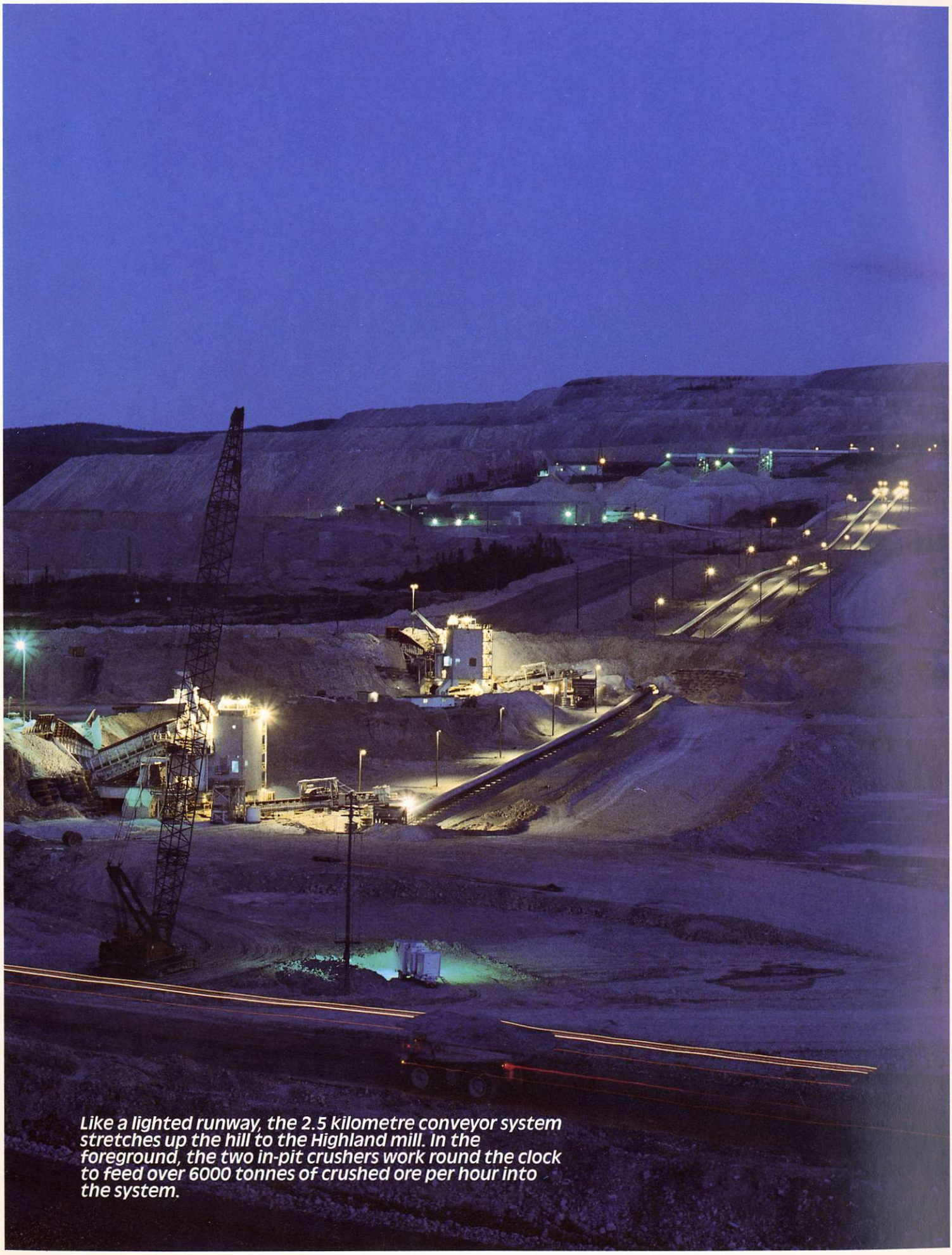
A World-Class Mine

Highland Valley Copper



Like a lighted runway, the 2.5 kilometre conveyor system stretches up the hill to the Highland mill. In the foreground, the two in-pit crushers work round the clock to feed over 6000 tonnes of crushed ore per hour into the system.

Corporate Mission Statement

'To optimize the long-term profitability of the mining and processing of mineral resources within the Highland Valley of British Columbia.'

Corporate Objectives

Highland Valley Copper will continue to review all areas of operation to ensure that the best productivity and cost efficiencies are attained. The partnership will investigate and incorporate new technological and process improvements to maintain its leadership position in the international mining world.

In addition, the partnership will maintain superior customer relations, secure competitive advantages and continue its geographical diversification in order to maximize sales returns on its concentrates.

The partnership recognizes employees to be one of its most important assets and will actively promote their safety, health and welfare. The partnership commits itself to foster superior employee relations through open internal communications.

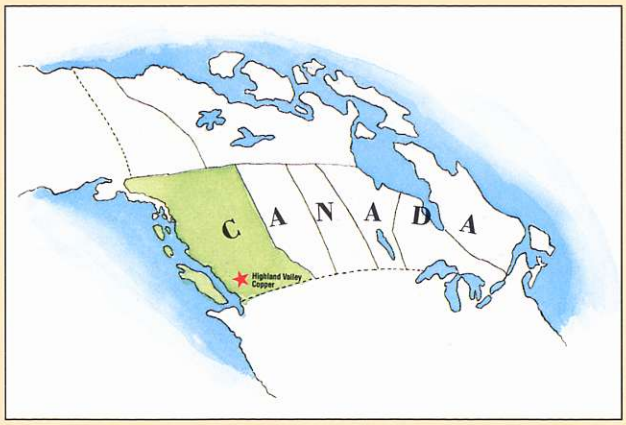
Highland Valley Copper is committed to protect the environment and to the reclamation of the disturbed land.

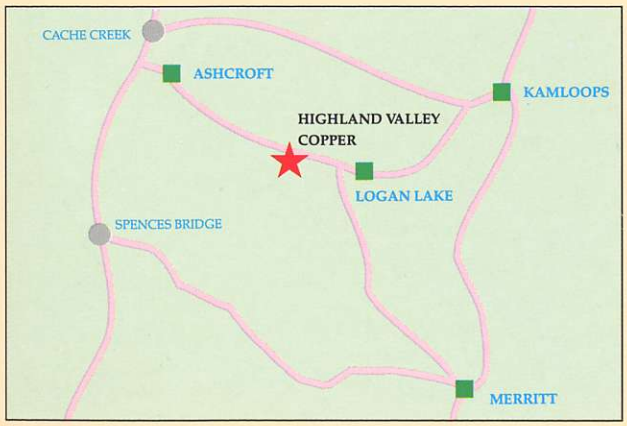
As a commitment to the surrounding communities, Highland Valley Copper will undertake new exploration programs within the Valley to ensure the longest possible economic life of the operation.

THE EARLY TIMES

Over two hundred million years ago, molten rock, deep under the earth's mantle, pushed up through cracks in the crust and hardened into large igneous deposits. One such occurrence happened along a belt stretching from the southern part of British Columbia to the southwestern part of the Yukon. Through the centuries, advancing glaciers deposited rock and soil over most of these rock formations. A number of these deposits or plutons, can be found in the area called Highland Valley, located approximately 80 kilometres southwest of Kamloops and 60 kilometres north of Merritt.

Portions of these plutons are near or at the surface. Early pioneers to the Valley found traces of early Indian mining on these outcrops. At the turn of this century many of these small deposits were reworked by settlers in the area. They hauled the ore by horse-drawn carts over 45 kilometres to Ashcroft where it was crushed and processed. The mining of these small deposits was laborious and not very rewarding. It was not until the 1950s, when strong economic growth created a growing demand for metals, that an active interest in the area was revived. By then the mining of relatively low grade ore had become feasible as mining costs had been drastically reduced by the utilization of large shovels and trucks, and milling systems had become highly efficient. This kindled the interest of prospectors who staked claims throughout the Valley.





Numerous distinct copper deposits have been discovered in the Highland Valley. The Valley and Lornex deposits, which together provide ore to Highland Valley Copper, are by far the largest. The Lornex orebody was discovered in 1964 and shortly afterwards the Valley orebody was found a few kilometres to the north. In 1972, production commenced from the Lornex deposit. This was followed by the Valley deposit being brought into production in 1983.

To preserve a little of the past history of the Valley, these two deserted Indian cabins were moved from the tailings area and relocated in front of the mine administration offices.

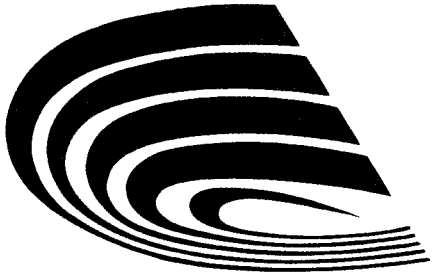
THE PARTNERSHIP

On July 1st, 1986, Highland Valley Copper was formed as a partnership between Lornex Mining Corporation Ltd. and Cominco Ltd. This partnership optimized the use of the two companies' best assets in the Highland Valley — the large and highly-efficient Lornex mill and Cominco's Valley orebody.

Early in 1988, Highmont Mining Company joined the partnership and the shutdown Highmont mill was used to expand the Lornex milling complex. Subsequently, Cominco's Bethlehem concentrator was shut down.

At the end of 1988, Lornex ceased to exist and participation in the cash flow of the partnership became 50% for Cominco, 33.6% for Rio Algom Limited, 13.9% for Teck Corporation and 2.5% for Highmont (other than Teck).

The control and management of Highland Valley Copper is shared equally between Cominco and Rio Algom.



Highland Valley Copper

The mine administration offices of Highland Valley Copper.

THE OREBODIES OF HIGHLAND VALLEY COPPER

THE LORNEX DEPOSIT

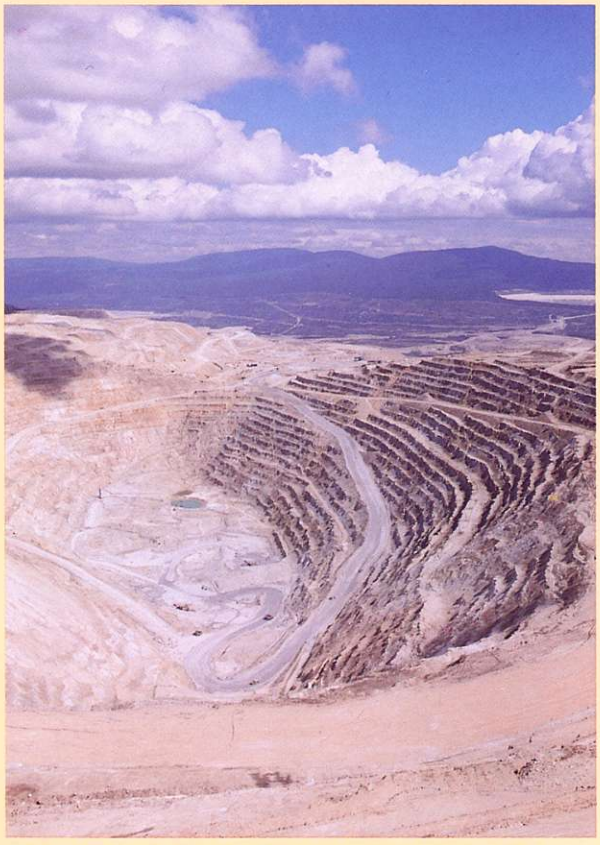
The Lornex orebody was discovered in the early 1960s by Egil Lorntzsen who formed Lornex. The orebody was of low grade and covered by considerable overburden and it was some years before Lorntzsen found a company which was interested enough to become involved with the development of the property. In 1965, Rio Algom carried out an extensive evaluation program and in 1968 decided to start developing Lornex.

Preproduction stripping began in 1970 and mill production commenced in 1972.

THE VALLEY DEPOSIT

The Valley orebody was discovered by Valley Copper Mines, an exploration company controlled by Cominco. Exploration programs from 1964 to 1969 delineated the largest known porphyry copper deposit in Canada, located a few kilometres north of the Lornex deposit. In 1981, Cominco acquired complete ownership of Valley Copper Mines.

The Valley orebody went into production in 1983 and the mine will eventually become one of the largest open-pit excavations in the world.



The Lornex pit, one of the largest open pits in Canada.

ORE RESERVES

Highland Valley Copper ore reserves as of January 1990, measured and indicated, totalled 776 million tonnes grading 0.41% copper and 0.007% molybdenum. Of this total reserve, the greater proportion is in the Valley deposit where the grade of copper is higher than the Lornex deposit. The reverse is the case with the molybdenum values.

The Valley pit, with the computer controlled dispatch centre at lower left and the conveyor system at upper left.

Production is drawn from both the Valley and Lornex pits and totals about 133,000 tonnes of ore per day. Of this total, approximately 80% comes from the Valley pit. Based upon current ore reserves, the mine plan is for 20 years, although additional mineralization exists and the mine life may be longer.

HIGHLAND VALLEY COPPER ORE RESERVES

January 3, 1990

Orebody	Reserves (M tonnes)	Grades (%Cu)	(% Mo)	Waste Ore Ratio
Valley	640	0.42	0.006	0.75
Lornex	136	0.38	0.013	1.07
Total	776	0.41	0.007	0.80

MINING

DRILLING AND BLASTING

Surveyor takes geodimeter reading from atop the pit.

Through the use of drilling, sampling, and computerization, geologists and engineers plan in detail what grades of ore will be mined and when and where it will be excavated within the configuration of the pits. Production drilling is done using five electric-powered and two diesel-powered rotary drills. The average penetration rate is 28 metres per hour and each hole is 275 mm in diameter.

Controlled blasting is carried out with buffer and trim rows between the production rows and the wall to reduce damage to the pit walls where these are expected to remain undisturbed for some time.

Blasting is done with an emulsion explosive in wet holes and Anfo in dry holes.


Geologist collects samples from the explosive drill holes prior to blast.

LOADING AND HAULING

The pits are mined by conventional truck and shovel method on a 24-hour-a-day basis, seven days a week, 365 days a year.

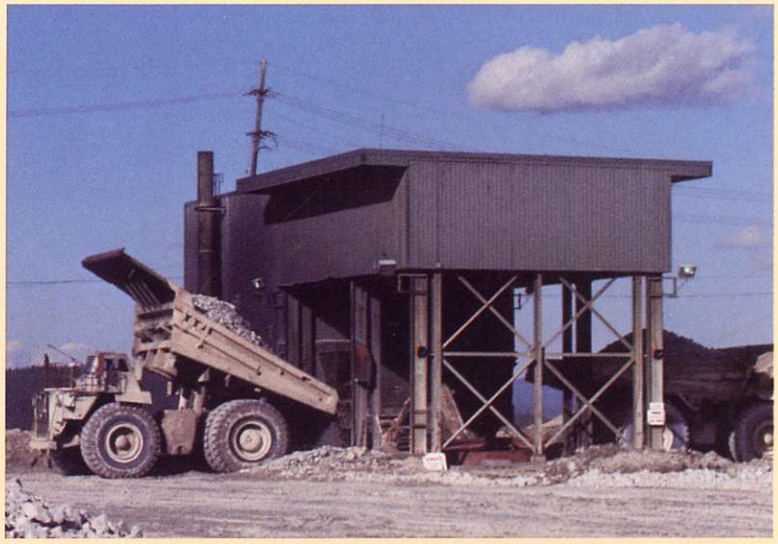
Approximately 275,000 tonnes of ore and waste are mined each day yielding about 133,000 tonnes of ore.

Primary excavation in the pits is carried out by a fleet of twelve electrically-powered shovels, eight of which are in operation at any given time. Loaders are used for occasional rehandling of stockpiles at the crushers as well as pit-wall cleanup and haulage-road maintenance.

The haulage fleet consists of twenty-two 154-tonne, and twenty-six 172-tonne trucks.

Waste dumps and stockpiles are maintained by eleven track dozers. Cleanup around shovels is handled by a combination of four rubber-tired dozers and two track dozers. Roads are maintained by ten large graders.

Modern technology is used to get maximum benefit from the shovel/truck rock-handling system. A number of



(Top left) The 172 tonne trucks continually feed Valley pit ore into the in-pit crushers. (Top right) Ore from the Lornex pit is crushed in a fixed crusher, which is part of the overall conveyor system. (Above) Production blast in the Valley pit.

Mechanics keep mine equipment in running order.

Using computer and cad programs, mine planning staff create current and future plans for both the Valley and Lornex pits.

shovels are equipped with a state-of-the-art weighing device known as Suspended Load Measurement Module or SLMM, which enables the shovel operator to load the design tonnage onto each truck. Previously the operator had to judge the load from experience.

In addition, all pit equipment, especially the trucks, are controlled through computer-driven dispatch. The position of each truck is known at all times and trucks are dispatched to the shovel needing them at the time they become available. Blending to a desired grade and/or grindability can also be achieved. Production data, including the output from the SLMM, are gathered continuously throughout the shift.

Efficiency measurements and other statistics are instantly available to operators and managers. A microwave network delivers the data to a satellite computer in the field.

All ore produced in the Valley pit is trucked to one of the two in-pit crushers which are movable and kept as close to the mining benches as possible. The conveying system from each crusher is capable of handling 6,000 tonnes per hour and deposits all ore onto a transfer point located south of the pit. From the transfer point the Valley ore is conveyed to the Highland mill. Ore from the Lornex pit is trucked to a fixed crusher installation close to the throat of the pit and from there, is conveyed to the Highland mill.

At the end of mine life, the presently smaller Valley pit will be twice the size of the present Lornex pit, and the waste and tailings material will have produced a productive flat bottom valley area, far larger than before the mines started.

MINE PLANNING

Mine engineering personnel are responsible for developing mine plans which both direct the day-to-day operation of the mine, and ensure its long-term development in a manner which maximizes the economic return from the ore reserves.

Mine planning is carried out by mine engineers in two phases — long- and short-range. Long-range planning is conducted by year for the mine life, while short-range

Through the use of computer electronics and a superior vantage point the Valley pit dispatch operator controls the movement of the haulage trucks.

planning deals with the detailed planning from daily scheduling through three-month plans.

Long-range mine plans are developed from computerized geological models. These models allow engineers to control important parameters such as head grade and concentrator throughput, while maintaining relatively consistent manpower and equipment requirements. Short-term mine planning uses current blasthole-assay information and geological-rock-grindability information.

This information allows the planning and operational personnel to establish practical priorities in mining, in order to ensure the release of the required mix of ore necessary for efficient concentrator operation.

The team of shovels and trucks can move over 6000 tonnes of Valley ore an hour to the in-pit crushers.

This aerial view of the mine site shows, clockwise from top; the Lornex pit, the Valley pit, the in-pit crusher and the conveyor system leading up to the Highland mill and three coarse ore piles.

THE MILLING OPERATIONS

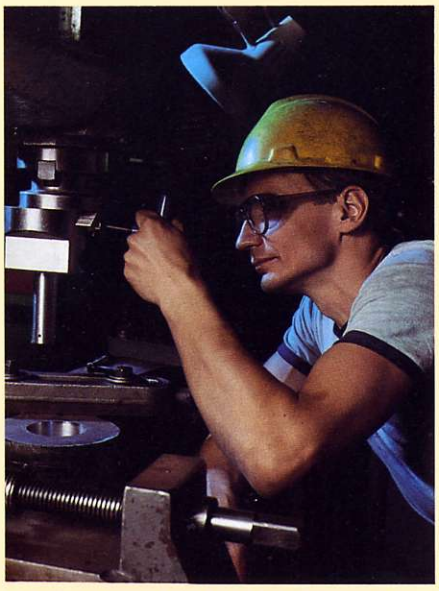
THE HIGHLAND MILL

Designed to process 34,000 tonnes per day, the original two-line Lornex mill proved to have a realistic throughput rate of 43,000 tonnes per day. A third grinding mill line was added in 1981 increasing the capacity to 78,900 tonnes per day when milling Lornex pit ore, and 90,000 tonnes per day when milling a mixture of ores from the Lornex and Valley pits. During the first half of 1989 the Highmont concentrator relocated to a position attached to the original Lornex mill, with two additional grinding lines, was commissioned. Currently, with five grinding mill lines, the Highland mill processes approximately 133,000 tonnes per day and produces 1,100 tonnes per day of concentrate grading 40% copper.

The milling processes are undergoing constant improvement and updating in order to maintain a competitive position.

GRINDING

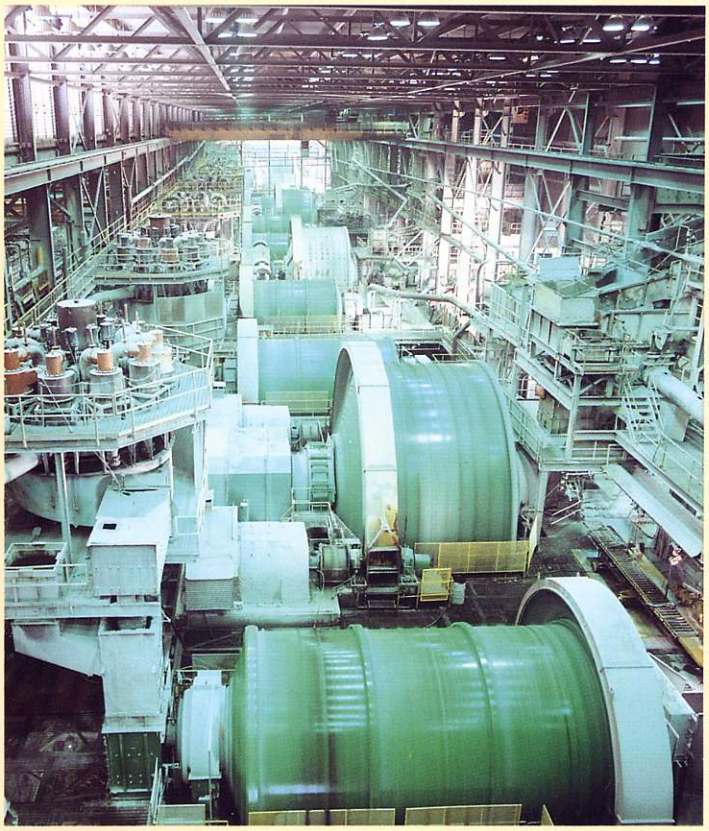
The Highland mill is fed from three coarse-ore stockpiles which are supplied from three crushers via a system of conveyors. Varying degrees of semi-autogenous milling are used, in which most of the grinding is done by large rock chunks breaking smaller pieces. The three 'Lornex' primary mills use steel grinding media to assist in grinding the ore. The two 'Highmont' grinding lines incorporate an intermediate crushing stage for oversize material not reduced in the primary grinding mill. These two lines use a much smaller steel charge to grind the ore.

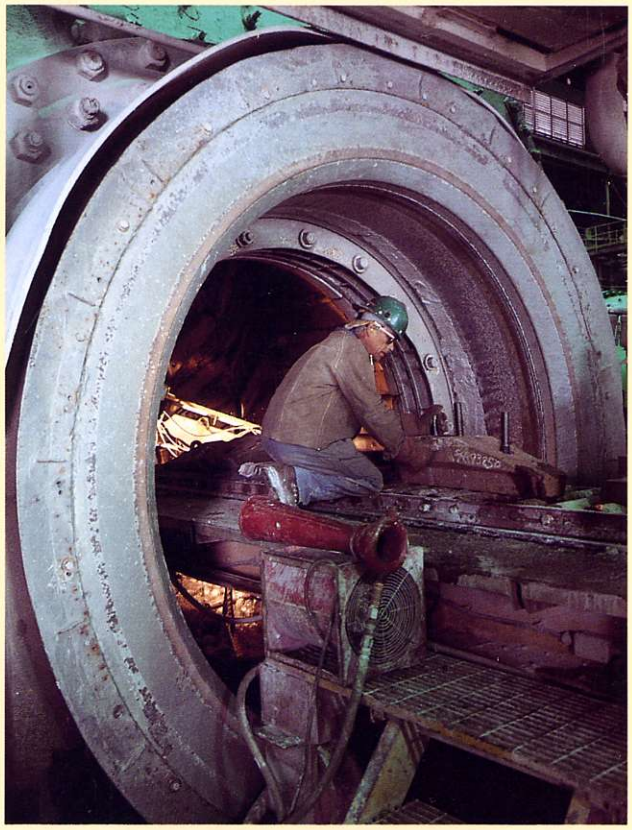


The machine shop can fabricate most parts required to keep the mill running at full production.

The coarse ore passes through the grinding circuits being reduced to a fine size and liberating the copper and molybdenum minerals from the waste rock. The finely ground mixture of waste rock and minerals moves in a slurry from the grinding circuit to the flotation process.

The grinding circuit process streams are continually monitored for flow rate and solids content; the power draught and loading of each grinding mill is also measured and a computer maintains the correct setting to maximize throughput and efficiency.





(Top left) The Highland mill with its five grinding lines. (Top right) Repairing the lining of one of the ball mills. (Above) The Highland mill with the concentrate storage shed and molybdenum building along the side (centre right) and the mine administration building (lower right).

FLOTATION CIRCUITS

Chemicals are added prior to and during the flotation operation. A chemical "collector" is added which adheres to the surface of the valuable minerals, and a "frother" is added to improve the formation of bubbles in the slurry.

In flotation, the slurry is agitated and frothed with air. This separates the grains of waste rock from the activated ore minerals (chalcopyrite, bornite, and molybdenite) which adhere to the air bubbles and rise to the surface of the flotation tanks. The bubbly froth carrying the grains of ore minerals is skimmed off and refloated in two cleaning stages.

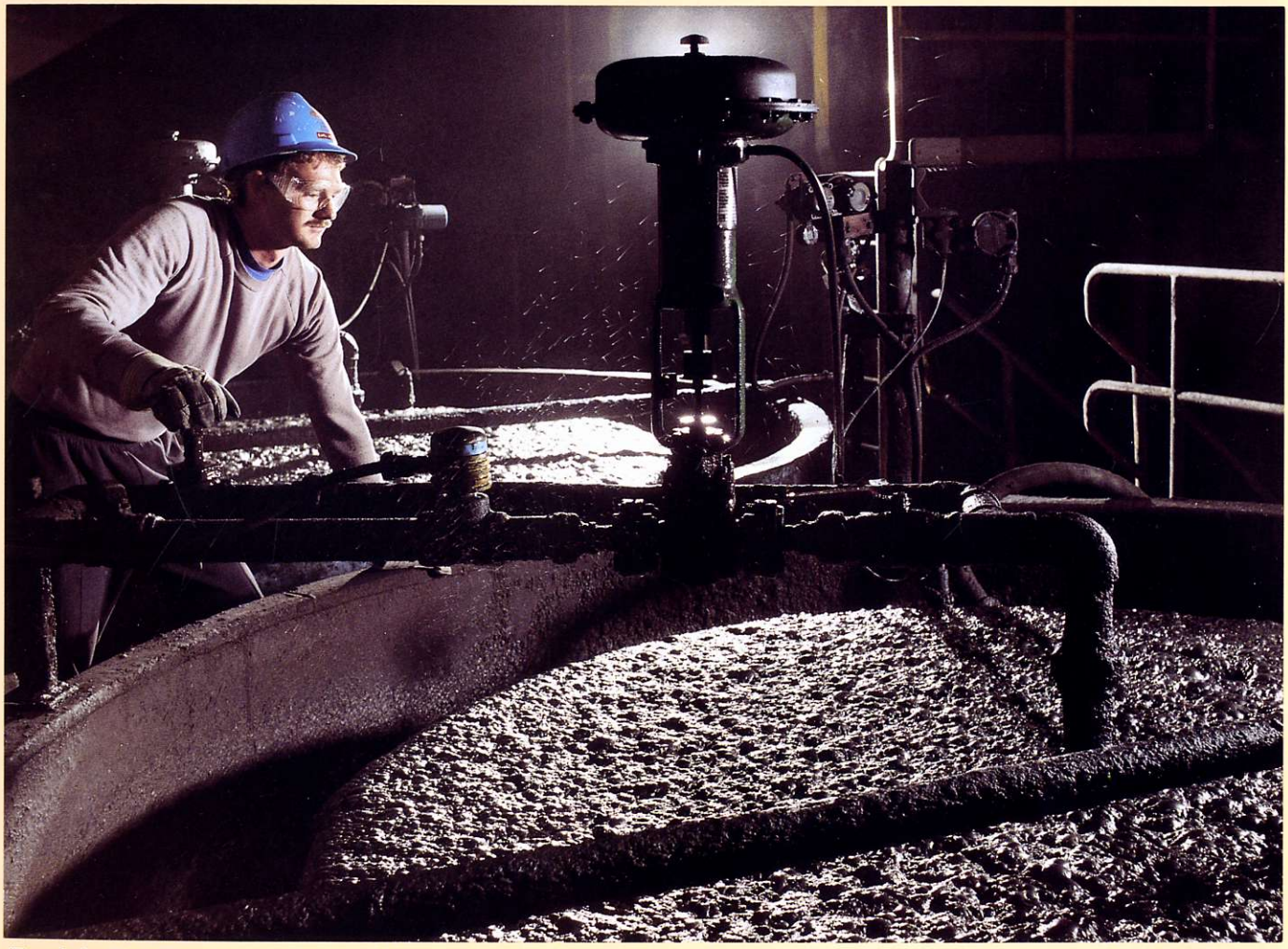
In the flotation circuits, over twenty critical flows are automatically sampled and analyzed every six minutes using x-ray florescence. A computerized reagent system uses this information to ensure that the correct proportion of chemicals is added at ninety different points in order to recover as much of the valuable minerals as possible.

At this point the concentrate contains both copper and molybdenum minerals; to separate the molybdenum from the copper minerals more reagents are added to prevent the copper minerals from adhering to the bubbles and molybdenum is separated in a second flotation process. The copper concentrate is filtered, dried, and discharged into a storage silo. This concentrate is loaded into trucks from the silo and taken to the railhead in Ashcroft. From Ashcroft the concentrate is moved to Vancouver by rail to await shipment to offshore smelters.

Molybdenite concentrate is an important by-product of the production of copper concentrate. During the molybdenum-flotation process the recovered molybdenite concentrate contains about 2% copper. Using a ferric chloride leaching process the contained copper is reduced to 0.2%.

The molybdenite concentrate is shipped by truck for distribution in North America, and to Vancouver for offshore destinations.

A truck delivers its load of copper concentrate to the Ashcroft loadout terminal.



(Top left) The main control room in the Highland mill features the latest in computer technology. (Top right) Flotation operator adjusts air stream. (Above) Operator inspects the slurry in one of three column cells.

WATER SUPPLY AND TAILINGS DISPOSAL

WATER AND TAILINGS

More than 255,000 cubic metres of water per day are used in the flotation process to sustain the daily milling rate of 133,000 tonnes at the Highland mill.This volume is higher than the maximum daily water demand for a city the size of Kamloops with a population of 62,000 residents.

Because Highland Valley is located in what is called the 'Interior Dry Belt', an area where precipitation varies from 30 to 60 cm annually, water must be collected and pumped to the mill for use in the flotation process and then fed back to the tailings pond. The tailings pond acts as a controlled catchbasin for recycled water, surface drainage water and fresh water from wells or rivers. In addition, it provides a secure containment area for the large quantity of sand-like tailings produced by the milling process. The tailings pond is contained between two dams about thirteen kilometres apart.

Process water and tailings sand produced in the milling process are transported by gravity through three, high-density polyethylene pipelines 7 kilometres long, and deposited in the south end of the tailings pond. Approximately one-third of the tailings flow is pumped to the north end of the pond to provide 1,300,000 cubic metres of sand annually for building of the L-L dam. Seepage through the dam and surface water below the waste dumps, is collected and put back into the pond thus eliminating the possibility of contamination of surrounding areas.

View of tailings pond looking towards the H-H dam.

The reclaim water system, with a capacity of 153,000 litres per minute, is comprised of two barge-mounted pumping stations feeding two booster stations. From the booster stations water is pumped to the 871 million litre reservoir and, from this structure, the flow is routed back by gravity to the Highland mill and the three 4.5 million litre storage tanks.

The raw make-up water demand of 24,000 litres per minute is met from dewatering wells located on the perimeter of the Valley pit, additional wells, snow melt, and surface runoff. Another source of make-up water is the Spatsum facility located in the Thompson River that can pump up to 26,500 litres per minute into the reclaim system. The intake incorporating a travelling screen is designed to ensure low flow velocity that prevents young fish from entering the river pumps.

View of the large L-L dam.

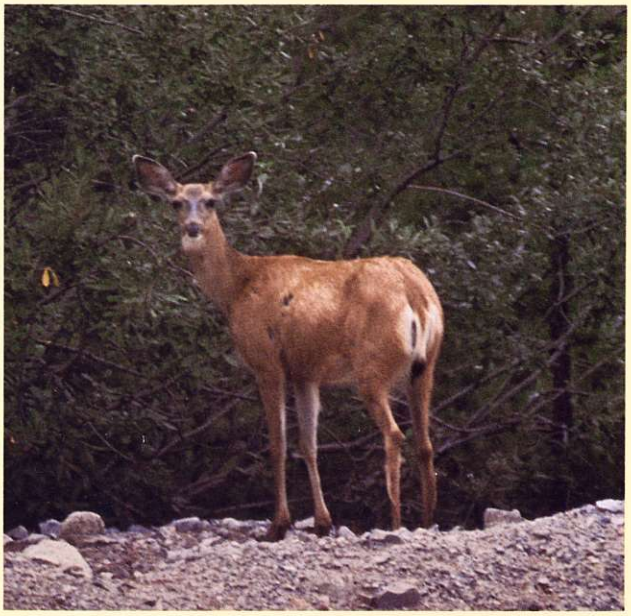
RECLAMATION AND ENVIRONMENT

Reclamation has been carried out in the Highland Valley since the early 1970s. Since the nature of open-pit mining generally involves an increased disturbance of the land with time, reclamation often cannot be commenced in a significant manner until areas of the mining/dumping activities have ceased. Early reclamation work focuses on testing the suitability of plant species, time of planting, planting frequency, as well as fertilizer application rates and mixtures for the various site conditions. As much as possible, native plant species are utilized.

Reclamation is being carried out on the inactive Highmont and Bethlehem tailings ponds. This program covers approximately 400 hectares. Reclamation on the waste dumps has also commenced; however, the progress is tied to the mining schedules and the overall pit development. By 1990, Highland Valley Copper had reclaimed and revegetated 12% of the area disturbed by the mining activities. This is an integral part of the mining process.

As the tractor/seeder drops grass seed on an old tailings area the front end loader lays a thin layer of asphalt to keep the freshly planted seeds from blowing away.

New reclamation on old tailings area in progress. Within two years this area will be an extension of the large green field in the background.



(Top) Many forms of wildlife live in and around the mine site. (Above) Large mine site areas no longer in use are on the way to becoming productive pasture land.

Some of the ultimate land uses planned for different areas of the abandoned mine sites are tree farming in cooperation with the Provincial Forestry Service; enhanced grazing land, both for cattle and wildlife; hay production on irrigated flat areas and recreational land for public use.

Waste management encompasses a wide spectrum - from water to hazardous wastes. Water is monitored to insure that quality standards are being met. Programs are in place to manage hazardous materials which are used at the mine, and personnel are trained in the proper procedures for handling hazardous materials. Disposal of hazardous waste material is carried out in compliance with the applicable regulations.

Old Lornex waste dumps are turned into vast useable pasture land.

MARKETING AND SALES

Highland Valley Copper is one of the world's largest producers of copper concentrate. Each year it delivers over 400,000 tonnes of clean, high grade material to smelters, mainly in the Far East and Europe. More than one half of this production is sold to Japan. These concentrates contain over 160,000 tonnes (or 360 million lbs.) of copper, as well as small amounts of silver and gold. Molybdenum concentrate containing 4 to 5 million lbs. of molybdenum is shipped to customers worldwide.

Copper metal has been used by man since the bronze age began about 3000 B.C. Today, because of its good electrical conductivity and ductility, copper is used for the transmission of electricity, for electric motors and appliances and for piping and plumbing fixtures. Due to its high thermal conductivity, copper is also used in water heaters, boilers and cooking utensils. It can be alloyed with zinc to form brass and with tin to form bronze.

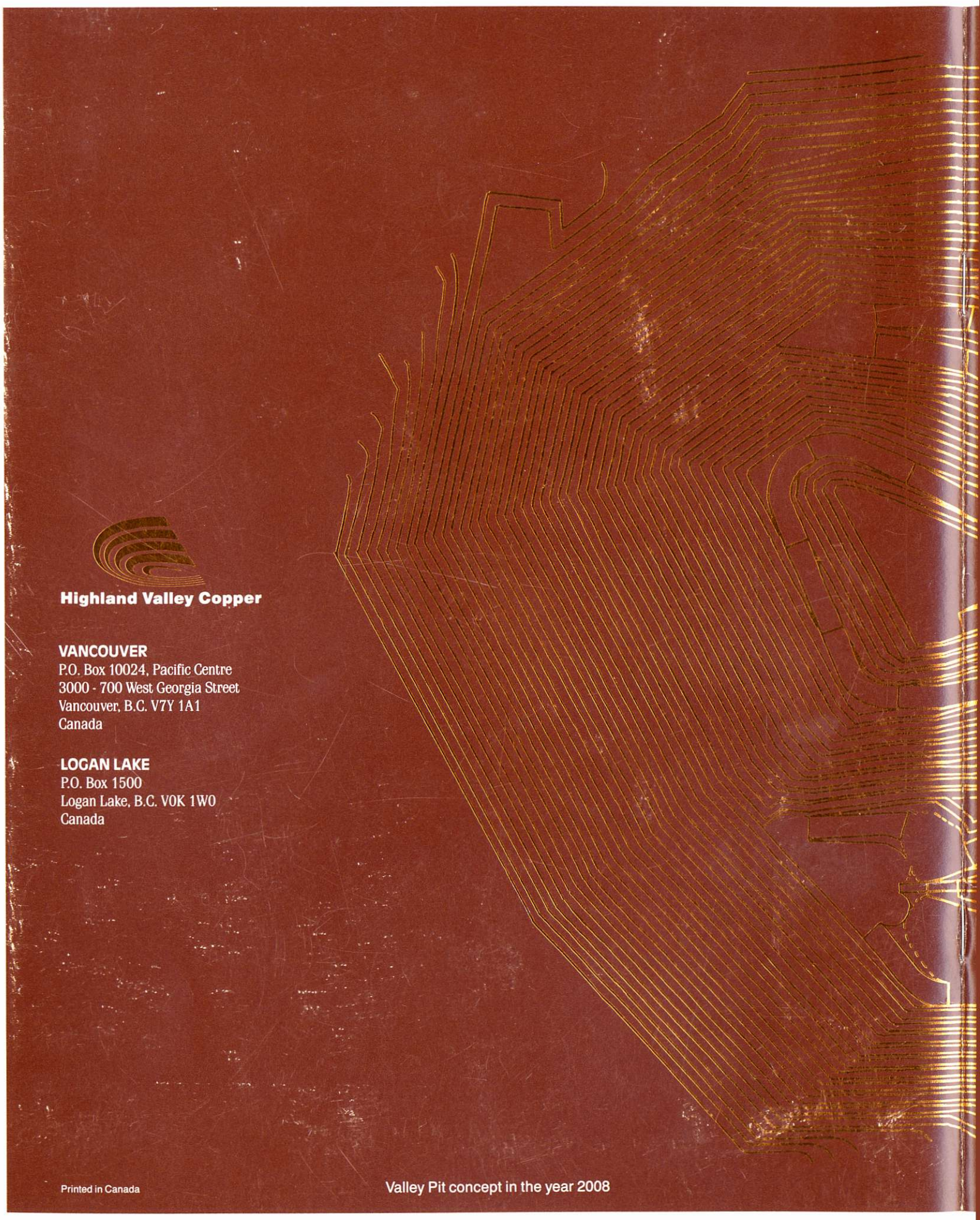
Molybdenum is a versatile alloying material. It provides hardenability in steels and irons. Not only is it an efficient hardening agent, but it enhances the toughness of the hardened steel at the same time. Molybdenum also enhances the corrosion resistance of stainless steel.

Marketing and sales are conducted from Highland Valley Copper's office in Vancouver by a small team of marketing and transportation specialists.

Over 90% of Highland Valley Copper's copper and molybdenum concentrate sales are to overseas customers.

Highland Valley Copper concentrate is loaded into ocean-going vessels for destinations around the world.

The community of Logan Lake, 15 kilometres from the mine site, is the home for about 40% of the Highland Valley Copper employees.



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Valley Pit concept in the year 2008