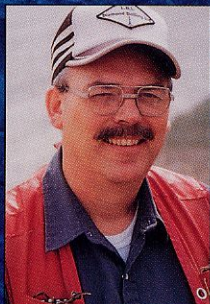
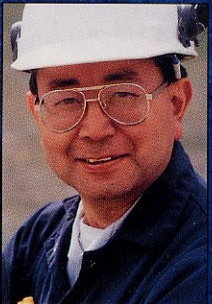


G I B R A L T A R M I N E S

*Tom Schwartz
June 10/93*

THE FIRST TWENTY YEARS
1972 - 1992

883363



COPPER FROM THE CARIBOO REGION OF BRITISH COLUMBIA



I N T R O D U C T I O N

The Gibraltar Mine produces copper in concentrate, copper metal and molybdenum from a large mineral deposit located 37 miles north of Williams Lake in the interior of British Columbia.

Although it is the lowest grade copper mine operating in North America, with the orebody containing only 0.3% copper, it has been able to survive the wide fluctuations in the copper metal market where many others have not.

Gibraltar started producing in 1972, a time of unprecedented growth in the minerals industry. The political and social environment of the day favoured the development of large-scale mining operations. Incentives such as the three-year tax free period for new mines were a boon to the industry and a major reason for Gibraltar's start.

Gibraltar was fortunate to come into production right in line with a significant increase in the price of copper, which helped to pay off the \$64 million construction cost in just under two years.

Gibraltar has been able to continue in operation all these years by keeping up with technological change and, with its employees, looking at ever more efficient methods of operation. Gibraltar survived the recession of the early 1980's by going through a major restructuring programme, which left it well positioned for the next recovery in copper prices.

The mining equipment in operation in 1992 is 2½ to 3 times larger than that in 1972, while the workforce level at 277 is a fraction of its 1982 level of 659.

Being able to do "more with less" is the secret to success that will hopefully enable Gibraltar to operate into the 21st century.



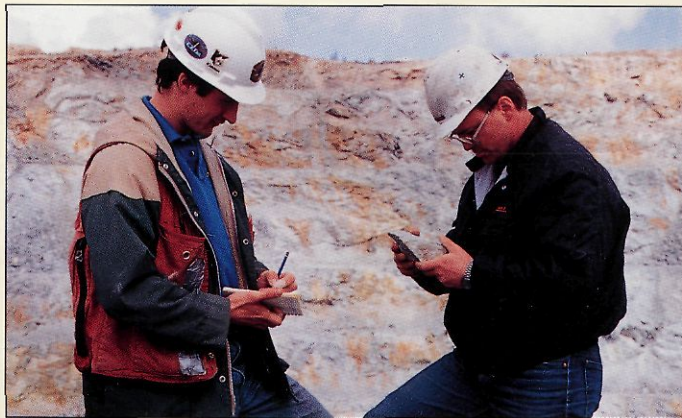
MINING

The four orebodies being mined are located on the westerly slope of Granite Mountain near McLeese Lake. Currently (1992) two open pits are being mined. Computer technology is used to design these open pits and schedule the mining to achieve the most economic extraction of resources.

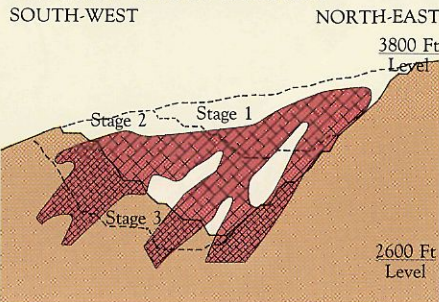
Mining is carried out on 45 ft.-benches, with safety berms of 45 ft. minimum width installed every second bench. This design incorporates working faces of 67 degrees, to give an overall final pit slope of 45 degrees.

To prepare the rock for mining, it first undergoes drilling and blasting. Surveyors locate the position of the 97/8-in. to 133/4-in. diameter drill holes at 20 ft. to 30 ft. intervals. These 52 ft.-deep holes are loaded with an ammonium nitrate-based blasting agent at a rate of 0.4 lbs. of explosive per ton of rock. In this manner, the pit produces 105,000 tons of broken material per day to be moved.

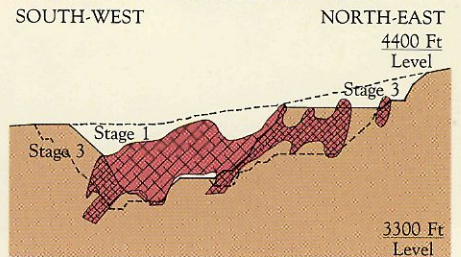
Production crews, working round the clock, load ore, oxide material and waste rock into 240-ton trucks using electric shovels up to 40 cubic yards in capacity (pictured left). The material is separated using assays and surveyed boundaries, into either ore which is fed into a crusher and conveyor system, or oxide and waste, which are placed on dumps. The oxide material is stored in a separate location to allow treatment at a later date to extract the small amounts of copper by leaching (See Cathode Copper page 6).



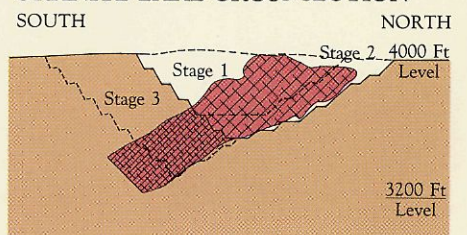
GIB-EAST CROSS SECTION



POLLYANNA CROSS SECTION



GRANITE LAKE CROSS SECTION



- Mined Out Ore
- Projected Ore



MILLING

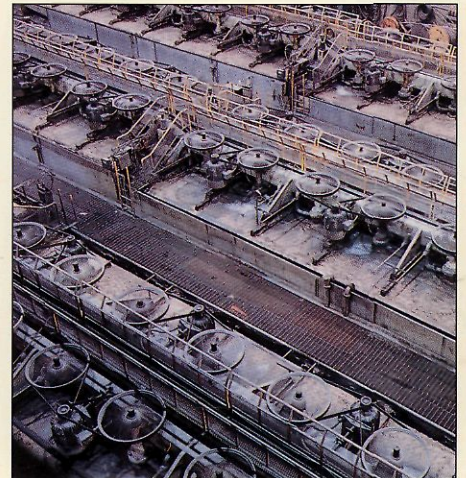
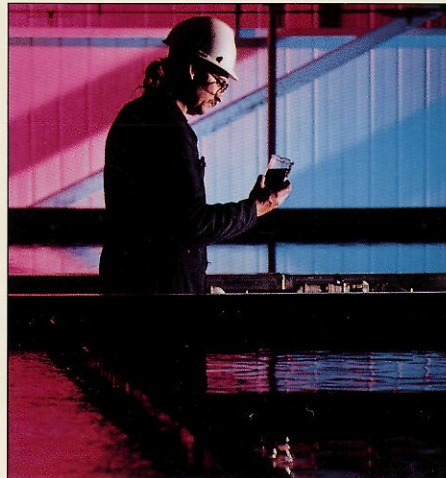
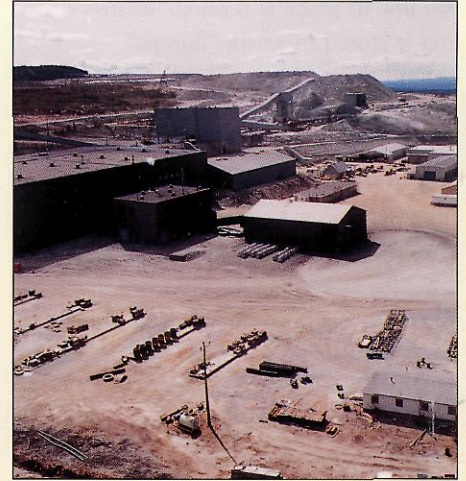
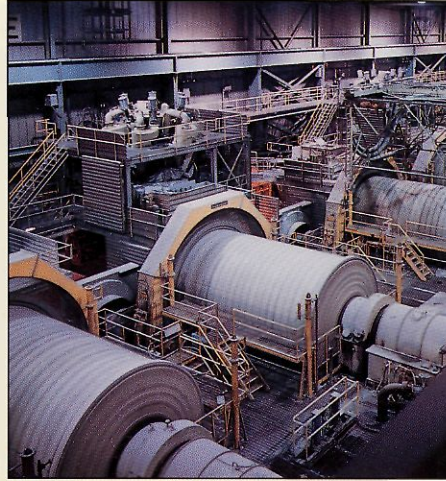
Milling is the process of extracting the valuable minerals in the ore by separating them from the remainder of the rock. At Gibraltar, the ore typically contains only 0.3% copper. This means every ton of ore milled contains about 6 lbs. of copper. In the mill, about 82% of this copper is recovered as a concentrate. Each ton of ore milled is reduced to only 20 lbs. of concentrate.

The first step in extracting the copper is to grind the ore in the presence of water to a fine slurry. The copper minerals are then extracted by a process called flotation. Reagents, which coat the copper particles, are added to the slurry of ore and water. The slurry then passes through agitated tanks, where air is blown in at the bottom to form thousands of small bubbles (pictured left). The reagents, which coat the surface of the copper minerals, cause them to stick to the bubbles and carry them to the surface, where they are skimmed off. There are a number of stages of flotation used to make the copper concentrate as pure as possible.

There is some molybdenum in the slurry and this floats with the copper minerals. They are separated later, again by flotation.

The residual slurry, called tailing, goes to a special impoundment area, the "tailing dam", where the sand is permanently stored. Most of the water is recycled to the mill to be used again.

The final copper concentrate, containing 28% copper, is trucked 18 miles to Macalister where it is loaded on to BC Rail cars for transport to North Vancouver. Here it is loaded aboard bulk carrier ships for transfer to smelters, primarily in Japan, where it is refined into pure metal.



CATHODE COPPER

During mining, not all of the rock extracted has enough copper in it to warrant the cost of processing it through the mill. The rock that is too low in grade is termed "waste" and is stored in waste "dumps" around the property. The low levels of copper can, however, be recovered by the leaching method. By adding acid in solution to the dumps (pictured lower right), a leaching process is set in motion in which naturally occurring bacteria break down the copper minerals and allow the copper to be dissolved and carried from the dumps.

A plant to recover 5,000 tons per year of copper metal was commissioned in 1986. Acid solutions are fed to the top of the dumps, the solution filters through the rock, dissolving copper, and is collected in ponds at the foot of the dumps. The copper-in-solution is piped to an extraction plant which uses a chemical separation technique called solvent extraction which upgrades the copper in solution. Electricity is then run through the solution, causing pure copper metal to plate on to suspended stainless steel sheets (picture at right). The copper is then stripped off the sheets and is ready for market.

The copper is so pure (99.9%) that it fetches a premium price. This part of Gibraltar's operation turns waste into metal and has an added environmental benefit. By dissolving metal out of the rock, the natural leaching process, which would occur slowly in any event, is accelerated, removing the metals which would otherwise require a much longer-term control programme.



RESPECTING THE ENVIRONMENT

Pollution and environmental matters are of paramount concern to the public, the government and the industrial sectors. The mining industry is subject to stringent environmental regulations at all stages of exploration, development and operation of mines. At Gibraltar, protecting the environment is as important to us as producing copper profitably.

The first priority of a mine is to protect the waters and lands around the mine from contamination by substances generated by, or used in, the operation. Gibraltar operates under a zero discharge waste water system, in which all process water and natural run-off is collected, recycled and re-used. An extensive monitoring programme of surface and sub-surface water is designed to ensure no contaminants reach the environment outside the property (picture right).

Gibraltar has already begun reclaiming areas which have been affected by mining. The Company has contributed \$7 million to a \$10 million fund to ensure that final reclamation costs will be met when operations cease. The fund will be fully in place by 1994.

Environmental research is ongoing in several areas to assure the most up-to-date and efficient methods will be used to return the land to a profitable level for both recreational and commercial ventures. Wildlife, such as this deer (right), already share the Gibraltar property.

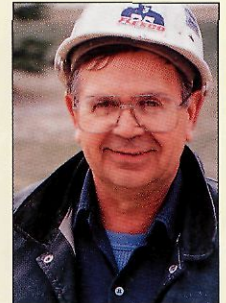
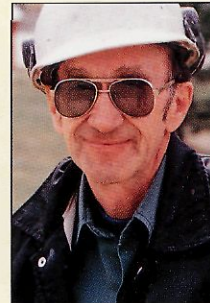
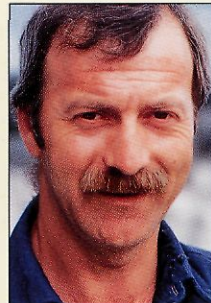
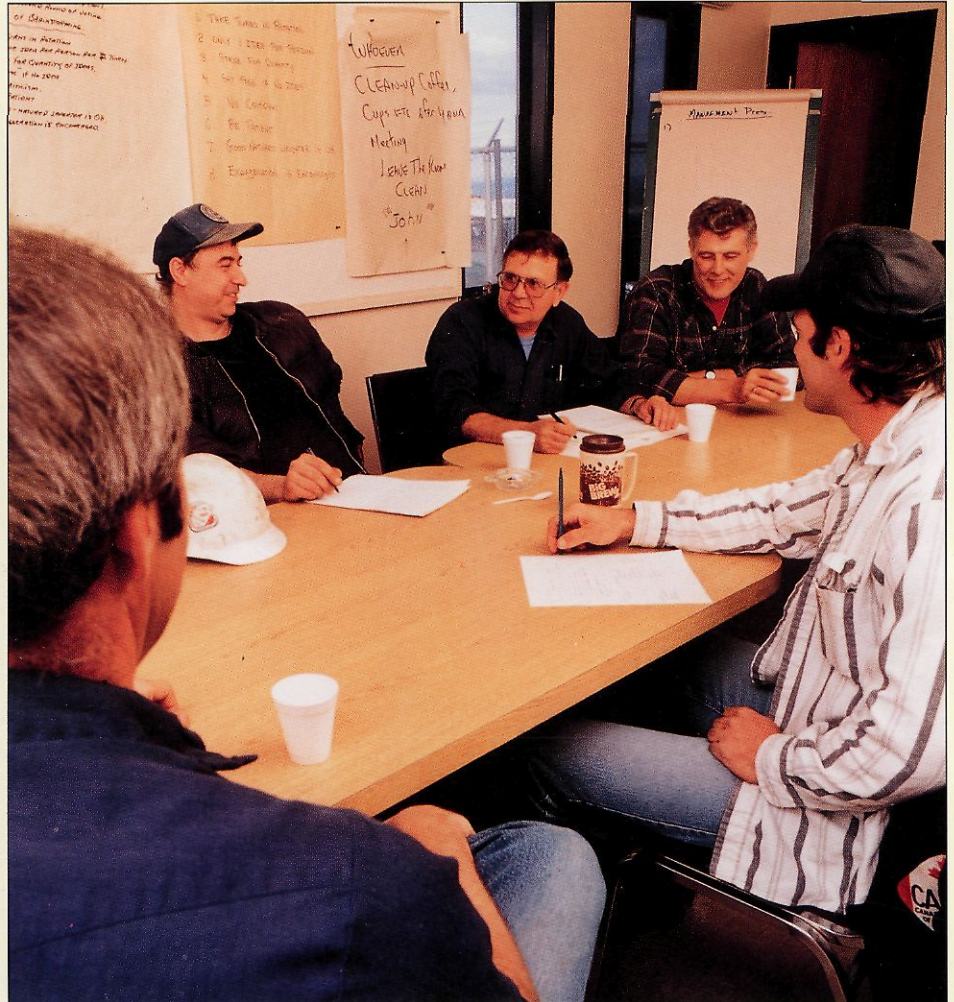


HUMAN RESOURCES

We regard our employees and their skills as our greatest asset. Gibraltar has had to change constantly since it started in 1972 in order to stay in operation. This has included technological innovation and changes in how we perform the work.

At the end of 1981, the workforce numbered 649, compared with our total today of 277. We have always strived to find better and more efficient ways of doing our jobs. Through our employees' dedication, continuing training programmes and support, we have been able to survive where many other mines have not. Some of the people who were here in 1972 are pictured on these pages and on the cover.

At Gibraltar we are striving to get employees more involved in the decision-making process in their areas of expertise and responsibility through a programme called "Improving Gibraltar by Involvement". The concept is to show employees they make a difference and to encourage them to contribute ideas on ways that jobs can be bettered. Groups of employees meet on Company time to analyze problems and suggest solutions, such as the group pictured at right.



GIBRALTAR AND THE COMMUNITY

Since the Gibraltar Mine started operating 20 years ago, it has been one of the mainstays of the Williams Lake and area economies. The 1991 payroll was just under \$18 million, with most of the after-tax money being spent in the local area. Compared to other occupations in British Columbia, mining jobs pay above average wages (about \$47,000 per year at Gibraltar) and make it possible for mining people to enjoy excellent lifestyles.

In addition to direct payroll and benefits, the mine has paid a total of \$83.6 million in Federal, Provincial, and property taxes since its startup. The mine supports local community service clubs, charitable organizations, sports events and teams and provides scholarships to high school graduates. Gibraltar has committed \$500,000 for the development of a multipurpose arts centre at the Williams Lake arena complex.

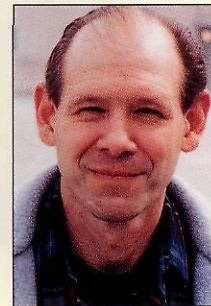
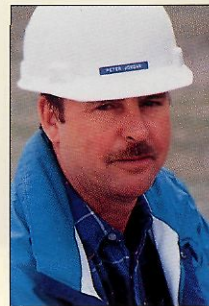
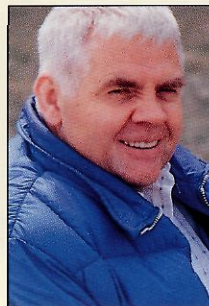
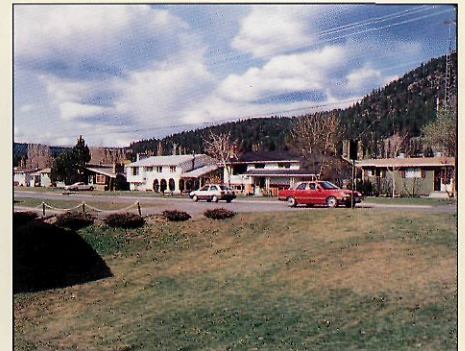
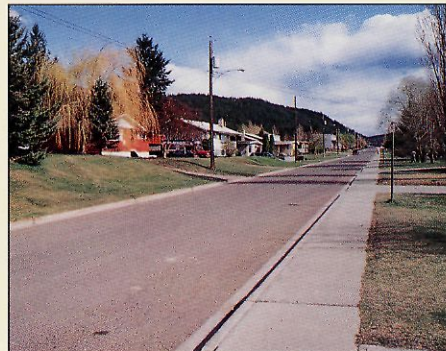
The mine creates many economic spinoffs to local suppliers and providers of services, with 1991 expenditures totalling over \$2 million.

In summary, the investment of \$64 million in 1971/72 has temporarily disturbed some 1,800 hectares of land and has generated over \$368 million of economic activity in the local area. This does not include the many more millions of dollars in goods and services in the multitude of spinoff and support industries.

DIRECT CASH GENERATED 1972-1991 (\$ MILLIONS)

Wages/Salaries/Benefits	\$242.3
Shareholders' Dividends	\$115.0
Taxes: Federal	39.3
Provincial	24.9
Property	17.9
Mineral	1.5
	<u>83.6</u>
	\$ 83.6
Local suppliers	\$ 42.0
TOTAL	\$482.9

Mining is of major significance to the Canadian economy.



KEY DATA

	1991	1972-1991
Tons Mined	36,159,000	525,908,000
Tons Milled	13,143,000	250,523,000
COPPER PRODUCTION		
Lbs. in concentrate	63,393,000	1,460,760,000
Lbs. in cathode	7,343,000	45,654,000
Lbs. molybdenum	808,000	17,864,000
Area disturbed		1,748 hectares
Area reclaimed to-date		262 hectares



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