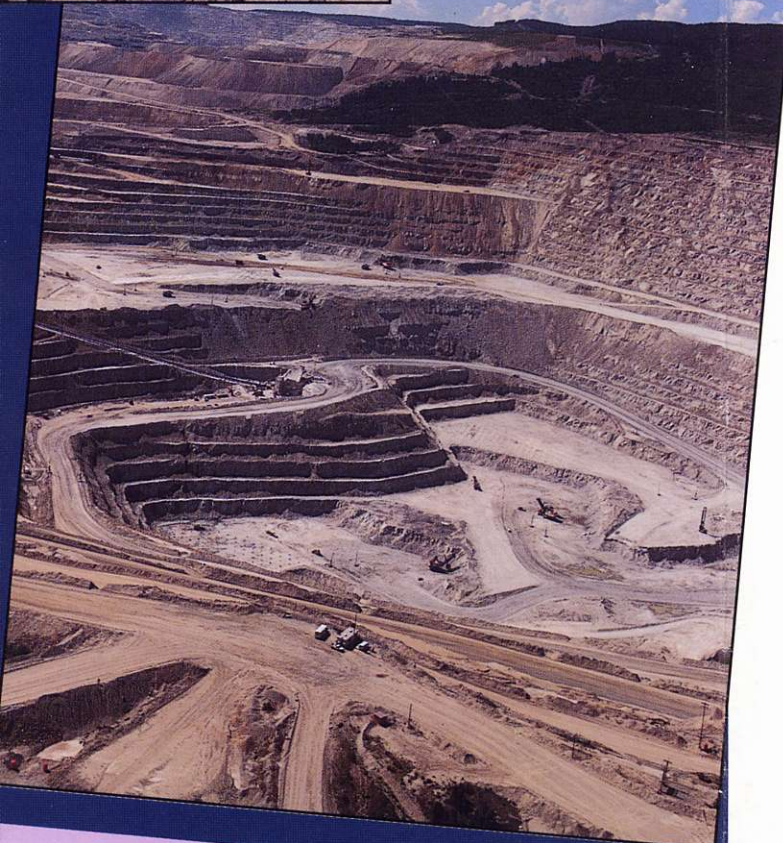




The excavations

Highland Valley Copper has two copper/molybdenum orebodies: the older Lornex orebody (inset), and the newer Valley orebody which went into production in 1983 and will eventually become one of the larger open-pit excavations in the world.

Canadian owned and operated

Highland Valley Copper is owned by three major Canadian companies; Cominco, Rio Algom and Teck Corporation.

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



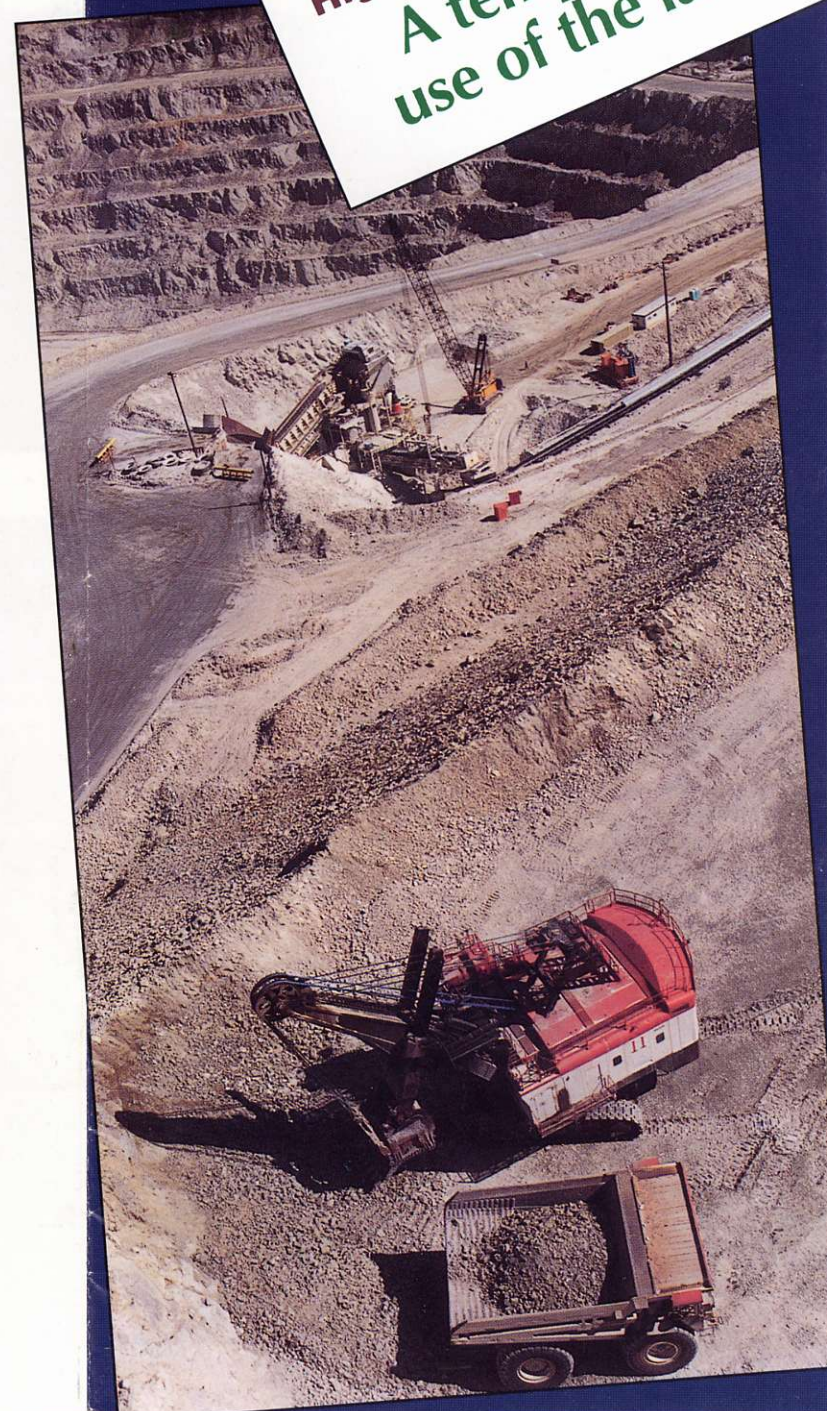
Highland Valley Copper

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Highland Valley Copper
**A temporary
use of the land**

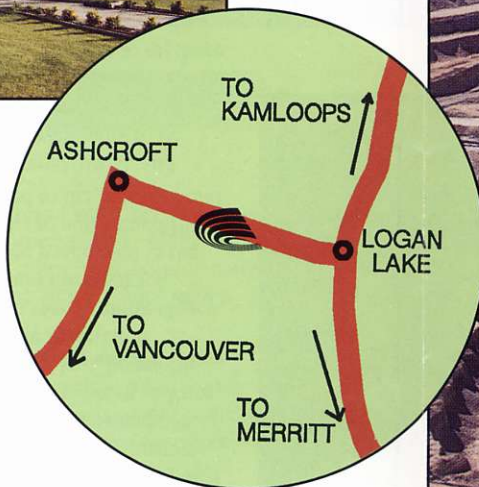


The mine

On July 1st, 1986, Highland Valley Copper was formed as a partnership between Lornex Mining Corporation Ltd. and Cominco Ltd. Two years later Highmont Mining Company became part of the operation. The partnership optimized the use of the companies' best assets in the Highland Valley – the large and highly efficient Lornex mill which was enlarged with Highmont's mill and Cominco's Valley orebody.

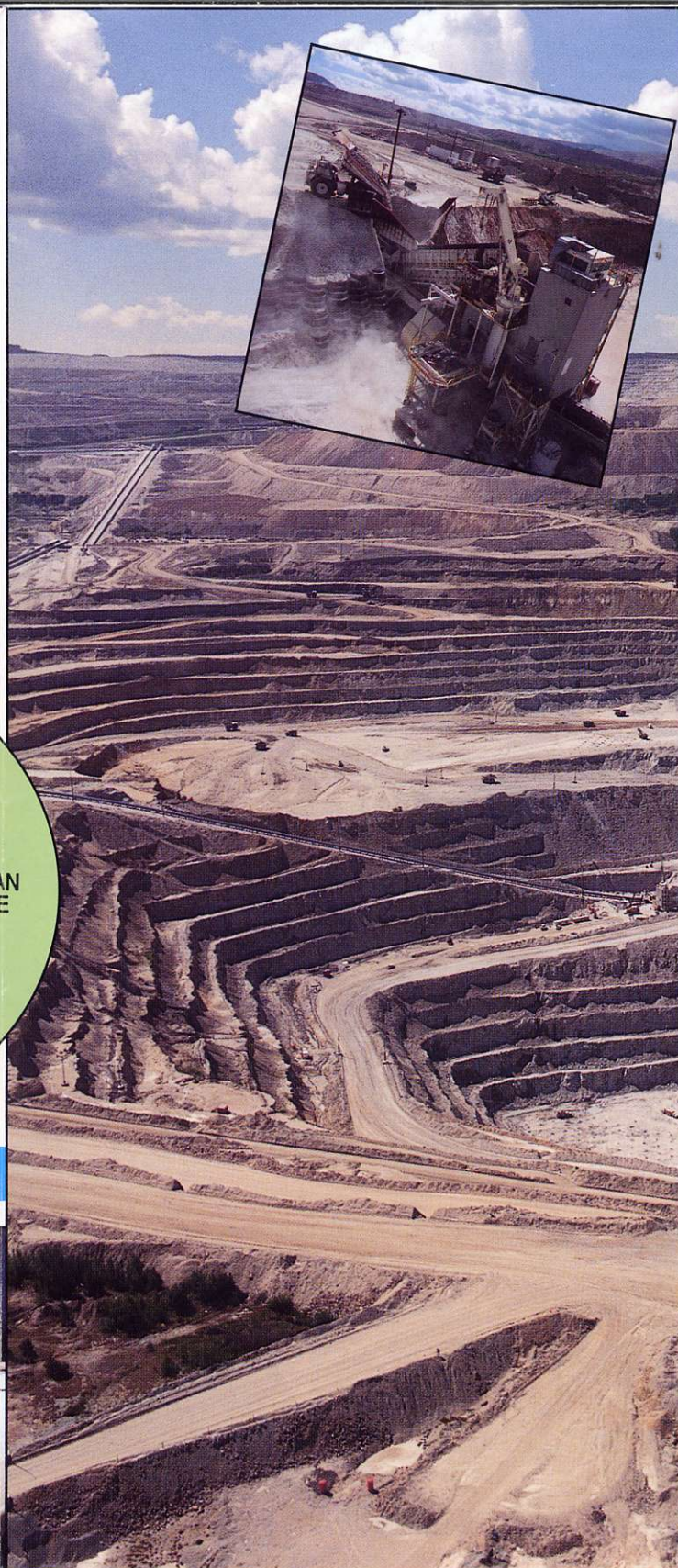
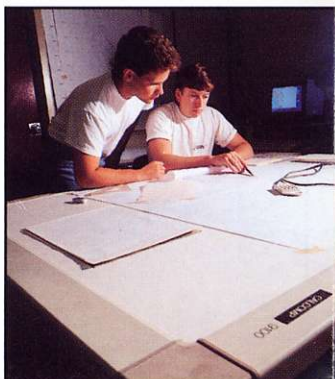


Above: The mine administration offices of Highland Valley Copper. Right: The mine is located approximately 80 km southwest of Kamloops and 60 km north of Merritt.



Planning the job

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.



Getting the ore out



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 260,000 tonnes of ore and waste are mined each day yielding about 125,000 tonnes of ore.

Primary excavation in the pits is carried out by a

fleet of electrically powered shovels. The haulage fleet consists of 33 172-tonne trucks.

Modern technology is used to get maximum benefit from the shovel/truck rock-handling system. 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. In addition, all pit equipment, especially the trucks, are controlled through a computer-driven dispatch system.

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. The ore from the Lornex pit is fed into a fixed crusher near the Highland mill.

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

Breaking down the ore

Currently, with five grinding mill lines, the Highland mill produces 1,100 tonnes per day of concentrate grading 40% copper. The mill is fed from three coarse-ore stockpiles which are supplied by the three crushers via a system of conveyors.



Top: Production blast in the Valley pit. Right: One of the coarse ore piles that feed the concentrator.

Recovering the minerals

The coarse ore passes through the grinding circuits and is reduced to such a fine size that the copper and molybdenum minerals are liberated 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.

A chemical "collector" is added to the slurry which adheres to the surface of the valuable minerals, and a "frother" is also added to improve the formation of bubbles. This process separates the grains of waste rock from the activated ore minerals 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 to two cleaning stages, one for copper concentrate and the other for molybdenite concentrate. The water used in the flotation process, along with the non-mineral sand-like particles, is directed to the tailings pond. The copper concentrate is filtered, dried, and discharged into a storage silo eventually to be loaded into trucks and taken to the railhead in Ashcroft. From Ashcroft, the concentrate is moved to Vancouver by rail to await shipment to offshore smelters. The molybdenite concentrate is shipped by truck for distribution in North America and offshore destinations.



Above: Bags of molybdenum ready for shipping. Delivering concentrate to the Ashcroft loadout terminal.



Left: The L-I dam and tailings pond. Above: Planting trees on groomed waste dumps. Right: Waste dumps are turned into useable pasture land. Above right: Deer and other wildlife frequent the reclaimed areas.

Recycling the water

More than 255,000 cubic metres of water per day are used and recycled in the flotation process. This volume is approximately one and a half times the maximum daily water demand for a city the size of Kamloops with a population of 73,000 residents.

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 tailing pond is contained between two dams about 13 kilometres apart.



Left: The community of Logan Lake, 15 km from the mine site, is the home for about 33% of the Highland Valley Copper employees.

Reclamation

Highland Valley Copper's reclamation department along with the Provincial Government's Mines Department have established guidelines for long-term reclamation. These rules apply to the mined-out pits, waste dumps and tailings ponds and other disturbed areas.

Some of the ultimate uses planned for different areas of the abandoned mine sites are: enhanced grazing land, both for cattle and wildlife; hay production on irrigated flat areas and recreational areas for public use, such as the Trojan Pond for fishing.

Environmental protection

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 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. As much as possible, local native plant species are utilized. By the end of 1994, Highland Valley Copper had reclaimed 15% of the area disturbed by the mining activities.

Waste management encompasses a wide spectrum. Water is monitored to insure that quality standards are being met. Numerous programs are in place to manage hazardous materials, such as PCB and waste oil. Personnel are trained in the proper procedures for handling and disposing of these materials in compliance with the applicable regulations.

Delivering the product

Highland Valley Copper is one of the world's larger producers of copper concentrate. Each year it delivers 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. Marketing and sales are conducted from Highland Valley Copper's office in Vancouver where over 90% of copper concentrate and molybdenum sales are made to overseas customers.

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, air-conditioners, boilers and cooking utensils. It can be alloyed with zinc to form brass and with tin to form bronze. A by-product of the copper ore is molybdenum, a versatile alloying material used primarily in the hardening of steel.



Above: Loading copper concentrate in Vancouver.

