LGA 39 Cyclone Feed Pump.
20.	SIXTY	KREBS Cyclone, Model D20B, arranged in FOUR clusters of 16 Cyclones ea.
21.	72	DENVER 600-H Bulk Rougher Scavenger Flotation Cell, arranged in four banks of 18 cells each.
23.	SIX	DENVER SRL 10 x 8 Scavenger Concentrate Pump.
24.	TWENTY	DENVER 30 DR Bulk Cleaner Flotation Cells, arranged in 2 rows of 10 cells each.
25.	THREE	DENVER SRL 5 x 5 Cleaner Concentrate Pump.
26.	SIXTEEN	DENVER 30 DR Bulk Re-cleaner Flotation Cell, arranged in two rows of 8 cells each.
27.	ONE	85' Dia. Bulk Concentrate Thickener, DORR-OLIVER, Torque Type.
28.	TWO	DORR-OLIVER Diaphragm Pump, Model 6W.
29.	TWO	DENVER SRL 4 x 3 Bulk Concentrate Pump.
30.	TWO	5' Ø x 6' Moly Conditioning Tank.
31.	TEN	DENVER 24 DR Moly Rougher Flotation Cell.
32.	ONE	DENVER SRL 5 x 5 Moly Rougher Tails
33.	EIGHT	DENVER 24 DR Moly Scavenger Flotation Cell.
34.	ONE	DENVER SRL 5 x 5 Moly Scavenger Concentrate Pump.
35.	ONE	DENVER SRL 3 x 3 Moly Cyclone Feed Pump No. 1
36.	TWO	KREBS Cyclone, Model D6B.
37.	ONE	DENVER 5 x 10 First Moly Regrind Ball Mill.
38.	TEN	DENVER Sub-A No. 18 SR Flotation Cell, First & Second Moly Cleaner
39.	ONE	DENVER SRL 2-1/2 x 2" Moly Cyclone Feed Pump No. 2
40.	ONE	KREBS Cyclone, Model D6B.
41.	ONE	DENVER 5 x 6 Second Moly Regrind Ball Mill.
42.	EIGHT	DENVER Sub-A No. 15 Flotation Cell, Third Moly Cleaner Flotation Bank.
43.	SIX	DENVER SRL 1-1/2 x 1-1/4" Moly Cleaner Tail Pump Nos.3,4,5,6,7,8.
45.	SIX	DENVER Sub-A, No. 15 Flotation Cell, Fourth Moly Cleaner Flotation Bank.
46.	SIXTEEN	DENVER Sub-A No. 15 Flotation Cell, Moly Cleaner Nos. 5, 6, 7, 8 Flotation Banks.
47.	ONE	5,000 Gal. Moly Concentrate Surge Tank.
48.	ONE	DORR-OLIVER 6' Dia. x 6 Disc Moly Filter No. 1
49.	ONE	Repulper.
50.	TWO	DENVER SRL-2-1/2" x 2" Moly Wash Pump Nos. 1, 2.
51.	ONE	DORR-OLIVER 6' Dia. x 8 Disc Moly Filter No. 2
52.	ONE	Repulper.
53.	ONE	Moly Cake Ribbon Feed Screw No. 1.
54.	ONE	Moly Cake Ribbon Feed Screw No. 2.
55.	ONE	Moly Concentrate Emergency Floor Storage.
56.	ONE	Moly Filter Cake Sump Pump.
57.	ONE	4' Dia. x 4 Hearth Spinner Moly Concentrate dryer.
58.	ONE	Moly Conc. Ribbon Feed Screw No. 1.
59.	THREE	Moly Concentrate Storage Bin, Nos. 1, 2 and 3, 15 Ton each.
60.	ONE	Moly Concentrate Ribbon Feed Screw No.
61.	ONE	Moly Packer, HOWE-RICHARDSON, Auger Type.
62.	ONE	Roller Conveyor.
63.	TWO	Scale, HOWE-RICHARDSON, Model 100-32000.
64.	-	Moly Concentrate Temporary Drum Storage.
65.	-	Moly Concentrate Haulage Truck.

GENERAL PLANT AREA - PICTORIAL FLOWSHEET INDEX (Cont'd)

67.	TWO	DORR-OLIVER Diaphragm Pump, Model 6W.
68.	TWO	DENVER SRL 4 x 3 Copper Filter Feed Pump Nos. 1 and 2.
69.	TWO	8-1/2" Dia. x 7 Disc, DORR-OLIVER Copper Concentrate Filter.
70.	ONE	30" Belt Conveyor No. 5.
71.	ONE	Dryer Bypass Ribbon Feed Screw.
72.	ONE	24" Belt Conveyor No. 8.
73.	-	Emergency Copper Concentrate Storage.
74.	-	Front-End Loader.
75.	ONE	24" Belt Conveyor No. 8
76.	ONE	Copper Dryer Ribbon Feed Screw.
77.	ONE	8' Dia. x 48' Long Standard Copper Concentrate Rotary Dryer.
78.	ONE	24" Belt Conveyor No. 7.
79.	ONE	Belt Scale, RAMSEY VEY-R-WEIGH, Model 10-11.
80.	ONE	Copper Concentrate Storage Bin, 1,400 Ton Capacity.
81.	ONE	60" Feed Conveyor No. 9.
82.	ONE	Belt Scale.
83.	-	Copper Concentrate Haulage Truck.
84.	ONE	Tailing Thickener Feed Distributor.
85.	THREE	325' Dia. DORR-OLIVER Torque Type Tailing Thickener.
86.	ONE	Tailing Thickener Underflow Collection Box.
87.	ONE	Tailing Diversion Box.
88.	ONE	Tailing Emergency Pond.
89.	ONE	Tailing Emergency Pond Decant Pump.
90.	-	Drop Box.
91.	ONE	Tailing Pump Sump.
92.	ONE	Tailing Emergency Dump.
93.	TEN	G.I.W. 16 x 16 LSA 39 Tailing Pump.
94.	NINETY	12" Dia. Tailing Cyclone.
95.	SIX	Interceptor Well Pump.
96.	THREE	PEERLESS, Model 16HXB, Reclaim Water Barge Pump.
97.	THREE	PEERLESS Model 16 MC Reclaim Water Booster Pump.
98.	ONE	Tailing Thickener Overflow Collection Box.
99.	TWO	Mill Water Tank, 100,000 Gals.
100.	FOUR	ALLIS-CHALMERS 10 x 8, Model SJD Tailing Thickener Overflow Pump.
101.		Thompson River-Spatsum.
102.	THREE	PEERLESS Vertical River Intake Pump, 3,800 GPM each.
103.	ONE	Clearwell Tank, 1.5 Million Gallons.
104.	FOUR	BYRON JACKSON, 6 x 8 x 118, 9-Stage River Water Booster Pump.
105.	ONE	River Water Reservoir, 60 Million Gallons.
106.	ONE	Water Surge Tank, One Million Gallons.
107.	THREE	Water Head Tank, One Million Gallons each.
108.	ONE	Gravity Tailing Line, Diversion Box.

From Dwgs. 111-100-106
111-100-107

FG:fg - July 4, 1973.

MINERAL PROCESSING

The 38,000 dry short tons per day capacity processing plant is scheduled to operate continuously and in 1973, the average daily throughput was 38,320 dry short tons. This was achieved with an onstream efficiency of 85.78% compared to a design capacity factor of 90.0%. The hourly milling rate throughout 1973 averaged 1,861.30 dry short tons per hour or 930.65 dry short tons per autogenous mill line. The design hourly milling rate of the Concentrator was 1,760 dry short tons per hour, the equivalent of 42,200 dry short tons per day which approximates an average of 38,000 dry short tons per day with an onstream efficiency of 90%.

The 4,000 tons per hour nominal capacity single stage crushing plant section of the processing plant is presented diagramatically by Figure No. 3 "Concentrator Department - General Plant Area - Pictorial Flowsheet".

The sequential material flow through the grinding and flotation sections is schematically outlined by Figure No. 3. A general description of the process is as follows:

1. Run-of-mine ore is delivered to the crushing plant by 120-ton capacity end-dump trucks. The ore is reduced to 8-inch material in a single pass through an Allis-Chalmers 60-inch x 89-inch gyratory crusher. Crushed ore discharges to a 300-ton surge pocket under the crusher. From the ore pocket, material is transported by dual speed 96-inch apron feeder to a 72-inch collection belt conveyor and thence to a 60-inch belt conveyor which discharges to a coarse ore surge pile. The nominal capacity of the coarse ore surge pile is 450,000 dry short tons and design live capacity is 150,000 dry short tons.

2. Crushed ore from the coarse ore stockpile is reclaimed by two parallel lines of four variable speed 48-inch x 13-foot apron feeders. This coarse ore is fed directly to two identically arranged parallel grinding circuits at a feed rate of 900-1300 dry short tons per line.

   Primary grinding is achieved by two 32-foot diameter by 15 foot-6 inch D.E.W. semi-autogenous mills. The mills are equipped with a grate discharge followed by a trommel screen. Trommel discharge is jetted back into the mill and the undersize is pumped to a mechanical splitter to two 8-foot x 20-foot vibrating screens. The screen oversize is laundered to the feed-end of the autogenous mill. The screen undersize reports to the ball mill discharge sumps.

   The semi-autogenous mills are driven by two 180 revolutions per minute, 4,000 horsepower, quadra torque motors. The mills rotate at 10.0 revolutions per minute or 73.2% of critical speed.

   The secondary circuit is comprised of two 16-1/2 foot diameter by 23-foot ball mills for each autogenous mill. Each of the four secondary mills operate in a closed circuit with a cyclone cluster containing sixteen D20B Krebs cyclones. The respective screen

undersize, ball mill discharge, and scavenger flotation product is classified in the cyclone cluster with the underflow reporting to the ball mill. The overflow nominally at 38% solids with 80% passing 149 microns, reports by gravity to four parallel rougher-scavenger flotation banks.

The secondary grinding mills are driven by synchronous 180 revolutions per minute, 4,000 horsepower motors through a Fawick air clutch. The mills rotate at 14.14 revolutions per minute or 74.2% of critical speed.

3. The primary flotation process in the Lornex concentrator produces a bulk concentrate containing both copper and molybdenum values. The bulk flotation circuit consists of a rougher-scavenger section followed by two stages of cleaning. Each bank of rougher-scavengers contains eighteen Denver 600-H-DR flotation machines, eight of which are roughers and ten of which are scavengers.

   The scavenger concentrate is returned to the grinding circuit and the rougher product is cleaned and recleaned in two parallel circuits of ten and eight Denver 30-DR units, respectively.

   The cleaner tailing combines with the scavenger product and the recleaner tailing are fed into the cleaner circuit. Final bulk recleaner concentrate is dewatered in an 85-foot thickener prior to copper-molybdenum separation.

   Tailings from each of the four rougher scavenger banks, nominally at 0.04% Cu, is collected in a common sump and transported to the tailings thickeners for dewatering prior to disposal via our recently commissioned gravity tailings line to the tailings pond.

4. Dewatered bulk concentrate, at 40-60% solids, is fed to two conditioners which precede the molybdenum-copper separation plant. The copper concentrate is depressed with Moly L (Anamol D), and molybdenite floated with fuel oil in ten Denver Sub-A No. 24 rougher cells and eight Sub-A No. 24 scavenger cells. Rougher concentrate is reground in a 5-foot diameter by 10-foot Denver ball mill, cycloned and cleaned in six No. 18 Denver Specials. The first cleaner tailings is recirculated to plant feed and the first cleaner concentrate is reground in a 5-foot diameter by 6-foot Denver ball mill, cycloned and cleaned in four No. 18 Denver Specials. Six additional cleaning stages (No. 15) complete the circuit and pulp flow is counter current with the tailings returning to the previous cleaning stage and the concentrate going to the successive cleaning stage.

   The process flow is outlined schematically in Figure No. 4 "Moly Plant Flow sheet".

Final molybdenite concentrate from the eighth cleaning stage, averaging 55.00% Mo, 0.80% Cu, and .014% Pb, is transferred to a holding stock tank. The slurried concentrate is pumped to the concentrate filtration plant where a single disc filter (6 foot) is utilized to dewater the concentrate prior to drying in a Skinner multiple-hearth dryer.

The tailings product from the molybdenite flotation plant is the final copper concentrate. This material flows by gravity to a 100-foot diameter thickener for dewatering prior to filtration.

5. Underflow from the final copper thickener is pumped to two 8-1/2 foot diameter by 7-disc Dorr-Oliver-Long filters. The filtered product, normally at 12 - 14% moisture, is conveyed to an 8-foot diameter by 48-foot, natural gas-fired, parallel-flow rotary dryer. Dryer discharge, at 7% moisture, 33% Cu and 14% insol, is conveyed to a 1400-ton storage bin from whence it is trucked to Ashcroft for rail transportation to Vancouver to await marine transportation to off-shore smelters.

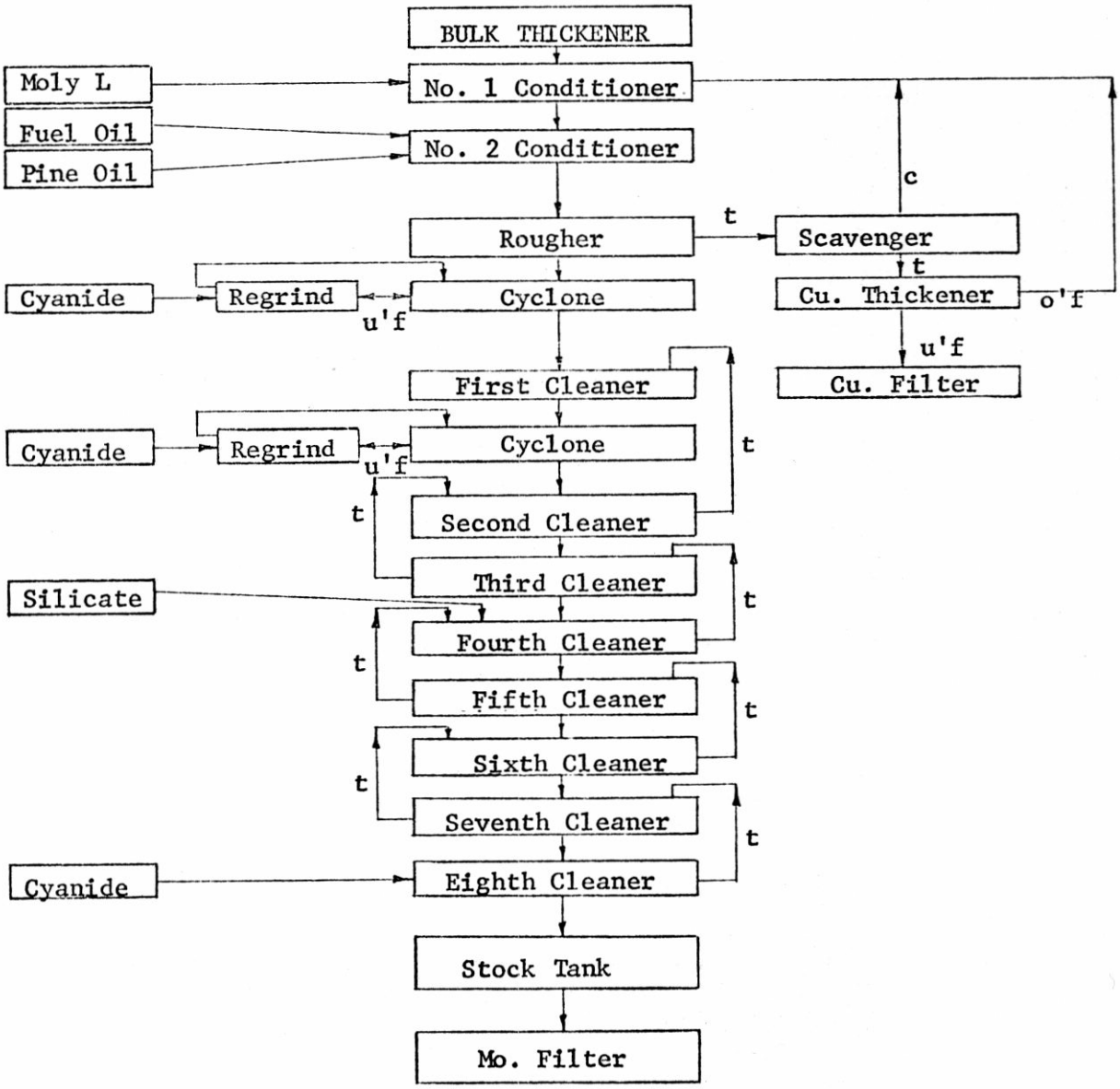
The Milling Statistics for the twelve-month period ending December 31, 1973, are as follows:

Total Mill Feed	13,986,958 dry short tons at .424% Cu, and .0173% Mo
Concentrate Produced	155,413.3 dry short tons of copper concentrate at 34.098% Cu, and 3,196.79 dry short tons of Molybdenite Concentrate, at 54.39% mo
Overall Copper Recovery	89.45%
Overall Molybdenum Recovery	71.27%
Power Consumption (Grinding Circuit)	12.237 Kilowatt hours per ton of mill feed
Grinding Media	Primary Circuit - 0.58 pounds per ton milled Secondary Circuit - 1.05 pounds per ton milled
Reagent Usages:	
Bulk Flotation	
Collector (S.I.X.)	.008 pounds per ton milled
Collector (P.A.X.)	.007 pounds per ton milled
Frother (Dow-250)	.030 pounds per ton milled
Frother (Pine Oil)	.087 pounds per ton milled
Lime	2.17 pounds per ton milled
Flocculant (polyacryl)	.013 pounds per ton milled

FIGURE 4

LORNEX MINING CORPORATION LTD.

MOLY PLANT FLOWSHEET



Moly Flotation Depressant (Moly L)*	20.57 pounds per ton of copper concentrate
Depressant (NaCn)	9.87 pounds per ton of copper concentrate
Collector (Fuel Oil)	2.76 pounds per ton of copper concentrate
Dispersant (Na_2SiO_3)	0.50 pounds per ton of copper concentrate

* Arsenic Trioxide + Sodium Sulphide

Mineral Processing Operating Crew Strength - 176

	Hourly Rated	Staff
Operators	74	10
Maintenance	57	8
Metallurgy and Assaying	5	20
Superintendents		2
	136	40

Concentrator operations are monitored and, where practical, controlled from a central room. Tonnage recorders, water addition controllers, electric power draw detectors, mill hydrostatic pressure recorders, mill-bearing remote temperature detectors, sump level controllers, process alarm annunciators, density gauges, and equipment motor status lights are incorporated throughout the operation to provide maximum efficiency.

Tailings from the copper scavenger flotation flow by gravity through a short section of 36-inch plastic pipe to a pulp splitter for distribution to three centre drive 325-foot diameter thickeners. The thickeners are equipped with automatic rake-lifting devices. Thickened tailings at about 45 percent solids are piped to a central collection box through concrete tunnels under each tank.

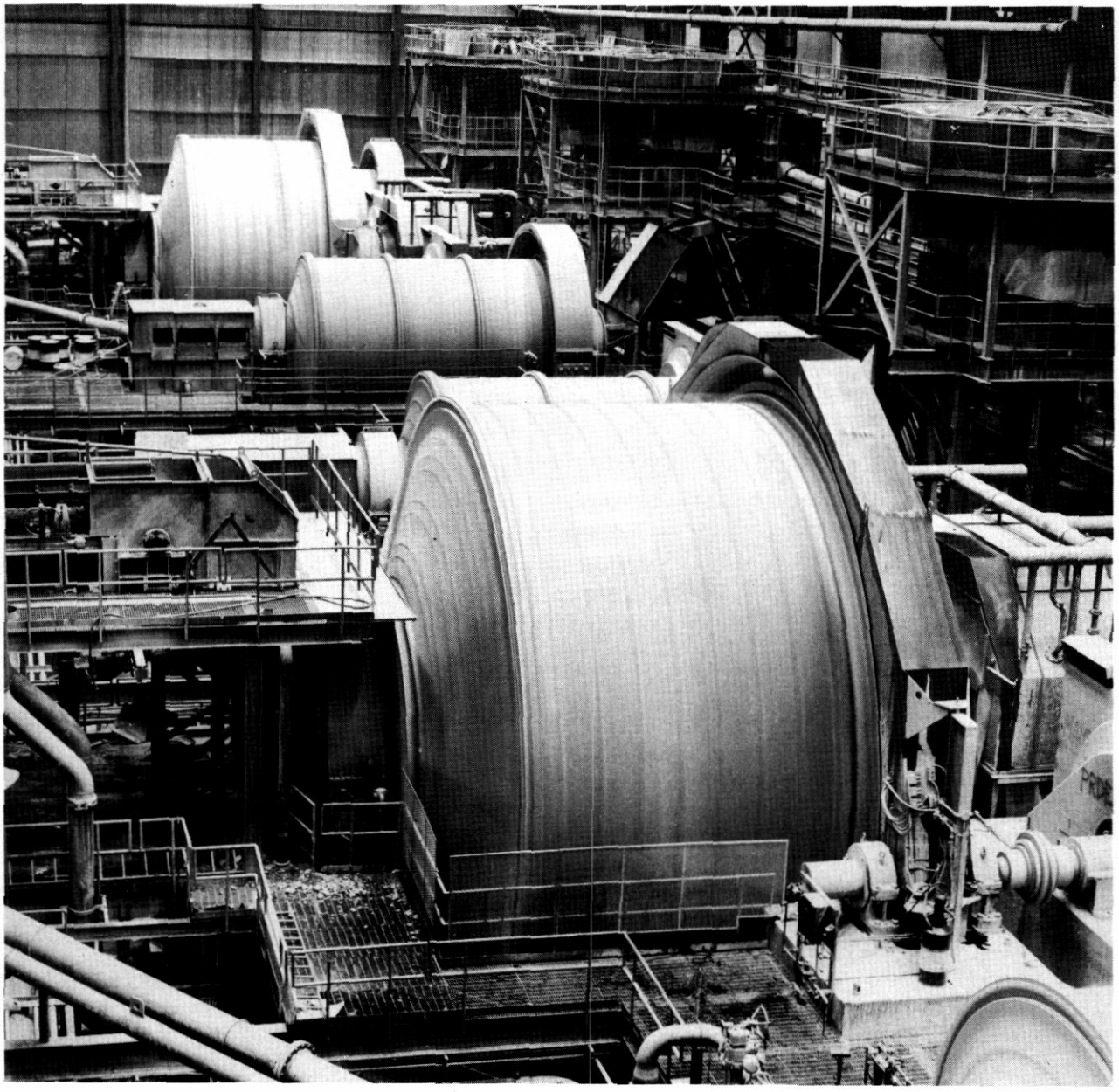
The combined underflows are conveyed through one of two 36-inch diameter pipes to a diversion box. This box is equipped with pneumatically operated knife gates to divert all or part of the flow to an emergency storage area in the event of operating difficulties with the tailings disposal system. From the diversion box, the tailings flow by gravity through 2,000 feet of 36-inch asbestos concrete line to a dropbox.

At the dropbox outlet, a 30,000 United States gallons per minute capacity Sclair pipe (plastic) gravity disposal line transports final tailings to the impoundment area. The line has a total length of 23,800 feet, the first 800 feet of which is 28-inch outside diameter installed at a 9% slope. The remainder of the line is 36-inch outside diameter with a gradient of .2 percent.

Tailings are deposited in a delta at the inside toe of the upstream earthfill tailings dam.

The compacted zoned earthfill starter dams will be raised to maintain a minimum flood storage capacity of 16,000 acre feet as required by pollution control permits. During initial stages the dams will be raised from borrow material, with a compacted till core, compacted outside shell and an uncompacted inner shell. During later stages, the dams will be raised continuing the compacted till core from borrow using compacted cycloned sand for the outer shell and non-compacted cycloned sand for the inner shell.

In addition to deep well monitoring pumps at the downstream toe of the east and west tailings dam, floating barge-mounted pumps deliver tailings pond supernatant to two booster pumps which feed reclaim water to three 1,000,000-gallon mill water head tanks. Total mill water is comprised of the above, raw water from the Thompson River and tailings thickener overflow.



Autogenous grinding and ball mills in the concentrator of Lornex Mining Corporation.

GEOLOGY OF THE LORNEX DEPOSIT

By J. M. Carr
(adapted from Minister of Mines and Petroleum Resources, B.C., Annual Report, 1966)

Lornex Mining Corporation Ltd. controls about 200 recorded mineral claims which extend southward from Indian Reserve No. 13 in the Highland Valley. Exploration of the property since 1965 has been financed by Rio Algom Mines Limited in association with The Yukon Consolidated Gold Corporation Ltd., which took options on treasury shares and thereby gained control of the company at the end of 1966. A very large low-grade deposit of copper and molybdenum was outlined by pattern drilling at a distance of about 4 miles southwest of the Bethlehem mine and in 1966-67 the deposit was bulk-sampled from a 550-foot deep shaft and lateral workings, employing a newly erected 100-ton pilot mill. A trial pit was also made on the deposit.

The following notes are based on a four-day examination of surface exposures and drill core made in July and supplemented by maps and other information kindly supplied by the company. As well as showing the geology, Figure 5 shows the location of diamond-drill holes then completed and of most of the trenches on the North and Discovery zones. Some trenches failed to reach bedrock, and others were partly caved at the time of examination and afforded exposures as indicated. Later drilling on the North zone, which is the main part of the deposit so far as known, was partly on intermediate lines spaced at 400 feet and partly on lines farther to the south. Holes on line No. 3N are 800 feet south of those on line No. 11N and are reported to show a probable connection between the North and Discovery zones, which together may form a deposit 5,000 feet long in a southeasterly direction and in places as much as 1,600 feet wide. The maximum elevation of mineralized outcrops is 5,200

feet, and the deepest mineralized intersections are at 3,625 feet elevation, giving a known vertical range of mineralization of nearly 1,600 feet. Superficial deposits as much as 250 feet deep overlie the western part of the North zone, roughly along Award Creek, where they occupy a glacial valley from which at some stage meltwater escaped eastward and cut bedrock channels that are conspicuous topographic features at the Discovery zone.

The Lornex deposit occurs in the Bethlehem (Skeena) quartz diorite partly at the eastern contact of a younger stock of the Bethsaida granodiorite. In holes Nos. 20 and 21 the contact is steeply and strongly faulted in a northerly direction and is the western limit of strong alteration and mineralization. Its position is inferred nearly 1 mile farther south, between holes Nos. 4 and 6, which are outside the deposit and show the two rocks as mineralized about equally. Existing maps suggest that here the contact possesses a northwesterly strike.

The mineralized rocks are strongly fractured and altered. Altered quartz diorite is partly darker and partly lighter than the fresh rock, and it contains quartz grains that are enlarged by silicification. Pink perthitic orthoclase feldspar remains largely unaltered, whereas plagioclase becomes either chalky or yellow. Hornblende and some of the biotite are chloritized. Elsewhere biotite is partly bleached and in places new biotite is formed. Quartz fills abundant fractures, mostly as slender veins that are margined by sericite and chlorite and by silicified and argillized rock. The veins and fractures contain sulphides as well as coarse sericite, or calcite and zeolites which are variously pink and white in colour. A late generation of quartz veins is barren of sulphides. Faults are numerous in the drill-holes and mostly possess gouge which is either sericitic or chloritic and calcitic. The walls of the faults are extensively altered and commonly mineralized. Evidence of post-mineral

movement is seen in crushed sulphides and quartz veins. Fault attitudes are poorly known, but a 30-foot-wide fault exposed at the Discovery zone has a northwesterly strike and a steep dip.

Bornite, chalcopyrite, pyrite, and molybdenite occur mostly in or close to quartz-filled fractures, either as stringers or as disseminations which may be quite coarse. Locally the sulphides are well crystallized in voids. Eastward near the edge of the North zone the assemblage bornite, chalcopyrite, and molybdenite gives way to chalcopyrite, pyrite, and molybdenite. Partial oxidation of sulphides has produced limonite, malachite, azurite, tenorite, cuprite, and locally native copper generally at shallow depths and without causing appreciable supergene enrichment. Due no doubt to glacial erosion, the oxidized surface zone is missing from the western part of the deposit.

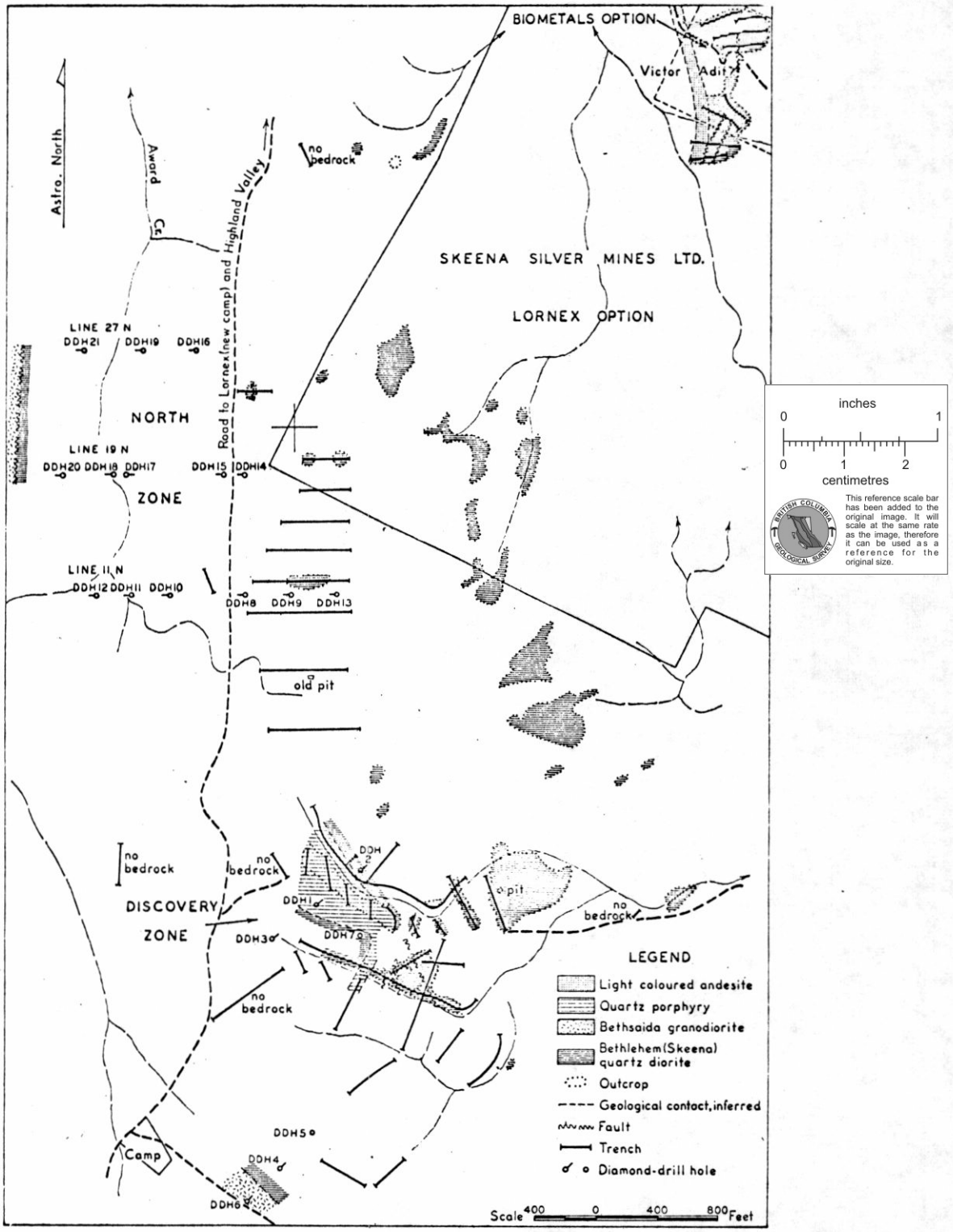


Figure 5 Lornex Mining Corporation Ltd. Geological map of part of the Lornex.

TO THE SHAREHOLDERS:

Consolidated net earnings for the first six months of 1975 were $15,627,000 compared to $29,408,000 for the same period in 1974. The comparative net earnings per common share were $1.25 and $2.37 respectively. The foregoing earnings per share figure for 1975 does not reflect the results of the rights issue that was completed during July, the dilutive effect of which would not be material.

The sharp decline in earnings in 1975 was due mainly to substantially lower copper prices realized at the Lornex copper-molybdenum mine (59.85% owned by Rio Algom) and at the wholly-owned Mines de Poirier copper mine, as well as to a higher effective rate of taxation. Lower copper prices were also the main reason for the slight decrease in revenue as compared to the first half of 1974, more than offsetting increases in revenue from uranium mines and steel operations.

Revenue and pre-tax earnings from uranium operations increased in the first half of 1975 as compared to the same period in 1974. Uranium production at Elliot Lake continues slightly below the level achieved in the comparable period last year primarily because of the continuing shortage of underground miners.

Revenue and earnings at Lornex were much lower in the first half of 1975 as compared to the similar period in 1974 primarily because of substantially lower copper prices. As previously announced by Lornex production levels at the mine have been reduced in 1975 due to the oversupply of copper concentrates and copper metal which is particularly acute in Japan where most of the Lornex production is sold.

Revenue and earnings at the Mines de Poirier copper mine were substantially lower in the first half of 1975 mainly due to lower copper prices. Production was slightly higher than in the first half of 1974 due to improved grades; the better grades resulted from mining areas of higher grade ore as the mine neared the end of its productive life. The economically recoverable ore reserves have been mined out and the mine closed down on June 27, 1975.

Steel revenue was slightly higher in the first half of 1975 but earnings were lower, primarily due to continued escalation of operating costs. Steel market conditions deteriorated during the early part of the year; although there are now signs of improvement in some product lines, it is expected that their effect will be mitigated in the third quarter by the seasonably lower level of business activity which normally prevails during this period.

The Company's board of directors has approved the expenditure of $76 million for the first phase expansion of the Elliot Lake uranium mining operations. This will result in the expansion of the milling rate at the Quirke property from the present 4500 tons per day to approximately 7000 tons per day by the end of 1978. The Company has also embarked on a long term housing program, the first phase of which will entail an expenditure of $5 million in 1975.

At a meeting held on May 2, 1975, the holders of Rio Algom's Series A debentures approved modifications to certain provisions of the original indenture relating thereto which will assist Rio Algom to continue its expansion program. As consideration for approval of these modifications the interest rate on the Series A debentures was increased from 5¾% to 6¾% per annum effective April 1, 1975, and the annual sinking fund payments were increased, in each of the years 1975 to 1978 from $2.0 million to $3.0 million, and in each of the years 1979 to 1982 from $2.5 million to $3.0 million.

In June, 1975, Rio Algom offered to the holders of its outstanding common shares, other than shareholders in the United States of America, the right to subscribe for one additional common share for each ten common shares held of record at the close of business on June 13, 1975 at a subscription price of $21.00 per share. At the closing date of July 11, 1975 subscriptions had been received for over 99% of the common shares offered, which resulted in net proceeds of slightly more than $25 million. Concurrently with the rights offering, $50 million principal amount of 11½% Sinking Fund Debentures Series B maturing July 15, 1995 were issued yielding net proceeds of approximately $49 million. The net proceeds of both issues together with funds generated from operations will be used for general corporate purposes including capital expenditures required for the expansion of the Elliot Lake uranium mining operations, the expansion of steel operations and pollution control programs.

Further investigative work has been initiated on the Sage Creek coking coal property in southeastern British Columbia in which ownership is held 60% by the Company and 40% by Pan Ocean Oil Limited. A program estimated to cost approximately $2.3 million in 1975 is being undertaken which will be funded by the Company and Pan Ocean in the ratio of their respective ownership.

As previously announced a letter of intent had been received from Washington Public Power Supply System (Washington PPSS) in the United States of America for the sale and purchase of uranium oxide. A formal agreement has now been concluded with Washington PPSS providing for the sale in 1975 of 1,000,000 pounds of uranium oxide in concentrate. This agreement is subject to Canadian governmental approval.

As indicated in the 1974 Annual Report, it is expected that the Company's net earnings will be influenced in the near term by the depressed state of the world copper markets, the change in demand for stainless and some specialty steel products and the effect of rapidly escalating costs.

R. D. ARMSTRONG
Chairman and
Chief Executive Officer

G. R. ALBINO
President and
Chief Operating Officer

Toronto, Canada
July 31, 1975.

RIO ALGOM LIMITED
CONSOLIDATED STATEMENT OF EARNINGS

for the six months ended June 30, 1975
($000's omitted)

	1975	*1974*
Revenue:		
Revenue from mine production and sales of steel and other products	$191,826	$204,409
Investment and other income	1,173	3,009
	192,999	207,418
Expenses:		
Cost of mine production and steel sales	120,443	107,461
Selling, general and administration	18,369	16,115
Interest	3,509	4,894
Depreciation and amortization	10,837	10,742
Exploration	2,142	1,388
	155,300	140,600
Earnings before taxes and minority interests	37,699	66,818
Income and mining taxes and government royalty	21,822	28,172
Earnings before adjustment for minority interests in subsidiary company	15,877	38,646
Minority interests in profits of subsidiary	250	9,238
Net earnings for the period	$ 15,627	$ 29,408
Earnings per common share	$ 1.25	$ 2.37

The earnings per common share are calculated after providing for dividends on first preference shares and are based on the average number of common shares outstanding during the respective periods.

Approved on behalf of the Board:
R. D. Armstrong, Director
G. R. Albino, Director

Subject to year end audit and adjustments.

RIO ALGOM LIMITED
CONSOLIDATED STATEMENT OF CHANGES IN FINANCIAL POSITION

for the six months ended June 30, 1975
($000's omitted)

	1975	*1974*
Source of funds:		
Earnings before adjustment for minority interests in subsidiary company	$ 15,877	$ 38,646
Add items included in earnings not involving current outlay of funds:		
Depreciation, amortization, and other charges (net)	11,298	10,676
Deferred income and mining taxes	4,258	5,550
Funds provided by operations	31,433	54,872
Issue of common shares under stock option plan	37	61
Housing loans of subsidiary (net)	140	132
	31,610	55,065
Disposition of funds:		
Expenditures (net) for plant and equipment, mining properties and pre-production	9,399	4,212
Dividends on common shares	6,744	6,131
Dividends on preference shares	346	366
Purchase of minority shareholders' interest in subsidiary company	1,258	—
Purchase of preference shares for cancellation	99	220
Investment in affiliated company	1,500	952
Reduction of long term debt:		
Rio Algom Limited debentures	1,000	1,580
Bank loans of subsidiaries	625	29,325
8¾ % Notes of subsidiary	5,835	4,911
	26,806	47,697
Increase in Working Capital	**4,804**	**7,368**
Working Capital, beginning of period	155,024	133,429
Working Capital, end of period	**$159,828**	**$140,797**

Rio Algom
Rio Tinto

92 ISW045 (6E)

Rio Algom Limited

Interim Report to the Shareholders

For the six months ended June 30, 1975

TO THE SHAREHOLDERS:

Net earnings for the first three months of 1975 were $113,000 compared with $9,437,000 for the same period in 1974. The comparative earnings per share of common stock were $0.01 and $1.15 respectively.

The sharp decrease in net earnings was due primarily to substantially lower copper prices. Copper prices were unusually high during the first five months of 1974 with the peak being reached in April and May of that year. In contrast, prices have been substantially lower throughout the first quarter of 1975.

Copper production was up slightly in the first quarter compared to last year's first quarter; copper grade was moderately higher and offset the drop in average milling rate to 37,165 tons per day compared to 38,831 tons per day in the first quarter of 1974. One mill line did not operate for the month of January 1974 because of an electrical failure and therefore adversely affected production for the first quarter of 1974.

World-wide demand for copper has been substantially depressed since mid-1974, and the Japanese smelting industry, in particular, has serious economic difficulties. As a result, the Japanese companies to whom Lornex concentrates are sold have not taken delivery of copper from Lornex at the rate being produced. In response, as previously reported, production levels have been reduced at the Lornex mine in the first quarter and reductions will continue for the balance of 1975.

Lornex is one of many major suppliers to the Japanese market who have reduced production levels and deliveries to that country. Other copper producers throughout the world, particularly in the United States, also have reduced production levels in line with reduced copper consumption.

One copper concentrate delivery was made to Japan in February 1975. A delivery of approximately 12 million payable pounds of copper in concentrates scheduled for March 1975 has been deferred until late April because of the longshoremen's strike at the port of Vancouver. As a result, Lornex inventories have increased further and totalled 61 million payable pounds as at March 31, 1975.

The high inventory level will be somewhat reduced by the April shipment to Japan and, in addition, with the concurrence of the Japanese customers, negotiations are under way for the sale and delivery to a third party of a large portion of the accumulated inventory over a period of some months on a schedule to be determined.

As foreseen in the 1974 Annual Report, the reduction in production, together with continued low copper prices, escalating operating costs and increased taxes and royalties have had a major adverse impact on Lornex' earnings for the first quarter. No material improvement is foreseen in the Company's earnings prospects for the balance of 1975 unless copper prices improve materially.

R. D. ARMSTRONG,
President and Chief Executive Officer

April 22, 1975

LORNEX MINING CORPORATION LTD.
STATEMENT OF EARNINGS

for the three months ended March 31, 1975

($000's omitted)

	1975	*1974*
Revenue:		
Revenue from mine production	$16,298	$31,169
Less smelting, refining and marketing charges	2,687	4,663
Net revenue	13,611	26,506
Investment income	122	163
	13,733	26,669
Expenses:		
Operating costs	6,684	5,698
Administrative and general expenses	1,386	1,294
Amortization and depreciation	1,493	2,110
	9,563	9,102
Operating profit	4,170	17,567
Interest on long term debt	1,783	2,488
Earnings before taxes and government royalty	2,387	15,079
Income and mining taxes and government royalty	2,274	5,642
Net earnings for the period	**$ 113**	**$ 9,437**
Earnings per common share	**$ 0.01**	**$ 1.15**

The earnings per common share have been calculated on the weighted average number of common shares outstanding during the periods.

Approved on behalf of the Board:
R. D. Armstrong, *Director*
G. R. Albino, *Director*

Subject to year-end audit and adjustments.

LORNEX MINING CORPORATION LTD.
STATEMENT OF CHANGES IN FINANCIAL POSITION

for the three months ended March 31, 1975

($000's omitted)

	1975	*1974*
Source of Funds:		
Operations		
Net earnings for the period	$ 113	$ 9,437
Add charges against earnings not involving current outlay of funds:		
Amortization and depreciation	1,493	2,110
Interest on Income Debentures, etc.	1,285	1,181
Deferred income and mining taxes	1,727	747
Total funds from operations	4,618	13,475
Housing loans (net)	61	148
Issue of common shares under stock option plan	—	9
	4,679	13,632
Disposition of Funds:		
Expenditures on plant and equipment	381	251
Buyback of houses (net)	62	200
Reduction of long term debt 8¾% Notes	1,525	—
Bank loans	—	12,334
	1,968	12,785
Increase in Working Capital	**2,711**	**847**
Working Capital, beginning of period	26,056	21,125
Working Capital, end of period	**$28,767**	**$21,972**

Lornex

Lornex Mining Corporation Ltd.

Interim Report to the Shareholders

for the three months ended March 31, 1975

TO THE SHAREHOLDERS:

Net earnings for the first six months of 1975 were $622,000 compared with $21,068,000 for the same period in 1974. The comparative earnings per share of common stock were $0.08 and $2.56 respectively.

The sharp decrease in net earnings was due primarily to substantially lower copper prices. Copper prices were unusually high during the first half of 1974 with the peak being reached in April and May of that year. In contrast prices have remained at a very low level throughout the first half of 1975.

Although tonnage milled decreased substantially as planned, total operating costs were higher in 1975 than in 1974 primarily due to escalation of unit costs.

Copper production for the first six months of 1975 was slightly lower than in the comparable period in 1974. Copper grade was higher this year and largely offset the planned reduction in average milling rate to 35,431 tons per day from 43,008 tons per day for the first half of 1974.

The comparative milling, metallurgical and production data for the first six months of each year were as follows:

	1975	*1974*
Tons of ore milled (thousands)	6,413	7,785
Average tons milled per day	35,431	43,008
Average mill head grade		
— copper	0.502%	0.425%
— molybdenum	0.017%	0.019%
Average mill recovery		
— copper	87.6%	89.4%
— molybdenum	79.4%	74.0%
Pounds of payable metal in concentrate produced (thousands)		
— copper	54,284	57,069
— molybdenum	1,694	2,131
Ounces of silver produced (thousands)	220	204
Ounces of gold produced	147	334

As previously reported world-wide demand for copper has been severely depressed since mid-1974 and the Japanese smelting industry in particular has had serious economic difficulties. As a result the Japanese companies, to whom Lornex concentrates are normally sold, have not taken delivery of copper from Lornex at the rate it is being produced. Production levels at the Lornex mine have accordingly been reduced in the first half of 1975 and reductions will continue for the balance of the year. Other copper producers throughout the world, particularly in the United States, have also reduced production levels in line with the reduced demand for copper.

Arrangements have been completed for the delivery and sale to a third party of a large portion of the accumulated inventory over a period of some months on the basis of approximately equal monthly deliveries. As at June 30, 1975 some 5.3 million payable pounds of copper in concentrate had been delivered under these arrangements. In addition two copper concentrate deliveries to Japan, containing 25.3 million payable pounds, were made during the second quarter of 1975. As a result, inventories of copper in concentrate have been reduced from the peak level of 61 million payable pounds as at March 31, 1975 to 56 million payable pounds as at June 30, 1975.

A repayment of $5.8 million was made on the 8¾% Notes in May, 1975 reducing the outstanding balance to approximately $17 million. Further repayments totalling some $5.9 million are due on August 15 and November 15, 1975.

R. D. ARMSTRONG,
President and Chief Executive Officer

July 29, 1975

LORNEX MINING CORPORATION LTD.

STATEMENT OF EARNINGS

For the six months ended June 30, 1975
($000's omitted)

	1975	*1974*
Revenue:		
Net revenue from mine production	$27,440	$53,634
Investment and other income	571	2,290
	28,011	55,924
Expenses:		
Operating costs	13,188	11,983
Administrative and general expenses	2,792	2,452
Amortization and depreciation	2,928	4,595
	18,908	19,030
Operating profit	9,103	36,894
Interest on long term debt	3,549	4,826
Earnings before taxes and government royalty	5,554	32,068
Income and mining taxes and government royalty	4,932	11,000
Net earnings for the period	**$ 622**	**$21,068**
Earnings per common share	**$ 0.08**	**$ 2.56**

The earnings per common share have been calculated on the weighted average number of total shares outstanding during the periods.

Approved on behalf of the Board:

R. D. Armstrong, *Director*

G. R. Albino, *Director*

Subject to year end audit and adjustments.

LORNEX MINING CORPORATION LTD.

STATEMENT OF CHANGES IN FINANCIAL POSITION

For the six months ended June 30, 1975
($000's omitted)

	1975	*1974*
Source of Funds:		
Operations		
Net earnings for the period	$ 622	$21,068
Add charges against earnings not involving current outlay of funds:		
Amortization and depreciation	2,928	4,595
Interest on Income Debentures, etc.	2,611	2,401
Deferred income and mining taxes	3,818	3,650
Total funds from operations	9,979	31,714
Housing loans (net)	140	132
Issue of common shares under stock option plan	—	9
	10,119	31,855
Disposition of Funds:		
Expenditures on plant and equipment	1,346	700
Buyback of houses (net)	168	186
Reduction of long term debt		
8¾ % Notes	5,835	4,911
Bank loans	—	29,325
	7,349	35,122
Increase (Decrease) in Working Capital	2,770	(3,267)
Working Capital, beginning of period	26,056	21,125
Working Capital, end of period	**$28,826**	**$17,858**

Lornex

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Lornex Mining Corporation Ltd.

Interim Report to the Shareholders

For the six months ended June 30, 1975

TO THE SHAREHOLDERS:

Consolidated net earnings for the first three months of 1975 were $8,281,000 compared to $14,779,000 for the same period in 1974. The comparative net earnings per common share were $0.66 and $1.19 respectively.

The sharp decline in earnings in 1975 was due mainly to substantially lower copper prices realized at the Lornex copper-molybdenum mine, 58.21% owned by Rio Algom, and at the wholly-owned Mines de Poirier copper mine. Lower copper prices were also the main reason for the slight decrease in revenue as compared to the first quarter of 1974, more than offsetting increases in revenue from uranium mines and steel operations.

Revenue and pre-tax earnings from uranium operations increased in the first quarter of 1975 as compared to the same period in 1974. Uranium production at Elliot Lake was slightly lower than in the first quarter of 1974 primarily because of the continuing shortage of underground miners.

Revenue and earnings at Lornex were much lower in the first three months of 1975 as compared to the similar period in 1974 primarily because of substantially lower copper prices. As previously announced by Lornex, production levels at the mine have been reduced in 1975 due to the world oversupply of copper concentrates and copper metal which is particularly acute in Japan where the Lornex production is sold.

Revenue and earnings at the Mines de Poirier copper mine were substantially lower in the first quarter of 1975 mainly due to lower prices. Production was also lower than in 1974. As previously announced the economically recoverable ore reserves will have been mined out by mid-1975 and the mine will be permanently closed at that time.

Steel revenue was higher in the first quarter of 1975 but earnings were slightly lower, primarily due to continued escalation of operating costs. Steel market conditions have continued to deteriorate since year-end in some product lines.

As previously announced an agreement has been concluded with Portland General Electric Company of Portland, Oregon providing for the delivery of 1,000,000 pounds of uranium oxide in concentrates in 1975. This agreement is subject to Canadian government approval.

A meeting of the Series A Debentureholders has been called for May 2, 1975 to approve certain proposed amendments to the trust indenture relating to the Series A Debentures which will assist the Company to continue its expansion program.

As indicated in the 1974 Annual Report, the Company's net earnings will be influenced in 1975 by the presently depressed state of the world copper markets, the indicated softening in the demand for stainless and some specialty steel products and the effect of rapidly escalating costs.

R. D. ARMSTRONG,
Chairman and
Chief Executive Officer

G. R. ALBINO,
President and
Chief Operating Officer

Toronto, Canada
April 25, 1975

RIO ALGOM MINES LIMITED
CONSOLIDATED STATEMENT OF EARNINGS

for the three months ended March 31, 1975
($000's omitted)

	1975	*1974*
Revenue:		
Revenue from mine production and sales of steel and other products	$ 94,051	$ 97,522
Investment and other income	521	465
	94,572	97,987
Expenses:		
Cost of mine production and steel sales	60,503	51,654
Selling, general and administration	8,921	7,976
Interest	1,696	2,486
Depreciation and amortization	5,494	5,263
Exploration	855	609
	77,469	67,988
Earnings before taxes and minority interests	17,103	29,999
Income and mining taxes and government royalty	8,775	10,990
Earnings before adjustment for minority interests in subsidiary companies	8,328	19,009
Minority interests in profits of subsidiaries	47	4,230
Net earnings for the period	**$ 8,281**	**$ 14,779**
Earnings per common share	**$ 0.66**	**$ 1.19**

The earnings per common share are calculated after providing for dividends on first preference shares and are based on the average number of common shares outstanding during the respective periods.

Approved on behalf of the Board:
R. D. Armstrong, *Director*
G. R. Albino, *Director*

Subject to year end audit and adjustments.

RIO ALGOM MINES LIMITED
CONSOLIDATED STATEMENT OF CHANGES IN FINANCIAL POSITION

for the three months ended March 31, 1975
($000's omitted)

	1975	*1974*
Source of funds:		
Earnings before adjustment for minority interests in subsidiary companies	$ 8,328	$ 19,009
Add items included in earnings not involving current outlay of funds:		
Depreciation, amortization and other charges (net)	5,721	5,383
Deferred income and mining taxes	1,947	3,147
Funds provided by operations	15,996	27,539
Housing loans of subsidiary (net)	61	148
	16,057	27,687
Disposition of funds:		
Expenditures (net) for plant and equipment, mining properties and preproduction	3,220	1,475
Dividends on preference shares	173	184
Purchase of minority shareholders' interest in subsidiary company	454	—
Purchase of preference shares for cancellation	39	55
Investment in affiliated company	596	952
Reduction of long term debt:		
Rio Algom Mines Limited debentures	51	529
Bank loans of subsidaries	312	12,334
8¾ % Notes of subsidiary	1,525	—
	6,370	15,529
Increase in Working Capital	**9,687**	**12,158**
Working Capital, beginning of period	155,024	133,429
Working Capital, end of period	**$164,711**	**$145,587**

Rio Algom

Rio Tinto

72 ISW045 (6E)

Rio Algom Mines Limited

Interim Report to the Shareholders

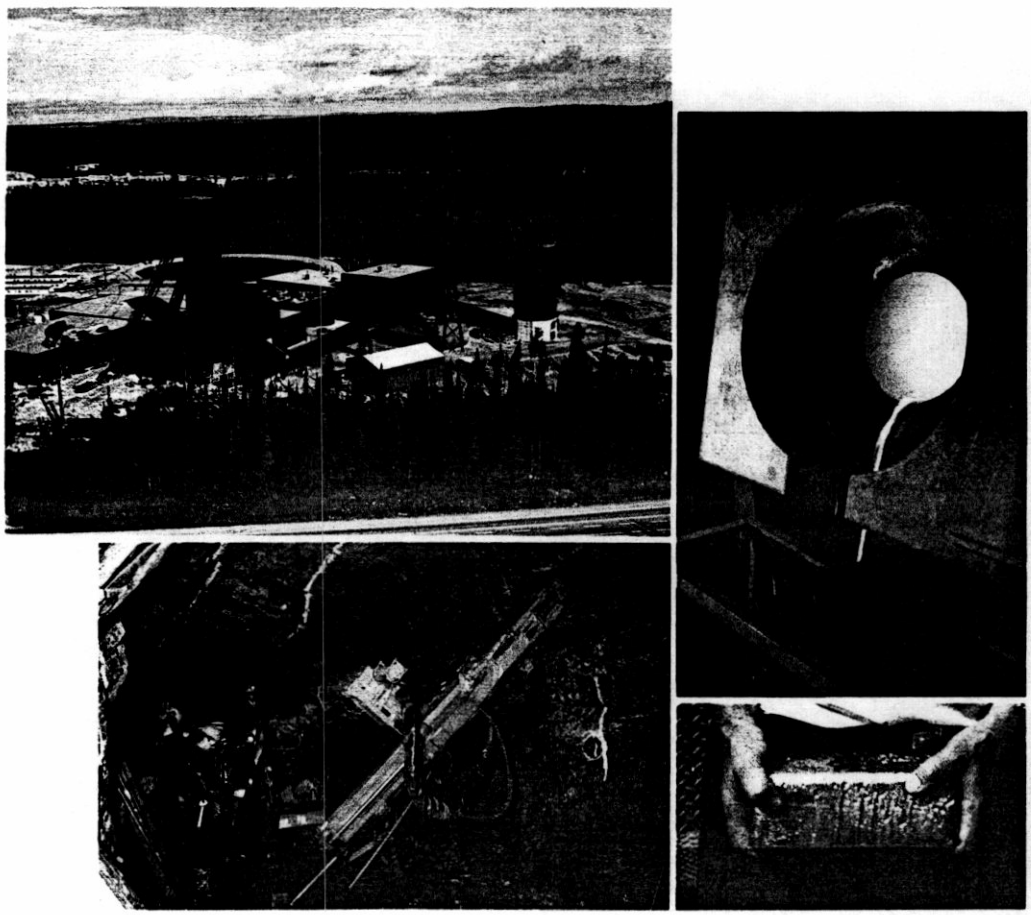
for the three months ended March 31, 1975

TECK CORPORATION ANNUAL REPORT 1985

Lornex
92ISW045-(6E)

TECK

PROPERTY FILE



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LORNEX MINING CORPORATION

Teck holds a 22% share interest in Lornex, whose copper-molybdenum mine in the Highland Valley area of British Columbia is Canada's largest metal mine.

The plant operated at an average of 88,000 tons per day during Teck's fiscal year, producing 209,097,000 pounds of copper and 7,678,000 pounds of molybdenum.

Lornex also holds a 39% joint venture interest in the Bullmoose Project.

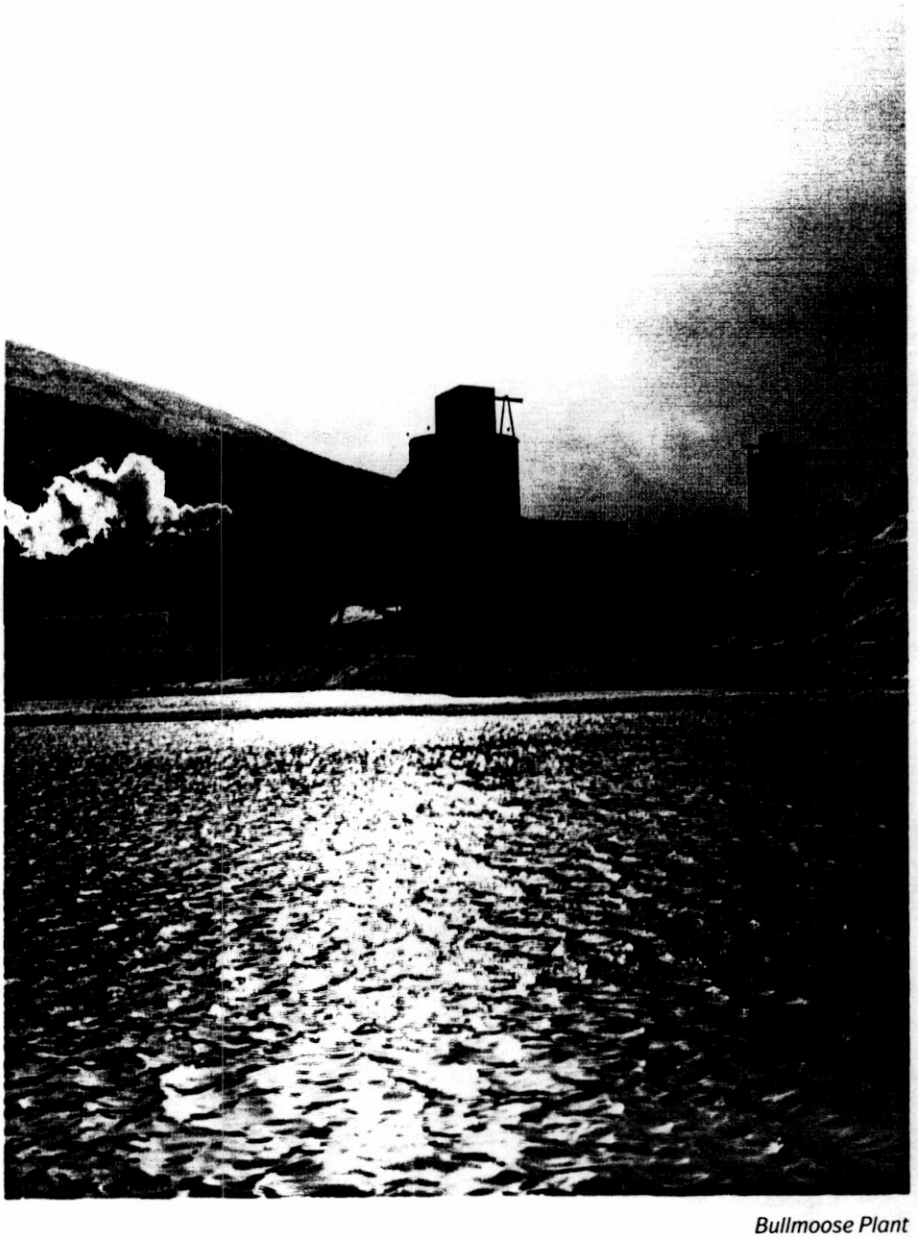
Lornex reported an unaudited net profit of $17.3 million for the year ending September 30, compared with a loss of 4.3 million a year earlier. Teck's share of Lornex results is included in earnings on an equity accounting basis.

	1985	1984
Tons milled	**32,149,000**	30,851,000
per day	**88,087**	84,500
Grade: % Cu	**.385**	.350
% Mo	**.016**	.017
Recovery: % Cu	**87.17**	87.84
% Mo	**74.05**	67.60
Production: lbs Cu	**209,097,000**	180,567,000
lbs Mo	**7,678,000**	7,406,000
oz Ag	**777,000**	718,000
Average price: Cu	**$0.85**	$0.80
Mo	**$4.50**	$4.48
Net Earnings (loss)*	**$17,274,000**	$(4,334,000)
Teck's Equity (22%)	**$3,800,280**	$(953,000)

*Includes 39% of Bullmoose Mine.

OTHER INTERESTS

During the year, Teck received $222,981 in royalty income from Kirkland Lake claims leased to a local gold producer, and $205,000 in royalties from geothermal power production in The Geysers area north of San Francisco.



Bullmoose Plant

LORNEX 92ISW045

1968
RESEARCH
DEPARTMENT

LORNEX MINING CORPORATION LTD.

1. Lornex Mining Corporation Ltd. is preparing to put its Highland Valley copper-molybdenum property into production by late 1971 or early 1972 at a total capital cost of $120,000,000.

   When financing is completed, Rio Algom Mines will hold over 50% of the outstanding common shares. Senior financing is being arranged through three Canadian banks and a consortium of Japanese interests. Pending final negotiations and Japanese government approval, copper concentrates will be sold to the Japanese group.

2. Ore reserves of 293,000,000 tons have been confirmed and grades are conservatively reported at 0.427% copper and 0.014% molybdenum. The official mill rate is 38,000 tons per day although a a higher rate in the order of 42,000 tons per day is anticipated. Recoveries of 92% for copper and 65% for molybdenum are expected.

3. A number of present value calculations have been included in this report assuming various metal grades, metal prices and mill rates. The most realistic estimate, in our opinion, uses a copper price of $0.45 per pound and gives a present value per share of about $12.00. This P.V. increases to over $17.00 with a $0.50 per pound copper price and decreases to about $8.00 if the established floor price of $0.41 per pound is assumed.

   The White Paper on Taxation, now expected in November, may recommend a reduction in the tax free period and in the present depletion allowance available to mining companies. Such changes would obviously reduce the calculated present value of Lornex shares.

4. Lornex shares are now trading at $11.00 which is slightly below what we consider to be a conservative present value of $12.00. As a general rule, shares of a new mine will sell close to their present value 1 to 2 years prior to production. By the time production commences the shares normally will trade at a 50% to 100% premium of this value. Thus, over the next 1 to 2 years the stock can be accumulated in the $10.00 range. Possible weakness due to tax uncertainties or softening copper prices would offer a good buying opportunity.

THE COMPANY Lornex Mining Corporation Ltd. was incorporated under the B.C. Companies Act in 1964 to develop its copper-molybdenum property in the Highland Valley area of B.C. about 30 miles from Ashcroft. Financing of this $120,000,000 project has been arranged through Canadian banks and Japanese interests and a concentrates sales contract with the Japanese interests is being finalized. When completed, this project will result in the largest single base-metal operation in Canada producing about 120 million pounds of copper and 3 million pounds of molybdenite in concentrate forms annually.

Early development work was financed through an underwriting and option agreement with Rio Algom Mines and the Yukon Consolidated Mining Corp. At present Rio Algom has a 36% interest and Yukon has a 24% interest in Lornex. Rio Algom maintains management control of the Company. Subsequent to the completion of financing, Rio's interest will increase to just over 50% of the 6,400,000 shares that will then be outstanding.

Construction and preparation of the mine for production is estimated to require 32 months. A definite start-up date has not yet been announced and will depend on completion of final discussions in Japan.

OREBODY The Lornex orebody falls into the porphyry copper category insofar as it is a large, low grade, economic, copper deposit. It is located near the centre of the Guichon Batholith in the Highland Valley and is contained in a zone of faulting and hydrothermal alteration up to 2,000 feet wide and more than 8,000 feet long. This zone grades into the Skeena granodiorite on the east and the Bethsaida granodiorite grading to quartz monzonite on the west. The Bethlehem Copper deposits are located on the opposite side of the Skeena granodiorite where it contacts the Guichon Quartz Diorite.

The primary copper minerals are bornite, chalcopyrite and chalcocite and the secondary oxide minerals are malachite and tenorite. Molybdenum occurs in economic amounts as the sulfide molybdenite.

ORE RESERVES A feasibility study by Bechtel Corporation has confirmed a tonnage of 293,000,000 tons of 0.427% copper and 0.014% molybdenum based on a cut-off grade of 0.26% copper. The overall waste to ore ratio is 0.862 to 1 including 35,000,000 tons of oxidized material which will be stockpiled. In addition, some 51,000,000 cubic yards of overburden must be removed.

The underground programme, including 5,439 feet of drilling and 13,000 tons of bulk sampling, indicated grades from 8.8% to 9.9% higher for copper and 4.5% to 13.8% higher for molybdenum. While the Company states there is insufficient evidence to raise the total ore reserve grades by these percentages, it appears that reported grades are conservative due largely to core losses. Moreover, it is estimated that the underground programme has tested about one-third of the tonnage to be mined in the first five years. Thus we have included an evaluation of the deposit assuming copper and molybdenum grades 8% higher than those officially reported.

DEVELOPMENT AND PRODUCTION PLANS Preproduction development, now in progress, involves stripping of about 29,000,000 cubic yards of overburden and removal of 6,300,000 tons of waste rock. The oxidized ore zone that lies above the sulfide ore will be stockpiled for possible future treatment since pilot testing of this ore was unsuccessful.

The official mill rate is 38,000 tons of ore per day. However, it is felt that a higher rate in the order of 42,000 tons per day may be achieved. At this higher rate present reserves will sustain a 20-year operation. Recovery of copper is expected to average 92% and molybdenum about 65% (as molybdenite). Development of the mine and construction of the plant should be completed within a 32-month period.

FINANCING The total capital cost of the project is estimated at $120,000,000. Of this amount, Rio Algom and Yukon will provide $23,600,000 through purchase of units comprising a $1,000 Subordinated Income Debenture and 80 Lornex shares. This will increase the Company's outstanding capitalization from 4,521,321 shares presently issued to about 6,400,000 shares. In the event of an overrun on expenses Rio Algom has agreed to purchase additional units to a maximum of $20,000,000. Under letters of intent, senior financing, totalling $86,500,000, has been arranged from two sources; a consortium of Japanese interests ($26.5 million) and three Canadian banks ($60 million). Final details are now being discussed with the Japanese and approval is expected before the year-end.

Of the remaining capital cost, $7.4 million has been spent on the project to date and a $2.5 million mortgage was obtained from N.H.A. for development of a townsite.

MARKETING The Company has arranged a letter of intent for the sale of its entire output of copper concentrate to six Japanese smelters for twelve years. The agreement awaits final negotiations and Japanese government approval. We understand that a floor price of $0.38 U.S. or about $0.41 Canadian has been established.

EVALUATION

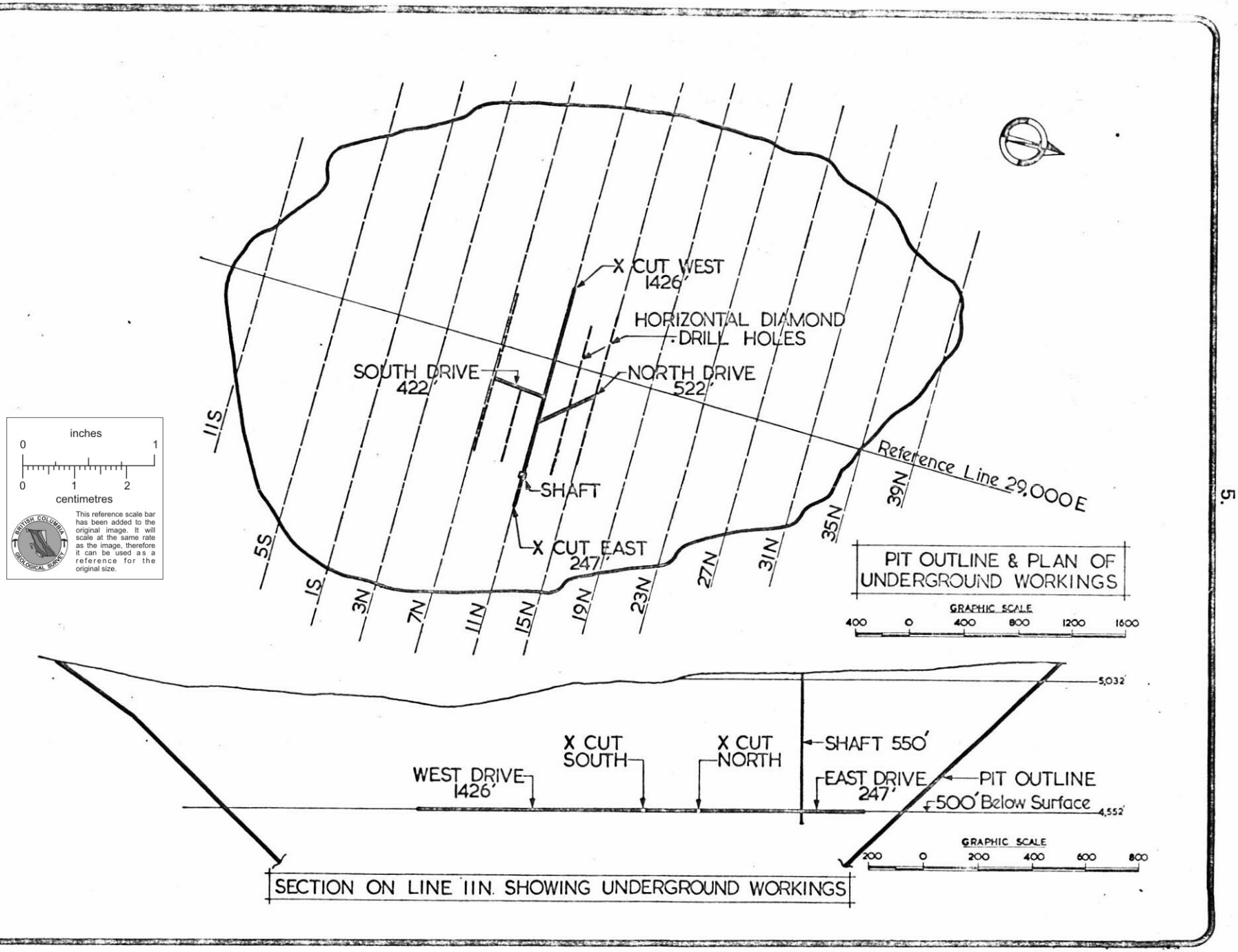
Assumptions

Ore Reserves	293,000,000 tons		
Metal Recoveries	Cu – 92%;	Mo – 65%	(in MoS_2)
Smelting, Refining & Freight Costs	Cu – 8¢/lb;	Mo – 7¢/lb.	
Operating Costs	$1.56 per ton of ore		
Capital Cost	$120,000,000		
Capital Additions	$ 30,000,000		
Interest Rate	8% per annum		
	10% per annum		

Assumptions (Cont'd)

	CASE I			CASE II		
Mill Rate	38,000 tons/day or 13,300,000 tons/year			42,000 tons/day or 14,700,000 tons/year		
Metal Grades Cu	0.427%			0.46%		
Mo	0.014%			0.015%		
	(a)	(b)	(c)	(a)	(b)	(c)
Metal Price Cu	$0.41	$0.45	$0.50	$0.41	$0.45	$0.50
(per lb.) Mo	1.83	1.83	1.83	1.83	1.83	1.83
CALCULATIONS						
N.S.R. per ton	$2.91	$3.23	$3.62	$3.14	$3.47	$3.90
Operating Profit per ton	1.35	1.67	2.06	1.58	1.91	2.34
Annual Operating Profit	$ 17,955,000	$ 22,211,000	$ 27,398,000	$ 23,226,000	$ 28,077,000	$ 34,398,000
Per share	2.81	3.47	4.28	3.63	4.39	5.37
Total net cash flow	106,000,000	156,600,000	224,000,000	168,500,000	234,300,000	309,700,000
Present value cash flow (discount at 10%)	24,600,000	45,200,000	73,500,000	51,700,000	77,700,000	110,800,000
Present value per share	3.84	7.06	11.49	8.07 7.10(1)	12.15 11.20(1)	17.31 16.40(1)

Note: (1) Present value per share if interest rate of 10% is assumed assumed on debt.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DRILL HOLES
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NORTH DRIVE
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SECTION ON LINE 11N. SHOWING UNDERGROUND WORKINGS

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PRESENT VALUE ESTIMATES

Most of the assumptions used in our valuation of Lornex are taken from the Bechtel Corporation feasibility study as published in the Lornex annual report. Each present value is calculated by discounting cash flow at 10% back to the commencement of production. Case I adheres strictly to officially reported metal grades and mill rates, whereas Case II uses more optimistic asumptions which we consider to be realistic. The variation in metal grades obtained from surface drilling and from underground work was discussed under "Ore Reserves". In Case II, copper and molybdenum grades are increased by 8% from 0.427% to 0.45% for copper and from 0.014% to 0.015% for molybdenum. In addition, we feel that there is a good possibility that mill capacity may exceed 38,000 tons per day. Thus, in Case II the mill rate is increased by about 10% to 42,000 tons per day.

At this time, we understand that Lornex is negotiating a floor price for copper of $0.38 U.S. per pound or about $0.41 Canadian with the Japanese smelters. Lornex will be paid the EMJ export price for copper which is currently about $0.67 U.S. per pound. While we do not expect this price level to be maintained over the long-term, over the next year or two we expect prices to stabilize around the $0.45-$0.50 level. The Canadian price at present is $0.57 Canadian per pound. In both Case I and Case II we have calculated the present values using $0.41, $0.45 and $0.50 copper (Canadian funds). The price of molybdenum is already at $1.83 per pound of contained molybdenum in concentrates.

In both Case I and Case II capital cost has been debt financed at 8%. In view of existing high interest rates, Case II has been reworked using a 10% rate per annum and results appear in parentheses.

The present three-year tax free period and 33% depletion allowance have been assumed in these evaluations. It is expected that the Government's White Paper due in mid-November will recommend a reduction in these tax incentives. To obtain some idea of the effect that these changes might have on the present value of Lornex, we have recalculated Case II(b) using a two-year tax free period and a 25% depletion allowance. This gives a present value per share of $10.70 as compared to $12.15.

CONCLUSION

The most obvious conclusion to be drawn from the range of values shown in the section on evaluation is the considerable degree of leverage exerted by the price of copper. We feel that $0.45 per pound is a reasonably conservative assumption. Thus it would appear that Case II(b) is the most realistic evaluation giving a present value in the order of $12.00 per share. Continuing high interest rates and the possibility of a less favourable tax climate may reduce this value to the $10.00 to $11.00 range. As a general rule shares of a new mine will sell close to their present value one to two years before the mine goes into production. However, by the time the mine is in production the shares normally sell at a premium of up to 100% over their present value. Lornex will be in production in about 2½ years and thus, for longer term growth potential, Lornex shares can be accumulated in the $10.00-$12.00 range over the next 1 to 2 years.

RESEARCH DEPARTMENT
HR - GH/ep

OCTOBER, 1969

BALANCE SHEET AS AT SEPTEMBER 30, 1968

Assets:	1968	1967
CURRENT:		
Cash	$ 121,719	$ 207,194
Short term investments, at cost, and deposits	304,197	2,506,163
Accounts receivable	10,997	38,209
	436,913	2,751,566
FIXED, at cost (notes 1 and 2):		
Plant and equipment	1,382,497	1,319,518
Mining properties	471,000	471,000
	1,853,497	1,790,518
OTHER:		
Deferred exploration, development and administration, at cost (notes 1 and 3)	5,381,113	3,180,761
Incorporation and organization costs	2,601	2,601
	5,383,714	3,183,362
	$7,674,124	$7,725,446
Liabilities and Shareholders' Equity:		
CURRENT:		
Accounts payable and accrued liabilities	$ 225,041	$ 269,262
Due to Rio Algom Mines Limited	47,730	78,387
Due to Rio Tinto Canadian Exploration Limited	29,583	6,027
	302,354	353,676
SHAREHOLDERS' EQUITY:		
Capital stock —		
Authorized:		
5,000,000 shares with a par value of 50¢ each		
Issued:		
900,000 shares for mining properties	450,000	450,000
3,621,321 shares for cash	1,810,660	1,810,660
4,521,321	2,260,660	2,260,660
Premium less discount on shares issued for cash	5,111,110	5,111,110
	7,371,770	7,371,770
	$7,674,124	$7,725,446

THE LORNEX COPPER DEPOSIT

A. C. SKERL

ABSTRACT

The Lornex deposit is situated at the centre of the Guichon Batholith in the Highland Valley at an elevation of 5,200 feet.

It is contained in a wide zone of faulting and hydrothermal alteration that is up to 2,000 feet wide and at least 8,000 feet long. Because of its softened nature very little of this zone has natural outcrops. It is bounded on the east by Skeena types of granodiorite and on the west by Bethsaida types.

Widespread mineralization in the form of bornite, chalcopyrite, and molybdenite is present within the zone of alteration both as stringers and disseminations.

So far exploration has been by bulldozing, percussion holes, and diamond drilling. The weakness of the ground has presented recovery problems and the deep overburden on the west side has been troublesome.

An average grade of about 1/2% copper is being found over a probable length of 3,000 feet and widths from 500 to 1,800 feet.

Large scale underground exploration is being planned in conjunction with a sampling plant and a pilot mill. A much better idea of the geology of the deposit should then be obtained as well.

ORE ZONE
3000 × 1100 × 1000 = 33 MT.
2,750 = $1,375 0
330 MT.

INTRODUCTION

This can only be a preliminary account of the geology of the Lornex deposit of the Lornex Mining Corporation. Very little of it can be observed in place because of the cover of overburden. During the next twelve months however I expect that the underground exploration will provide us with much new information that should make the interpretation of the diamond drilling much more definitive.

ASKNOWLEDGMENTS

In writing this report I have used the work of the three field geologists who have been at the property in succession during the past 18 months, namely, J. M. Newell, C. Vagt, and H. W. Marsh. They have laid a good foundation on which to build the geology of the deposit.

The field manager, J. W. Scott, has done a tremendous job keeping the exploration in high gear.

Mr. J. A. Sadler, President of Rio Canadian Exploration who now have the management control of the operation, readily agreed that I should present this paper.

I am grateful to the officials of the Bethlehem Copper Corporation for providing much information on their experiences during the exploration of their deposits.

Finally I would like to pay tribute to Egil Lorntzsen, President of Lornex Mining Corporation, who made it possible to write this paper by discovering the deposit.

SITUATION

The deposit is two miles south of the Highland Valley road where it passes along Quiltanton Lake and it is 3 1/2 miles southwest of the Bethlehem Mine that is on the opposite side of Highland Valley.

The highest part of the ore is at 5,200 feet and the lowest point reached

by drilling is at 3,625 feet or 300 feet below the elevation of Quiltanton Lake.

GEOLOGY

The Lornex deposit is centrally situated in the Guichon Batholith which has its long axis striking at N 15° W for about 40 miles and the short axis at right angles for 16 miles.

In the general area of the mine John Newell has distinguished two main rock types:

1. The Skeena granodiorite corresponding to Carr's Bethlehem Younger Quartz Diorite that grades to a quartz diorite and occurs in a northwesterly striking belt to the east of the deposit.
2. The Bethsaida porphyritic granodiorite that grades to quartz monzonite in a parallel belt to the west of the deposit.

Both types are further differentiated according to the predominance of biotite or hornblende.

The closest that these two types get together in outcrop is 3,000 feet. In the diamond drill core however numerous sections of a quartz porphyry have been recognized that is probably the dyke equivalent of the Bethsaida but no shapes can be given to these occurrences at present.

It is interesting to note that the Bethlehem deposits are on the opposite side of the mass of Skeena granodiorite where it is contact with the Guichon Quartz Diorite.

Going west from the fresh Skeena rocks there is an irregular belt of alteration up to 700 feet wide in which there is an increasing amount of argillic alteration with the development of chlorite, sericite, kaolin, etc., and quartz eyes until the rock is largely secondary in nature over a further width of at least 2,000 feet. In this latter section there is a large amount of faulting and fracturing. The west side is largely unknown because of the thick cover of overburden and the limited amount of drilling. Presumably the

alteration grades out to fresh Bethsaida.

More or less continuous mineralization is present within the zone of alteration for a length of 5,000 feet and a width of up to 2,000 feet. Discontinuous mineralization extends for at least another 2,000 feet to the south.

Within this zone of mineralization a potential orebody is being developed. The main portion is 3,000 feet long and up to 1,800 feet wide with a narrow tail extending for another 2,000 feet to the southeast.

For this whole occurrence there was only one outcrop and it consisted of broken rock containing malachite in an area about 6 by 6 feet. It was discovered by Egil Lorntzsen on 13th June 1964 on the side of an old glacial overflow channel.

It appears that an ice-filled hanging-valley once occupied the west half of the area that is underlain by the ore deposit and subsequently it was filled in by glacial material for a depth of several hundred feet. Award Creek has since cut down into the glacial deposits but as much as 250 feet is still left covering the ore.

Bulldoze cuts have exposed a small portion of the main part of the orebody on the east side. It consists of highly altered iron-stained rock with malachite widely distributed. On close inspection the tell-tale chocolate brown limonite left by the oxidation of chalcopyrite and the black specks of tenorite formed from bornite are found.

Drilling shows that oxidation is usually limited to the first 30 feet below bedrock but it may be present for as much as 100 feet.

MINERALIZATION

A large number of fractures striking northeast and north-northeast with steep dips to the east were exposed by the trenching. They are frequently mineralized especially when filled by quartz stringers. It is believed that these mineralized fractures belong to the group that predominates in the drill cores and extends throughout the orebody.

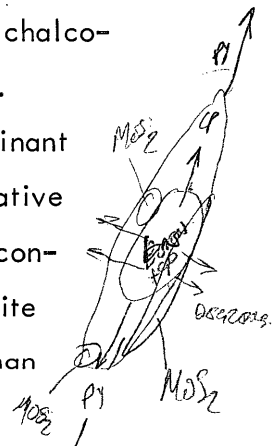
The primary copper minerals are bornite, chalcopyrite, and chalcocite. Small amounts of native copper and cuprite have been recognized.

As previously noted the oxide minerals are malachite and tenorite with occasional azurite.

Molybdenite is present in economic amounts and appears to be restricted to certain sections of the deposit.

MINERAL ZONING

Although a detailed plot of the percentage variation of bornite, chalcopyrite, pyrite, and molybdenite has still to be assembled a broad zoning is obvious.



There is a large central area in which bornite carries the predominant amount of copper with the balance as chalcopyrite. Going north and south the relative amount of bornite decreases until it is no longer present and the copper is entirely contained in chalcopyrite. Pyrite is then present and increases relative to chalcopyrite further to the north and south until the average copper content of the rock is less than 0.20%.

To the east and west the relative amounts of bornite and chalcopyrite are not so variable but the absolute amounts decrease.

The molybdenite appears to have a distribution largely independent of the copper. So far most of it is concentrated on the east side of the deposit with another area on the west. There is some evidence already that it can be significant at the north end whilst at the far south end there appears to be a separate concentration of molybdenite with only minor copper.

GRADE OF ORE

The average grade of the copper content of a particular section of the deposit is closely related to the amount of bornite present.

It is expected that a substantial tonnage of ore averaging about 0.50% Cu and 0.04% MoS_2 will be developed.

There does not appear to be any significant trend in the variation of the grade to a depth of over 1,000 feet in the sections drilled so far.

The reliability of the results obtained from percussion drilling can be seen in the following comparison with diamond drilling on line 11N:

15 vertical percussion holes of varying depths up to 300 feet and over a section length of 1,500 feet gave an average of 0.51% Cu.

A series of 6 diamond drill holes probed the same section to depths of 600 to 1,200 feet at 55° to 60° and averaged 0.48% Cu for a section length of 1,800 feet.

STRUCTURE

The largest fault intersected by the drilling to date is apparently 50 feet wide but its strike and dip are uncertain. It could well be the same fault that was cut by a drill hole at another 800 feet to the north which would give it a northwest strike and steep dip to the northeast. It would then match with a large fault exposed by the trenching in tne discovery area and striking north-northwest.

The drilling results suggest that the limit of mineralization on the west side for the northern portion of the main orebody could be a major fault striking due north.

A plot of the topographic lineations for the general area shows that two major fracture directions are north-northwest and north-northeast. I suspect that the zone of alteration and subsequent mineralization were localized by the junction of a large fault zone striking north-northwest and a series of north-northeast fractures.

Until tne deposit has been explored underground we cannot be sure of the fracture pattern and its relationship to ore.

EXPLORATION METHODS

After the initial discovery a bulldoze trench was cut along the rim of the overflow channel which exposed considerable malachite staining for a length of 600 feet in a northwest direction. A similar trench was then made alongside a parallel channel about 500 feet to the south and the malachite staining was again found for a length of 1,000 feet in a west-northwest direction. Further trenching demonstrated that a large area of mineralization was present.

A programme of percussion drilling with the Copco overburden machine was then started. Holes were set out at intervals of 100 feet on E - W lines spaced 200

feet apart.

At first all drilling was dry to a depth of as much as 250 feet and holes were stopped when water was encountered because of the lack of any return. The dust was carefully collected from every 10 feet, weighed and put through a Jone's splitter to obtain a sample for assaying. The two inch holes yield about 36 pounds of material for every 10 feet.

When a number of holes failed to reach bedrock or attain a suitable depth the machine was adapted to drill with water as well. The sludge so obtained was passed through a special electrically run splitter designed by Mr. J. W. Scott that yielded one-eighth of the material. This was dried, weighed, and assayed.

All holes have been drilled vertically although the machine can be used at an angle and should have been at Lornex now that we know that the mineral streaking has a steep attitude. To date over 450 holes have been drilled.

To obtain greater depth other equipment has been tried such as the Mayhew rotary drill, a churn drill, and the interesting Becker drill but with limited success considering the costs.

Ordinary diamond drilling gave poor core recovery and erratic sludge assays. NX wireline equipment gave better recovery but the sludge assayed much higher than the core. It was realized that much of the values were present as loose coatings of sulphides on numerous fractures from which they were washed by the drill water.

Wireline drilling in a special circulating mud has given much the best recovery - usually better than 95% - although it is expensive.

The plan of drilling is for diamond drill holes directed 60° W and collared about 300 feet apart along section lines spaced 400 feet apart. Most of the holes are about 1,400 feet long to give a vertical range of 1,000 feet. Four lines at 800 feet apart have been completed and the lines halfway between are now being drilled at an accelerated rate with four machines.

GEOPHYSICS

An IP survey by H. Seigel and Associates showed that a strong anomaly was present as an extension north of the discovery zone and this has now proved to be the main part of the ore deposit.

Because of the intense hydrothermal alteration I am not at all certain that the IP response was solely due to the sulphides - it could be mainly due to the large amount of clay minerals present.

By varying the electrode spacing it was possible to define the presence of deep overburden on the west side of the zone.

The zone was also defined by a magnetometer survey as a magnetic low of 200 to 400 gammas below the surrounding area due no doubt to the destruction of the original magnetite of the granodiorite during hydrothermal alteration.

GEOCHEMISTRY

A geochemical silt survey for copper and molybdenum showed that all the drainage channels from the portion of the mineralized zone with shallow overburden were anomalous for at least 4,000 feet away. Numerous samples gave over 3,000 ppm of total copper and some gave over 100 ppm total molybdenum.

Award Creek that flows along the west side of the mineralized zone gave essentially no response. This was a great surprise at first until it was realized that the creek was perched on 250 feet of glacial deposits.

COMPARISON WITH OTHER DEPOSITS

The following discussion is a direct outcome of reading the recently published "Geology of the Porphyry Copper Deposits of Southwest North America."

The original description of a porphyry copper deposit was a large, low grade, flat-lying body of disseminated copper minerals in an igneous rock that was formed by secondary enrichment. Over the years the definition has been continually stretched

so that now the term includes any copper deposit of large dimensions that can be mined on a large scale at a profit.

The Lornex deposit certainly falls well within the grouping of the typical porphyry copper deposits of the southwestern North America area yet the combination of the principal characteristics places it in a sub-division of its own. The outstanding attributes that make it distinctive are:

1. High proportion of bornite
2. Total lack of pyrite within the ore
3. Limited zone of leaching
4. No secondary enrichment
5. Relatively high average molybdenite content
6. Great depth
7. Extensive faulting
8. Intimate intrusion of tongues of quartz porphyry which are mineralized along with the intruded rock.

The major characteristics that it shares with other deposits are:

1. Large size
2. Quartz - sericite - clay alteration
3. Quartz porphyry intrusions

The Lornex deposit differs from the Bethlehem orebodies in the apparent absence of breccias and late acid dykes.