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**Cominco Ltd.  
1990  
Annual Report**

*Kenneth M. Dawson*





## Summary of Business Activities

Incorporated in 1906, Cominco Ltd. is an integrated natural resource company with principal activities being mining, smelting and refining, mineral exploration and fertilizer production.

Cominco is one of the world's largest producers of zinc and lead, accounting for 13 percent and 11 percent, respectively, of mine production in the Western World. The Company also produces and sells copper concentrate, silver, gold, ferronickel, molybdenum, cadmium, bismuth, germanium concentrate and indium.

Cominco is an important producer of fertilizers, most of which are marketed in North America, under the Elephant Brand name in Canada and under generic names in the United States. The principal products are ammonia, urea, ammonium nitrate, ammonium phosphate, ammonium sulphate and potash. The Company also produces sulphuric acid, sulphur dioxide and hydrofluosilicic acid.

Cominco is committed to the protection of the environment, to promoting the health, safety and welfare of its employees and to achieving favourable returns for its shareholders.

**Cover: There is no road access to the remote Snip gold mine at Bronson Creek in northwestern British Columbia. To overcome this, Cominco came up with a novel and efficient means of transportation — an all-weather hovercraft. It ferries supplies and concentrate along the Iskut and Stikine rivers between the mine and Wrangell, Alaska. Right: Snip's accommodation complex, service building and mill are located at the base of Johnny Mountain.**

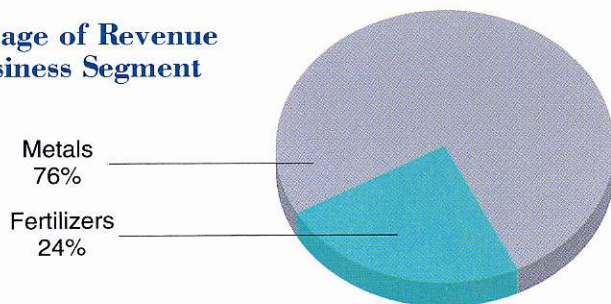


## Financial Highlights of the Year

(all dollar amounts in millions except per share figures)

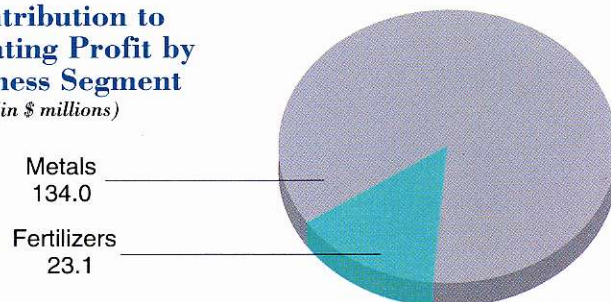
	1990	1989
Sales	\$1,403.5	\$1,591.3
Net earnings	54.8	214.6
Net earnings per Common Share	0.65	2.64
Return on Common shareholders' equity	4.5%	20.8%
Cash from operations	130.4	491.8
Dividends paid per Common Share	0.50	0.50
Shareholders' equity	1,312.9	1,303.4
Capital expenditures	237.7	380.6

### Percentage of Revenue by Business Segment



### Contribution to Operating Profit by Business Segment

(in \$ millions)







The Red Dog mine in northwestern Alaska completed its first full year of operations in 1990.

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## Terms Used

In this Report, all dollar amounts are Canadian unless otherwise noted. All tons are short tons, with metric tonnes (plus other metric measurements) adjacent in *italics* and in parentheses. A tonne is 1,000 kilograms or 2,204.6 pounds.

## Annual Meeting

The Annual Meeting of Shareholders of Cominco Ltd. will be held on April 25, 1991, at 11:00 a.m., in the Park Ballroom, Four Seasons Hotel, Vancouver, B.C.





**The concentrate storage building dominates the Red Dog port site on the Chukchi Sea. Concentrates are transferred to waiting vessels offshore via specially designed barges.**



## Report of the President to the Shareholders

As a result of below capacity production of lead and zinc at the Trail smelter, exhaustion of the Pine Point concentrate stockpile and lower metal prices, Cominco earnings dropped substantially below those achieved in the previous three years.

Earnings for the year were \$59.1 million before deducting a loss of \$4.3 million from gold properties that are planned for divestment, compared with record earnings in 1989 of \$214.6 million. The Corporation's sales for the year were \$1,403.5 million compared with sales of \$1,591.3 million in 1989.

Total indebtedness increased to \$582.4 million compared with \$468.6 million at the end of 1989 as a result of some on-going expenditures at the Red Dog mine, the costs associated with the start-up of the lead smelter at Trail, the on-going zinc plant modifications, the re-opening of the Sullivan mine and the construction of the Snip gold mine. Total capital assets were increased by \$237.7 million principally through expenditures on the preceding projects.

Metal prices for zinc, lead and copper, Cominco's most important products, were higher than most experts predicted, but prices for zinc and copper were well below last year's levels. The London Metal Exchange price for zinc at the beginning of the year was U.S. 59.4 cents/lb. and in May it reached a high of U.S. 84.8 cents/lb. By year-end, the price had fallen to U.S. 56.7 cents/lb., resulting in an average price for the year of U.S. 68.9 cents/lb. compared with an average of U.S. 77.7 cents/lb. in 1989.

Copper prices started the year on a weak note on the London Metal Exchange at U.S. \$1.08/lb., but rose to a high of U.S. \$1.54/lb. in September and finished the year at U.S. \$1.15/lb. for an average of U.S. \$1.21/lb. compared with an average of U.S. \$1.29/lb. in 1989. Lead prices were strong with the average price at U.S. 36.8 cents/lb., or U.S. 6.3 cents/lb. higher than the average in 1989. Prices for specialty metals such as silver, cadmium, bismuth and indium were well below prices achieved in 1989. Further compounding the decline in world metal prices expressed in U.S. dollars, was a Canadian dollar which was two per cent stronger in 1990 than in 1989.

The Metals business segment had an operating profit of \$134.0 million compared with \$407.9 million in 1989. Much of the difference was due to the poor performance of the Trail Metallurgical Operations. Zinc production at 203,200 tons was well below the plant capacity of 315,000 tons. Construction of modifications within the operating plant proved to have a more detrimental effect on production than anticipated. Modifications to the zinc plant were necessary to treat the more complex concentrate produced by Red Dog and most other zinc mines in the world. Construction of the new QSL lead smelter was completed to design specifications late in 1989 and the plant was operated until March 1990 when it was shut down for repairs and modifications. It was expected that the plant could be restarted towards the end of the year, but modifications proved to be more extensive than first contemplated. The start of another QSL plant in Germany will provide additional information and Lurgi, the process supplier, has advised that they expect modifications necessary for the successful operation of the Trail plant can be designed and installed by late 1991 or early 1992. The plant, as currently constructed, is suitable for revisions to the QSL process or conversion to another available technology should the need arise. Most of the plant's equipment, systems and structure are not affected by fundamental technology section. For example, the oxygen plant, gas handling system, slag and bullion treatment are compatible with any changes that may be necessary. As a backup, Cominco is continuing to investigate and is prepared to have test work done on other commercial scale lead smelting processes, including MIM's ISAMELT and SAMIN's Kivcet technologies. In the meantime, the old smelter is



R.E. Hallbauer



continuing to operate at about 80 percent of capacity and can be sustained at that level until modifications to the new smelter are complete.

It was gratifying to be able to achieve conditions that allowed the re-opening of the Sullivan mine. Development work started in August and the mill started operating in November. It is hoped that the Sullivan will operate for another 10 years as currently planned, but this will depend on metal prices, satisfactory operating costs and a continuation of improved productivity. The excellent operating results achieved at the mine in the first few months following the resumption of operations gives us cause for optimism.

Construction and start-up of the Red Dog mine was achieved on schedule, but Red Dog had its share of the start-up problems that are common to complex operations in a remote environment. Because of the short shipping season and the fact that concentrate production is not recorded in earnings until the product is sold, or in the case of treatment by Cominco, until the metal is sold, earnings at Red Dog were modest in 1990. With higher production and the filling of the concentrate pipeline, earnings should improve substantially in 1991. The Winter of 1990-1991 has been the worst experienced since work started at Red Dog, particularly with the amount of snow and high winds. The weather has caused problems in employee transportation, concentrate haulage and in ore feeding, but the operation has met the challenges of the harsh environment and has achieved satisfactory production levels.

In January 1991, the Snip gold mine in northwestern British Columbia began operations. As noted last year, construction of the mine was delayed to conduct additional underground development and drilling. This work confirmed ore tonnages and grades that justified a production decision and construction of the plant was started in the late Spring and was completed by year-end despite a year of heavy snow and cold weather.

The Fertilizers business segment had an operating profit of \$23.1 million compared with \$38.2 million in 1989. The decrease in profit was primarily due to lower potash prices. Production and sales of phosphate rock from Warm Springs were down because of below normal metal production at Trail. Operating profits from the nitrogen segment were higher than last year as markets improved during the year with urea prices reaching their highest levels late in the year.

Exploration is the lifeblood of a mining company and both Cominco and Cominco Resources continued active exploration programs in their respective areas with a total expenditure of \$39.5 million.

Cominco's most notable success in 1990 was the discovery by grass-roots exploration of a porphyry-style copper-gold deposit in south central Alaska. Results from an initial diamond drilling program conducted in 1990 at the "Pebble Beach" property suggest a resource of approximately 200 million tons averaging .4 percent copper and .012 ounces of gold per ton. Within this area, a 50-million-ton portion averages .5 percent copper and .015 ounces of gold per ton. The size of the deposit and grade indications are based on early-stage drilling. Most drill holes are only 300 to 400 feet deep and are approximately 1,000 feet apart. The zone is open to depth and to the northeast. A follow-up program of extensive detailed diamond drilling is planned for the 1991 field season.

Cominco Resources continued an active exploration program in many countries, but poor financial results from its participation in the Marte gold mine in Chile and from the Oregon nickel smelter reduced its ability to fund as extensive a program as it has in the past. It has therefore made a decision to farm out some of its properties and thereby create conditions under which it can continue to explore its more advanced projects and also continue its effort to locate new projects. Cominco Resources has a large number of exploration projects and there is an excellent possibility that a number of new mines will result from their programs.



A number of companies have announced cutbacks in exploration programs due to the deterioration of metal prices and earnings. Cominco will be continuing its programs in 1991, both through its own exploration and through Cominco Resources. Although the acquisition of orebodies can be an attractive proposition, particularly at an early stage, the truly great rewards for a mining company come from initial discovery. It is with this in mind that Cominco directs a great deal of its effort to grass-roots exploration in areas of favourable geology throughout the world. We currently have a number of early-stage projects that will be explored during the coming year.

Work on the Quebrada Blanca project in Chile, which is held jointly by Cominco and Cominco Resources, is progressing and we expect to have a decision on whether to proceed with development by mid-year.

The Company continued to improve and maintain environmental conditions at its operations. The failure of the QSL lead smelter at Trail to start on time has delayed some of our planned improvements, but we have made progress in other areas. The Vision 2000 program at Trail is progressing with improvements in storage, clean-up and dust control. Increasingly complex and comprehensive environmental review requirements at the Federal and Provincial Government levels have made the development of new projects more difficult and expensive. It is not only the meeting of effluent standards that is causing industry difficulty, it is the time required for project review, consultations and information gathering. Unless methods of dealing with new projects are streamlined, it will become increasingly difficult to find mineral deposits that are economic. Of further concern are the cost and difficulty of closing mines that have depleted their reserves. The trend to up-front funding of closing costs, relocation allowances and severance packages of up to two years' wages will mean that mines will fail to be developed; clearly an undesirable result if these projects conform to reasonable standards and create jobs and economic benefit in Canada.

For the last three years, which in general have turned out to be excellent years for metal markets, there has been speculation about the upcoming recession. With the exception of world instability due to the war in the Persian Gulf and recent events in Eastern Europe, the outlook for metals is still positive. Inventories for copper, zinc and lead are not high and not a lot of new mine or smelter capacity is coming into the market. Cominco is in good shape to either take advantage of strong markets or to survive in weak ones. Our major mining interests, such as Highland Valley Copper, Red Dog, Polaris and Hellyer, are able to compete with the best in the world and we intend to remain competitive through our worldwide search for new orebodies.

On behalf of the Board of Directors, I thank our employees for their efforts during the year. Construction and start-up of new operations is a challenging task and extraordinary efforts are required in the best of conditions. Many of our employees had their share of difficulties during the past year and their efforts are recognized and appreciated. I am confident that financial and production results in 1991 will reflect their efforts.

On behalf of the Board,



President &  
Chief Executive Officer

Vancouver, B.C.  
February 14, 1991



## Management's Discussion and Analysis

### Results of Operation

In 1990, Cominco's earnings and operational performance were disappointing. Lower zinc, copper and nickel prices, lower zinc and lead production at Trail, exhaustion of the Pine Point stockpile, a higher Canadian dollar and less than full production at Glenbrook Nickel all adversely affected results. Satisfactory operating performance was achieved at the Highland Valley Copper operation, and the Polaris mine performed well in 1990. The Red Dog mine operated at less than full capacity in its start-up year, but good progress is being made in achieving target results. Cominco enters 1991 with a superb base of assets, the new Snip gold mine commencing operations, and with several new projects in the planning stages, such as Quebrada Blanca in Chile, which will add to Cominco's earnings and cash flow in the future.

Earnings totalled \$59.1 million or \$0.70 per Common Share in 1990 before deducting a loss of \$4.3 million from the Corporation's share in Cominco Resources International's gold properties in the Maricunga District in Chile, which are included in a plan for divestment, compared with \$214.6 million or \$2.64 per Common Share in 1989. Return on Common shareholders' equity was 4.5 percent in 1990 compared with 20.8 percent in 1989. Dividends paid on Common Shares totalled \$0.50 per Common Share, the same level as in 1989.

In the Metals business segment, operating profit was \$134.0 million compared with \$407.9 million level in 1989. The London Metal Exchange price for zinc averaged U.S. 68.9 cents per pound, down U.S. 8.8 cents per pound from 1989. The LME copper price averaged U.S. \$1.21 per pound, down U.S. 8.0 cents per pound; the LME lead price averaged U.S. 36.8 cents per pound, up U.S. 6.3 cents per pound; and the LME nickel price averaged U.S. \$4.02 per pound, down U.S. \$2.02 per pound from 1989. Operating losses at Trail totalled \$45.0 million compared with a 1989 operating profit of \$119.0 million and accounts for the majority of the 1990 earnings reduction. Zinc production in 1990 was two-thirds of the 1989 level, but had risen to three-quarters by year-end and it is expected that full production will be achieved in early 1991. Leaching and purification improvements required to handle a change of concentrate feeds were made during the year and when completed will permit a return to full zinc production. The attempted start-up of the QSL lead smelter was put on hold in March 1990 and the plant taken off-line for further testing and modifications. Although final design and a start-up date are not set, the Corporation is committed to starting up the new smelter as soon as possible. The old lead plant has been extensively repaired and at year-end it was operating at about 80 percent of the 1989 level.

The Red Dog mine achieved an operating profit of \$18.0 million in 1990, its first operating year. Recognition of earnings from Red Dog in the future will be determined by the amount of concentrate shipped during the Summer shipping season and the terms under which smelters, including the Trail Metallurgical Operations, will consume and pay for the concentrates during the Fall and in the following year. The Sullivan mine resumed development work during the third



quarter and full production in the fourth quarter, following a shutdown in January related to high production costs and low prices. The \$8.0 million operating loss, compared with a \$10.0 million 1989 operating profit, adversely affected total division earnings.

The operating loss at Glenbrook Nickel totalled \$14.0 million in 1990, due to start-up problems and the rebuilding of processing facilities. Operating profit at Highland Valley Copper and at the Magmont mine exceeded the 1989 contribution. The 1989 Highland Valley Copper contribution was affected by a strike. The Polaris mine's operating profit was substantial, although lower than a year ago. A significant reduction in operating profit from the Pine Point mine, down from \$104.0 million in 1989 to \$16.0 million in 1990, resulted from the exhaustion of the concentrate stockpile at that mine.

In the Fertilizers business segment, operating profit fell to \$23.1 million from \$38.2 million in 1989. Much of the earnings' deterioration is attributable to a 40 percent decline in the Potash contribution where realized prices dropped 10 percent from the 1989 level. An increased loss at the Warm Springs phosphate mine resulted from a lower operating level caused by lower metal production at Trail, where the product is consumed. Returns from the nitrogen business were similar to 1989 levels.

Mineral exploration expenditures were higher in 1990, reaching \$39.5 million, of which \$37.0 million was expensed in the year, compared with \$30.6 million in 1989. The discovery in Alaska by Cominco of a large tonnage copper-gold deposit announced in early 1991 is evidence of the value of a significant and comprehensive exploration program operating worldwide. Cominco expects to continue to invest significantly in exploration in future years.

Interest expense was up significantly to \$23.6 million. Interest on the Red Dog mine project financing commenced in September when the mine's operating results began to be recorded, accounting for \$15.9 million of 1990 interest expense.

Cominco's share of the equity in earnings of Associated Companies increased to \$15.8 million in 1990 from \$13.1 million in 1989. The Hellyer mine in Australia accounted for \$12.1 million of the 1990 result.

Collective agreements were settled in 1990 at Trail, Kimberley, Warm Springs and Homestead. In 1991, contracts expire at Magmont, Potash Operations and Calgary Nitrogen Operations.

Cominco's adoption of the Mining Association of Canada's environmental policy means a continuation of the application of environmental protection standards at its operations. The modernization of all the Trail processing plants, initiated in 1977, has improved emissions and worker safety and has required substantial capital investment.

### **Liquidity and Capital Resources**

Cash from operations totalled \$130.4 million in 1990 compared with \$491.8 million in 1989, reflecting the lower level of operating earnings. Dividends on Common Shares remained constant at \$0.50 per share in 1989 and 1990, while preferred dividends declined slightly in 1990 because of the purchase for cancellation of some Series A and B shares during the year. Dividends to minority Shareholders increased significantly when Pine Point Mines Limited distributed most of its cash to Shareholders.



In November 1990, Cominco issued a \$125.0 million unsecured bond on a private placement basis. The net proceeds from this issue were used to repay existing, long-term bank debt resulting in an increase in unutilized credit facilities. In 1991, the prepayment of certain interest amounts related to the bond issue together with the final repayments of the 8½ percent sinking fund debenture will amount to about \$78.8 million.

Capital expenditures on land, building and equipment during 1990 totalled \$228.9 million compared with \$343.4 million in 1989 and expenditures on mineral properties were \$8.7 million compared with \$37.2 million in 1989. Cominco's most significant capital expenditure programs in 1990 were \$63.5 million on the Red Dog project and \$13.1 million on lead modernization at Trail. Other capital expenditures included \$11.3 million in deferred development costs at the Sullivan mine and \$28.9 million on improvements to the leaching plant, a new purification system and a higher-capacity cadmium plant at Trail. Major capital expenditures in 1989 included \$158.2 million at Red Dog and \$43.2 million on lead modernization at Trail.

Expenditures necessary to complete capital programs under way in 1990 are estimated at \$49.5 million. This figure does not include the cost of further modifications to the QSL lead smelter, as process testing and engineering have not been finalized. Capital expenditures to sustain present operations beyond 1990 will be lower than in recent years. New project expenditures and the means of financing them will be assessed as they arise. It is anticipated that all capital expenditures will be financed from operating cash flow and existing loan facilities. At the end of 1990, Cominco and its subsidiaries had lines of credit in place totalling \$609.0 million, of which \$502.0 million remained unused at year-end, and \$316.0 million is available for periods of five years or longer.

#### **Financial Position**

At December 31, 1990, working capital totalled \$296.7 million compared with \$463.1 million a year earlier, the reduction primarily resulting from the distribution by Pine Point Mines Limited of most of its cash by way of dividend, 50.1 percent of which was received by the Corporation and used to retire debt. Total indebtedness was \$582.4 million at December 31, 1990, which represented 31 percent of the total debt plus total equity. This compared with \$468.6 million of debt or 26 percent at December 31, 1989. Of the total indebtedness, \$232.1 million relates to the Red Dog mine and under the terms of issuance, permits the debt to have recourse only to the mine assets following achievement of certain completion tests expected to be passed in 1991. Book value per Common Share increased from \$13.83 to \$13.97 during 1990.



## Five-Year Financial Summary

(all dollar amounts in millions except per share figures)

	1990	1989	1988	1987	1986
<b>Operations</b>					
Sales of products and services	\$1,403.5	\$1,591.3	\$1,660.4	\$1,306.1	\$1,327.5
Net earnings (loss) <sup>1</sup>	54.8	214.6	213.5	80.7	(48.3)
— per Common Share <sup>1</sup>	0.65	2.64	2.56	0.89	(0.95)
Cash from operations	130.4	491.8	438.4	246.8	108.8
— per Common Share	1.60	6.14	5.43	3.24	1.46
Dividends on Common Shares <sup>2</sup>	39.7	39.6	23.7	15.4	11.1
— per Common Share	0.50	0.50	0.30	0.21	0.17
Capital expenditures	237.7	380.6	354.2	146.3	65.0
Total employment costs	385.4	372.5	349.1	341.5	418.1
<b>Financial Position</b>					
Assets:					
Working capital	\$ 296.7	\$ 463.1	\$ 421.0	\$ 426.7	\$ 226.1
Fixed assets (net)	1,657.5	1,552.2	1,292.5	1,062.1	1,008.8
Investments and other assets	161.3	166.7	116.0	129.0	147.5
Assets for sale	—	—	—	—	64.7
	<b>\$2,115.5</b>	<b>\$2,182.0</b>	<b>\$1,829.5</b>	<b>\$1,617.8</b>	<b>\$1,447.1</b>
<b>Financed by:</b>					
Long-term debt	\$ 428.4	\$ 421.8	\$ 289.1	\$ 325.4	\$ 476.4
Deferred liabilities	93.8	93.3	101.1	96.0	118.7
Income taxes not currently payable	262.1	245.2	148.2	37.8	16.3
Minority interests	18.3	118.3	71.3	46.2	12.7
Shareholders' equity	1,312.9	1,303.4	1,219.8	1,112.4	823.0
	<b>\$2,115.5</b>	<b>\$2,182.0</b>	<b>\$1,829.5</b>	<b>\$1,617.8</b>	<b>\$1,447.1</b>
Return on assets	3.8%	13.4%	16.1%	12.9%	Nil
Return on Common Shareholders' equity	4.5%	20.8%	27.6%	25.4%	Nil
Percent total debt to debt and equity	30.7%	26.4%	22.0%	25.4%	43.9%
Working capital ratio	1.8	2.6	2.5	2.4	1.6
Interest coverage ratio	2.7	22.5	14.2	4.6	—
Market price per Common Share (Toronto Stock Exchange)					
— High	\$ 28	\$32½	\$25½	\$23½	\$14¾
— Low	\$19½	\$22½	\$12¾	\$ 11	\$10½

<sup>1</sup> Before extraordinary items.

<sup>2</sup> Dividend paid to shareholders of record on December 9, 1986 was in the form of a stock dividend equivalent to \$0.17 per share.

# METALS

Cominco Metals operates a zinc-lead smelting and refining complex at Trail, B.C. and has interests in a nickel smelter and 12 operating mines in six countries.

Cominco's Canadian mines are the Sullivan mine at Kimberley, B.C. (zinc-lead-silver); the Polaris mine, N.W.T. (zinc-lead), a joint venture of Cominco and Pine Point Mines Limited; Highland Valley Copper at Logan Lake, B.C. (copper-molybdenum), a partnership of Cominco, Rio Algom Limited, Teck Corporation and Highmont Mining Company; and the Snip mine, B.C. (gold), a joint venture of Cominco and Prime Resources Group Inc.

Cominco American Incorporated, a wholly-owned subsidiary, operates the Red Dog mine in Alaska (zinc-lead) through a subsidiary and the Magmont mine in Missouri (lead-zinc-copper). Wholly-owned subsidiaries of Cominco Resources International Limited operate the Buckhorn mine in Nevada (gold) and hold interests in the Marte mine in Chile (gold) and the Maria mine in Mexico (copper). Cominco American Incorporated and a wholly-owned subsidiary of Cominco Resources own and operate the Glenbrook nickel smelter in Riddle, Oregon.

Associated Companies operate the Hellyer mine in Tasmania, Australia (zinc-lead-silver), and the Rubiales and Troya mines in Spain (zinc-lead).

Mitsubishi Cominco Smelting Company Limited, Tokyo, Japan, operates a lead smelter at Naoshima, Japan. In early 1991, the Indian government approved a proposal for Cominco Binani Zinc Limited to redeem all of the shares representing Cominco's 40 percent interest in that company. This will result in complete divestment of Cominco's interest in Cominco Binani.

Cominco Engineering Services Ltd., a wholly-owned subsidiary of Cominco, markets Cominco's technology and engineering expertise in the mining, metallurgical and process industries worldwide.

## Operations

### Trail Metallurgical Operations

Cominco's smelting and refining complex at Trail, B.C., produces a wide range of metals and related products, including refined zinc, lead, silver, gold, cadmium, indium, bismuth, germanium concentrate, copper sulphate, copper arsenate and a variety of sulphur products.

Cominco's two hydroelectric generating plants near Trail provide electrical power to the operations at Trail and Kimberley. Any surplus is offered for sale to West Kootenay Power and other Canadian and U.S. utilities.

The majority of the lead and zinc concentrates treated at the Trail complex during the year came from non-Cominco sources due to the shutdown of the Sullivan mine for part of the year and the exhaustion of stockpiled Pine Point concentrates. This is expected to be reversed in 1991 with the resumption of operations at the Sullivan mine late in 1990 and the treatment of concentrates from the Red Dog mine early in 1991.

In general, 1990 was a poor year for metal production at Trail, due mainly to a major construction program in the Zinc Operations and the shutdown of the new lead smelter for modifications, which resulted in a significant operating loss for the year.

The new QSL lead smelter operated from December 1989 until March 1990, when it was shut down for modifications to the process and to correct some mechanical deficiencies identified during the plant's operation. The process was

## Mining and Integrated Metals

Revenues and Operating Profit (Loss)	Revenues		Operating Profit (Loss)	
	1990	1989	1990	1989
	(millions)			
Trail Metallurgical Operations <sup>3</sup>	\$ 555	\$ 851	\$ (45)	\$ 119
Red Dog Mine <sup>3</sup>	51	—	18	—
Sullivan Mine <sup>1,3</sup>	17	93	(8)	10
Polaris Mine <sup>2</sup>	142	159	76	88
Pine Point Mine <sup>2,3</sup>	41	162	16	104
Highland Valley Copper <sup>1</sup>	222	170	75	72
Magmont Mine	29	28	17	14
Buckhorn Mine	7	11	(3)	—
Glenbrook Nickel <sup>4</sup>	38	2	(14)	(1)
Cominco UK	3	1	2	—
Cominco Engineering Services	8	8	1	—
Inter-Division Sales and Profit <sup>3</sup>	(47)	(234)	6	13
Unallocated Division Costs			(7)	(11)
	<b>\$1,066</b>	<b>\$1,251</b>	<b>\$ 134</b>	<b>\$ 408</b>
First Quarter	\$ 251	\$ 334	\$ 46	\$ 131
Second Quarter	260	338	26	111
Third Quarter	265	269	46	90
Fourth Quarter	290	310	16	76
	<b>\$1,066</b>	<b>\$1,251</b>	<b>\$ 134</b>	<b>\$ 408</b>

<sup>1</sup> Before deduction of Province of British Columbia resource tax payments of \$8.5 million in 1990 and \$12.3 million in 1989.

<sup>2</sup> Before deduction of Northwest Territories resource tax payments of \$7.8 million in 1990 and \$15.7 million in 1989.

<sup>3</sup> Sales revenues and operating profit for mines selling all or part of their concentrates to the Trail Metallurgical Operations are included above and Inter-Division pricing is generally in line with prevailing terms in the industry. Recognition of earnings on these sales is deferred on consolidation until the refined metal produced from those concentrates is sold to third parties.

<sup>4</sup> Included at 100 percent. Cominco's interest is 50.0 percent directly and 32.3 percent, being 50.0 percent of Cominco Resources' 50.0 percent interest.





The conductivity of the electrolyte in the lead cells is tested regularly to help ensure an efficient operation in the lead refinery at Trail.





**Jeff Bannister, Miner, operates a jack-leg drill in the Sullivan mine. Ore from the lower levels is being mined by conventional and mechanized methods.**



not removing lead from the slag efficiently in the reactor vessel and plans were made to modify the plant. As the scope of the required modifications grew, the start-up date for the smelter was pushed back. Late in the year it was decided in concert with Lurgi, the QSL process supplier, to undertake some further process tests at a new full-scale QSL plant in Germany. Definitive test results are expected in the second quarter of 1991.

The old lead smelter, which had been shut down late in 1989, was restarted in January 1990 at 50 percent of its production capacity. With the March shut-down of the new smelter, the old smelter continued to increase output and by year-end was running at about 80 percent of capacity. Increased maintenance expenses were necessary on a number of production and hygiene systems in the old plant.

In Zinc Operations, production for the year was approximately two-thirds of plant capacity, due to complications caused by a continuing \$85.0 million construction program to prepare for the treatment of Red Dog concentrates, compounded by a temporary change of concentrate sources. The projects included improvements to the leaching plant, installation of a new purification system and a higher-capacity cadmium plant. By year-end, most of the construction projects were completed and others were in their final stages. Refined zinc production was increasing during the fourth quarter.

### Red Dog

The Red Dog zinc-lead mine is located in northwest Alaska, about 90 miles (145 km) north of Kotzebue. The orebody is owned by NANA Regional Corporation Inc. and leased to Cominco Alaska Incorporated, which owns and operates the mining and processing facilities. NANA is paid a royalty, which increases after the capital investment plus interest is recovered by Cominco.

Minng and milling are carried out year-round. Concentrates are trucked to the port site on the Chukchi Sea, 52 miles (84 km) from the mine site, where they are stored until the 10- to 12-week summer shipping season when the sea is ice-free.

The mine's first full year of operation was in 1990. During the early part of the year, Red Dog experienced some initial start-up problems, which are common for new operations in a remote Arctic environment. However, operations continued to improve through the year and the total output for 1990 was near feasibility levels for the initial operating year.

In 1990, the first concentrates were shipped to Cominco's Trail Operations and to other customers in Japan, Korea and Europe.

Fifty-seven percent of the employees are NANA shareholders. Training of the operating and maintenance work force will continue in 1991.

### Sullivan

The Sullivan mine, located at Kimberley, B.C., resumed production in November 1990 after a nine-month shutdown.

In recent years, the Sullivan has become a marginally profitable operation due to higher mining costs associated with increased ground support and development requirements at lower levels where most of the remaining ore exists. Also, most of the remaining ore is metallurgically more difficult to separate and recover. A third factor having a major impact on profitability is the dramatic drop in silver content, combined with low silver prices.

In July 1990, a new 27-month Collective Agreement was reached with the United Steelworkers of America, which incorporated a completely reworked mine incentive plan. Based on the expected increased productivity resulting from the new agreement and metal prices at the time, a commitment was made to spend \$11.6 million on development over a three-month period to replenish the broken ore reserves and to do critical maintenance work. During this August-to-November period, a new process computer was installed and other technological

#### PRODUCTION OF REFINED METALS

		1990	1989
<b>Zinc</b>	tons	203,200	300,800
	(tonnes)	(184,300)	(272,900)
<b>Lead</b>	tons	71,800	114,100
	(tonnes)	(65,100)	(103,500)
<b>Silver</b>	ounces	7,953,400	11,255,800
	(kg)	(247,400)	(350,100)
<b>Gold</b>	ounces	26,900	40,800
	(kg)	(840)	(1,270)
No. of employees at year-end		3,041	3,057

#### RED DOG

		1990	1989
Ore milled	tons	996,695	33,305
	(tonnes)	(904,196)	(30,214)
<b>Zinc</b>			
Average ore grade		26.5%	20.4%
Concentrate	tons	337,400	—
	(tonnes)	(306,129)	—
Average concentrate grade		56.9%	—
<b>Lead</b>			
Average ore grade		8.5%	7.6%
Concentrate	tons	56,600	—
	(tonnes)	(51,388)	—
Average concentrate grade		55.1%	—
<b>Silver</b>			
Average ore grade		3.6	3.6
	oz./ton	(112)	(112)
<b>Bulk</b>			
Concentrate	tons	49,600	8,532
	(tonnes)	(45,010)	(7,740)
Average concentrate grade			
Zinc		31.7%	40.3%
Lead		22.9%	16.5%
No. of employees at year-end		350	228

#### SULLIVAN

		1990	1989
Ore milled	tons	440,479	1,822,800
	(tonnes)	(399,867)	(1,653,600)
<b>Zinc</b>			
Average ore grade		5.9%	5.4%
Concentrate	tons	42,200	172,600
	(tonnes)	(38,285)	(156,600)
Average concentrate grade		48.2%	47.7%
<b>Lead</b>			
Average ore grade		4.5%	4.4%
Concentrate	tons	23,200	96,300
	(tonnes)	(21,028)	(87,400)
Average concentrate grade		60.0%	61.0%
<b>Silver</b>			
Average ore grade		0.83	1.03
	oz./ton	(28)	(35)
No. of employees at year-end		655	727

improvements in the mine and concentrator were also completed. Production at planned rates was achieved in November, based on the concentrator operating on a five-day-a-week schedule with a reduced work force.

### Pine Point Mines

The Pine Point operation at Pine Point, N.W.T., was shut down in 1987 and concentrate shipping remained the only activity in 1990. During the year, a takeover bid was completed for all of the shares of Pine Point Mines Limited not owned by Cominco. Effective August 31, 1990, Cominco surrendered for cancellation all of the shares it held in Pine Point Mines representing a 50.1 percent equity interest. As part of the same transaction, Cominco acquired an undivided 50.1 percent interest in all of the assets of Pine Point Mines. These included a 45 percent interest in the Polaris mine and a 100 percent interest in the remaining operations at Pine Point, N.W.T. Cominco manages both properties under joint venture agreements with Pine Point Mines Limited.

### Polaris

The Polaris zinc-lead mine, concentrator and related exploration properties are owned 77.5 percent by Cominco and 22.5 percent by Pine Point Mines Limited. Cominco is the operator of the joint venture. This underground mining operation is located on Little Cornwallis Island, N.W.T.

Polaris set new records for both tonnage milled and zinc concentrate produced in 1990. Eleven shipments of lead and zinc concentrate were made to Europe between August 1 and October 25, for a record total of 314,500 tons (285,300) shipped.

Capital expenditures for 1990 included \$2.7 million for replacement of equipment and for completion of the Keel Zone haulage system. Exploration diamond drilling was carried out on nearby Truro Island. Results were sufficiently encouraging to justify further work. Drilling carried out in 1990 on the Eclipse showing on Little Cornwallis Island produced no new discoveries.

### Highland Valley Copper

Highland Valley Copper is located near Logan Lake, B.C. The Highland Valley partnership comprises Cominco (50 percent), Rio Algom Limited (33.6 percent), Teck Corporation (13.9 percent, including 2.5 percent from Highmont) and Highmont Mining Company (2.5 percent, excluding Teck's 2.5 percent).

During the year, a record 50,995,000 tons (46,263,000) was processed by the Highland mill and the average daily throughput rate at 139,700 tons (126,700) was a new record as well. The mine also achieved record tonnages, with 106 million tons (96 million) being removed from the Valley and Lornex pits. Productivity figures improved over the levels of previous years.

The Bethlehem Mill was taken off standby status and permanently shut down in February 1990.

Cominco's share of Highland Valley Copper's earnings was \$75.0 million compared with the previous year's \$72 million. The difference was primarily due to the effect of a 15-week strike on the 1989 results, partly offset by lower copper prices in 1990.

### Magmont

Magmont is a 50:50 joint venture operation of Cominco American Incorporated and Dresser Industries Incorporated. This underground mining operation at Bixby, Missouri, produces lead, copper and zinc concentrates.

Recovery of ore from an area of the mine that was affected by a groundfall in 1986 was completed in 1990, with ore recovery exceeding that attained in other high pillar mining areas. Capital expenditures of about U.S. \$0.4 million were made in 1990 for the replacement of mining and processing equipment.

Surface drilling yielded two minor extensions to lead mineralization, and

#### POLARIS

		1990	1989
Ore milled <sup>1</sup>	tons	1,121,700	1,128,000
	(tonnes)	(1,017,200)	(1,023,300)
<b>Zinc</b>			
Average ore grade		14.4%	14.1%
Concentrate	tons	250,400	247,500
	(tonnes)	(227,100)	(224,500)
Average concentrate grade		62.7%	62.0%
<b>Lead</b>			
Average ore grade		4.0%	3.5%
Concentrate	tons	53,200	45,200
	(tonnes)	(48,200)	(41,000)
Average concentrate grade		78.2%	78.2%
No. of employees at year-end		274	267

<sup>1</sup> Cominco owns 77.5 percent of the mine and Pine Point Mines Limited owns 22.5 percent. Ore milled is reported as 100 percent. Production data represent Cominco's 77.5 percent share. Figures for 1989 have been restated to conform with the 1990 presentation.

#### HIGHLAND VALLEY COPPER

		1990	1989
Ore milled <sup>1</sup>	tons	50,995,000	35,630,700
	(tonnes)	(46,263,000)	(32,324,000)
<b>Copper</b>			
Average ore grade		0.43%	0.43%
Contained in concentrate	tons	90,200	62,400
	(tonnes)	(81,800)	(56,600)
<b>Molybdenum</b>			
Average ore grade		0.008%	0.009%
Contained in concentrate	tons	1,100	800
	(tonnes)	(1,000)	(700)
<b>Silver</b>	ounces	983,500	688,500
	(kg)	(30,600)	(21,400)
<b>Gold</b>	ounces	6,500	4,700
	(kg)	(202)	(150)
No. of employees at year-end		1,227	1,248

<sup>1</sup> Ore milled is reported at 100 percent; the metal contained in production reported is Cominco's 50 percent share.

#### MAGMONT

		1990	1989
Ore treated <sup>1</sup>	tons	1,084,900	1,060,600
	(tonnes)	(984,200)	(962,200)
<b>Lead</b>			
Average ore grade		7.1%	6.8%
Concentrate	tons	47,800	44,600
	(tonnes)	(43,400)	(40,500)
Average concentrate grade		78.0%	77.9%
<b>Zinc</b>			
Average ore grade		1.0%	1.0%
Concentrate	tons	7,700	7,400
	(tonnes)	(6,900)	(6,700)
Average concentrate grade		58.2%	57.6%
<b>Copper</b>			
Average ore grade		0.3%	0.3%
Contained in concentrate	tons	800	700
	(tonnes)	(730)	(670)
No. of employees at year-end		190	192

<sup>1</sup> Ore treated is reported at 100 percent; the concentrate tonnage reported is Cominco's 50 percent share of production.





**Al Smith, Pit Operation Shifter, monitors haulage trucks and shovel movement from a control centre high above the Valley pit at Highland Valley Copper.**

ore reserves mined were partly replaced. Planning has begun for eventual ore exhaustion and shutdown of the Magmont Operation, which will take place over the next two to three years.

#### BUCKHORN

		1990	1989
Ore crushed <sup>1</sup>	tons (tonnes)	<b>826,700</b> (750,000)	806,000 (731,200)
<b>Gold</b>			
Average ore grade	oz./ton (g/tonne)	<b>0.059</b> (2.0)	0.059 (2.0)
Production			
Gold	ounces (kg)	<b>14,800</b> (459)	22,100 (690)
No. of employees at year-end		<b>80</b>	80

<sup>1</sup> Ore crushed is reported at 100 percent. Production ounces are Cominco Resources' 76 percent share of production.

#### Buckhorn

The Buckhorn heap-leach gold mine in Eureka County, Nevada, is operated by a subsidiary of Cominco Resources International Limited, which holds a 76 percent interest in the property.

Operating losses were incurred in 1990 due to increased stripping costs and more-refractory ores in the Ghost pit and a water shortage at the mine. The water shortage reduced the rate of leaching in 1990 and caused a substantial amount of gold to remain unrecovered on the leach pads, which will be recovered in 1991.

Ore reserves at year-end totalled 200,000 tons (180,000) grading .056 ounces of gold per ton (1.9 g/tonne). Mining operations will cease when the current ore reserves are depleted, probably in the first or second quarter of 1991. Exploration will continue at a reduced rate in 1991.

Provision has been made for reclamation and rehabilitation costs associated with the shutdown.

#### GLENBROOK

		1990	1989
Ore processed	tons (tonnes)	<b>610,000</b> (553,000)	274,300 (248,800)
Average ore grade			
Nickel		<b>0.94%</b>	0.81%
Contained nickel			
Produced	lbs. (kg)	<b>8,160,000</b> (3,700,900)	1,486,000 (1,348,100)
Abrasives products (June - year-end)			
	lbs. (kg)	<b>24,400</b> (11,100)	—
No. of employees at year-end		<b>277</b>	233
Production reported at 100 percent.			

#### Glenbrook

The Glenbrook nickel smelter near Riddle, Oregon, acquired in 1989, is a 50:50 joint venture of Cominco American Incorporated and a wholly-owned subsidiary of Cominco Resources International Limited.

Glenbrook completed the rebuilding of the processing facilities during 1990. Production during the first six months was lower than expected due to start-up problems, which necessitated some major equipment modifications, including electrical transformer rebuilds. During the second half of the year, production capability improved, but rates fell short of expectations. In the fourth quarter, the adjacent mine was reopened to provide higher-grade material than is available in the ore stockpiles at the smelter.

A feasibility study has been completed on a program to import nickel ore to provide Glenbrook with a long-term source of higher-grade raw material.

In June, the Glenbrook Nickel joint venture completed the acquisition of the Green Diamond Abrasives Processing Plant, located about three miles (five km) from Glenbrook. The feed for this operation is granulated slag produced during the production of ferronickel in the smelter.

#### MARTE

		1990	1989
Ore crushed <sup>1</sup>	tons (tonnes)	<b>1,956,600</b> (1,775,000)	—
<b>Gold</b>			
Average ore grade	oz./ton (g/tonne)	<b>0.044</b> (1.37)	—
Production			
Gold	ounces (kg)	<b>6,800</b> (212)	—
No. of employees at year-end		<b>217</b>	—

<sup>1</sup> Ore crushed is reported at 100 percent. Production ounces are Cominco Resources' 25.7 percent share of production.

#### Marte

The Marte heap-leach gold mine, located in Chile, is owned by Compañía Minera Tres Cruces SCM, which is 25.7 percent-owned by a subsidiary of Cominco Resources International Limited.

In 1990, the Marte mine operated well below the planned rate although the orebody has met expectations with respect to grade and tonnage. Cominco Resources' share of gold production for the year was only 6,800 ounces (212 kg), which represents approximately 28 percent of the planned level. The production shortfall has been due to several factors, a major cause being the inability of the crushing and agglomerating systems to process ore at the required throughput and granulometry.

#### Aberfoyle

Cominco, through a wholly-owned subsidiary, Cominco Australian Pty. Ltd., has a 46 percent interest in Aberfoyle Limited, an Australian mining and exploration company. Aberfoyle owns and operates the Que River and Hellyer zinc-lead-silver mines and operates the Bardoc gold mine (57 percent-owned). Cominco's share of 1990 net earnings was \$12.1 million compared with net earnings of \$7.2 million in 1989.

Aberfoyle's sales revenue in 1990 was \$152.7 million compared with \$113.2





**Graeme Anderson, Research Engineer, analyzes the microstructure of a zinc galvanized coating with an optical microscope at the Product Technology Centre.**





**Gerry Fudge, Miner, operates a single-boom hydraulic jumbo in the 130 portal at the Snip gold mine. Production at Cominco's newest mine started January 1991.**



million in 1989. Net earnings were \$27.4 million compared with \$16.1 million in 1989.

It was Hellyer's first full year of large-scale production in 1990. Several mine and plant improvements were undertaken and by year-end throughput was established at 1.38 million tons (1.25 million) per year, 25 percent above the original design. Metallurgical recoveries improved during the year and further improvements can be expected in 1991.

Que River performed well throughout its final year of full-scale operations. At year-end, the mine was shut down except for a small salvage operation.

The Bardoc operation produced 41,400 ounces (1,300 kg) of gold, in what also appears to be its final full year. The operation is now treating low-grade stockpiles at a grade of approximately .035 ounces per ton (1 g/tonne).

### Exminesa

Exminesa (Exploración Minera Internacional España S.A.) is a Spanish mining company in which Cominco has a 48 percent interest. The company operates the Rubiales zinc-lead mine and concentrator in Lugo province and the Troya zinc-lead mine and concentrator in Guipúzcoa province. Base metal exploration is carried out in both these areas as well as in neighbouring provinces, while exploration for gold is centered in northwestern Spain.

The Rubiales mine, which started production in 1978, will exhaust its reserves and close down at the end of 1991. During 1990, extensive drilling of a strong zinc-lead anomaly, located approximately 24 miles (40 km) north of the mine, failed to be of economic interest and no further work is contemplated on the prospect. Follow-up evaluation work continued on a number of interesting gold showings in the area and the formation of a small subsidiary company with a local slate quarry operator to develop one of the company's slate deposits is pending. Total exploration expenditures in northwestern Spain were \$2.6 million.

### ABERFOYLE

		1990	1989
<b>Hellyer</b>			
Ore milled	tons	1,070,800	641,500
	(tonnes)	(971,400)	(582,000)
<b>Zinc</b>			
Average ore grade		13.1%	13.1%
Concentrate	tons	155,900	82,000
	(tonnes)	(141,500)	(74,400)
Average concentrate grade		49.6%	49.3%
<b>Lead</b>			
Average ore grade		7.1%	7.2%
Concentrate	tons	39,400	19,400
	(tonnes)	(35,700)	(17,600)
Average concentrate grade		57.1%	58.0%
<b>Bulk</b>			
Concentrate	tons	73,600	51,700
	(tonnes)	(66,800)	(46,900)
Average concentrate grade			
Zinc		28.5%	25.4%
Lead		21.1%	24.5%
Copper/Silver concentrate produced	tons	7,500	2,800
	(tonnes)	(6,900)	(2,500)
Concentrate grade			
Copper		11.9%	13.7%
<b>Que River</b>			
Ore delivered	tons	307,900	294,000
	(tonnes)	(279,300)	(266,700)
Average ore grade			
Zinc		11.0%	12.4%
Lead		5.9%	7.1%
Silver	oz./ton	3.9	4.8
	(g/tonne)	(147)	(180)
<b>Bardoc</b>			
<b>Gold</b>			
produced	ounces	41,400	39,300
	(kg)	(1,300)	(1,200)
No. of employees at year-end		322	335
Production reported at 100 percent.			

### Associated Companies

Associated Companies	Percentage Ownership	Revenues		Share of Net Earnings	
		1990	1989	1990	1989
Aberfoyle Limited	46	\$161	\$121	\$12.1	\$ 7.2
Mitsubishi Cominco Smelting Company Limited	45	43	38	1.6	1.2
Crop Production Services Ltd.	33	170	14	0.7	(0.2)
		\$374	\$173	\$14.4	\$ 8.2

### Summary of Financial Position of Associated Companies

	1990	1989
		(millions)
Working Capital	\$108.3	\$ 92.8
Fixed Assets	146.5	180.4
Other Assets	4.3	28.3
	\$259.1	\$301.5
Less: Long-term debt	\$ 71.2	\$101.9
Other non-current liabilities	2.8	2.8
Income taxes not currently payable	11.3	12.9
Net Assets	\$173.8	\$183.9
Cominco's share of net assets	\$ 76.9	\$ 74.1

### Summary of Results of Operations of Associated Companies

	1990	1989
		(millions)
Revenues	\$374.0	\$173.4
Costs and expenses	319.1	141.2
Earnings before the following	54.9	32.2
Income taxes	21.5	14.2
Total net earnings of Associated Companies	\$ 33.4	\$ 18.0
Cominco's share of net earnings	\$ 14.4	\$ 8.2
Dividends received by Cominco	\$ 10.3 <sup>1</sup>	\$ 10.6 <sup>1</sup>

<sup>1</sup> Includes dividend from Exminesa of \$1.4 million in 1990 and \$4.9 million in 1989.

**EXMINESA**

	1990	1989
<b>Rubiales Mine</b>		
Ore milled tons	688,600	748,100
(tonnes)	(624,700)	(678,700)
<b>Zinc</b>		
Average ore grade	5.7%	6.2%
Concentrate tons	62,300	74,600
(tonnes)	(56,500)	(67,700)
Average concentrate grade	60.7%	59.9%
<b>Lead</b>		
Average ore grade	1.1%	1.0%
Concentrate tons	10,400	9,700
(tonnes)	(9,400)	(8,800)
Average concentrate grade	62.8%	67.7%
No. of employees at year-end (including Villafranca office)	403	385
<b>Troya Mine</b>		
Ore milled tons	295,400	279,200
(tonnes)	(268,000)	(253,300)
<b>Zinc</b>		
Average ore grade	11.2%	11.5%
Concentrate tons	54,700	52,100
(tonnes)	(49,600)	(47,300)
Average concentrate grade	55.2%	56.1%
<b>Lead</b>		
Average ore grade	0.9%	0.9%
Concentrate tons	2,100	1,500
(tonnes)	(1,900)	(1,400)
Average concentrate grade	51.1%	57.7%
No. of employees at year-end	151	140
Production reported at 100 percent.		

The Troya mine commenced operations in late 1986 and currently has sufficient reserves for a further five years of production. An extensive drilling and geophysical surveying program, carried out around the Troya deposit during 1990 at a total cost of \$1.3 million, failed to add significant new reserves. Future programs will continue exploration in areas more removed from the immediate mine area.

Both Rubiales and Troya fell well short of expected concentrate production, due largely to ground support problems and increased mining dilution.

Capital spending during the year totalled \$4.8 million, including \$3.5 million for production equipment and facilities and \$1.3 million for mine development, largely at Troya.

The good metal prices prevailing for much of the year were largely offset by the significant strengthening of the peseta against the U.S. dollar and lower concentrate production and, as a result, the company returned to a loss position in 1990. Despite the loss and a charge to the profit and loss account of \$3.7 million late in the year due to a long-standing legal dispute, the company's continued strong cash situation allowed funding of the year's exploration and capital programs as well as payment of a modest dividend. Cominco records income from Exminesa as dividends are declared, rather than on an equity accounting basis.

**Cominco Engineering Services Ltd.**

CESL (Cominco Engineering Services Ltd.), a wholly-owned subsidiary of Cominco Ltd., offers a full range of consulting engineering services and process technology to the mining, metallurgical and process industries. Sales of services and equipment reached a record high of more than \$29.3 million for 1990.

During the year, CESL was involved in the construction of several new plants for Cominco at Trail, including the major modifications undertaken in the Zinc Operations, and continued to play an important role in the fine-tuning of the Red Dog mine operation in Alaska.

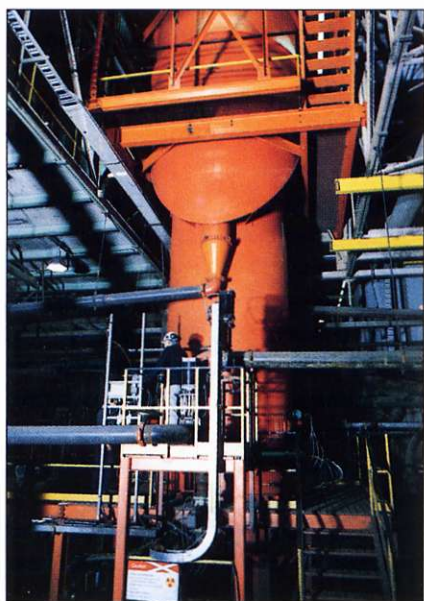
While continuing its support of Cominco and its Associated Companies throughout 1990 by providing engineering and project management services, CESL has expanded its third-party client base and its influence as a global provider of professional and technical expertise. The Metallurgical and Mining groups have successfully penetrated the highly competitive small mines development area in Western Canada and the United States.

Significant international projects awarded to CESL in 1990 included: engineering for a large process control system for a gold mill in the U.S.S.R.; an engineering and procurement contract for a greenfield zinc plant in India; and a basic engineering contract for a new lead refinery in Mexico. North American projects included: the detail engineering and procurement for a new underground crushing system at a gold mine in the Canadian Arctic; a feasibility study for a new gold operation in northern Saskatchewan; and a feasibility study for the rehabilitation of a lead-zinc mine in the northwestern United States.

In 1990, CESL's Column Cell Technology Division continued its industry leadership in the design and operation of column flotation systems in this very specialized field of mineral processing. Highlights included the commissioning of projects at large copper concentrators in Chile and Papua New Guinea and lead-zinc concentrators in the Yukon and Australia.

A new operating unit was formed in 1990 to market CESL's environmental expertise and technology. CESL has become known for its expertise in the treatment of mine waste water and other metallurgical effluents. Projects in 1990 included a unique pit dewatering and an effluent treatment plant for a large open-pit gold operation in Nevada.

CESL employed 378 people during 1990, compared with 350 in 1989. It operates from offices in Vancouver and Trail, B.C., Calgary, Alberta, and Saskatoon, Saskatchewan.



**Cominco Engineering's Column Cell is at the forefront in mineral processing technology.**



## Research and Development

### Technical Research Centre

Technical support for Cominco's worldwide exploration and mineral processing operations is provided by the Technical Research Centre and Trail Operations Development at Trail, B.C. The main areas of research involve mineral beneficiation, hydrometallurgical and pyrometallurgical processing, mine reclamation and patents and licensing. Expenditures for 1990 totalled \$7.2 million.

In 1990, mineral beneficiation research and testing was focused on improving Red Dog's concentrator performance, the treatment of Sullivan's lower-level complex ore and other new prospective orebodies. Participation in cooperative research programs on grinding and flotation through the Australian Mineral Industries Research Association (AMIRA) and the Canadian Mining Industry Technology Council (MITEC) was expanded during the year.

Support for Cominco Engineering Services Ltd., with emphasis on pressure leaching, effluent treatment, lead refining and mineral dressing testwork, continued during the year.

At year-end there were 45 employees in Technical Research and 39 employees in Trail Operations Development.

## New Developments

### Snip

The Snip gold mine, located about 60 miles (100 km) northeast of Stewart, B.C., is a joint venture between Cominco (60 percent) and Prime Resources Group Inc. (40 percent). Gold production at Snip started in January 1991, following the construction of a 330 (300) tons per day mill which was completed in late 1990.

The Snip orebody, ranging in thickness from 3 to 33 feet (1 m to 10 m), outcrops at the surface. Ore is mined using conventional and mechanized methods. Forty percent of the gold values are being recovered in bullion form from a gravity separation circuit and the remainder in a sulphide flotation concentrate. The concentrate is being shipped off-site to a custom smelter for recovery of the contained gold, silver and copper values. For the projected mine life, annual gold production will average about 90,000 troy ounces (2,800 kg).

At full production, Snip will employ about 140 people on a rotational schedule of four weeks in and two weeks out.

### Maria

The Maria copper mine, located near Cananea, Mexico, is owned by Minera Maria S.A. de C.V., which is 49 percent owned by a subsidiary of Cominco Resources International Limited, with the remainder held by Empresas Frisco S.A. de C.V.

Shipments of ore from the Maria mine commenced in the second half of 1990. At year-end the flat-lying, high-grade orebody was being mined at a rate of 450 tons (400) per day, by the underhand cut and fill technique, which will enhance grade control and maximize recovery of the ore. The mining rate is expected to increase during 1991. A continuous mining machine is being used, providing reduced operating costs and minimizing the need for explosives.

Cominco Resources' partner, Empresas Frisco, is constructing a concentrator at the mine site and Minera Maria has an option to the end of 1991 to purchase the concentrator at cost. The concentrator will provide better returns from high-grade ore and allow the processing of lower-grade ore after the depletion of the high-grade orebody.

Mineable reserves of high-grade ore total 512,600 tons (465,000), grading 12.8 percent copper. In addition, there are 429,900 tons (390,000) of lower-grade ore, grading 1.8 percent copper.





In addition to refined zinc, lead and silver, Cominco produces a wide variety of specialty metals at Trail for customers around the world.



## **Quebrada Blanca**

The Quebrada Blanca property, a world-class copper deposit, is located in northern Chile close to the Bolivian border. Cominco Ltd. and Cominco Resources International Limited each own a 42.5 percent working interest in the operating company, Compañía Minera Quebrada Blanca S.A. ENAMI, a Chilean government-owned mining company, retains a 10 percent carried interest. Sociedad Minera Pudahuel, a private Chilean mining company, will own a 5 percent carried interest upon successful completion of metallurgical testwork and a decision to put the property into production; it also has an option to acquire an 8.5 percent working interest at the time of a production decision by contributing 10 percent of the capital costs.

Metallurgical testwork has been under way since early 1990 and in July an on-site pilot plant was put into operation. Results to date from the testwork and pilot plant have been satisfactory.

Engineering studies are in progress to determine the feasibility of developing a 19,000 tons (17,200) per day open-pit mine using heap-leaching, solvent extraction and electrowinning to produce 165 million pounds per year of high-grade copper cathode. The Feasibility Study Report will be completed in the first quarter of 1991. Negotiations are well advanced to obtain commitments to provide financing in the event that a production decision is made.

The deposit's high-grade secondary enriched zone containing 85 million tons (77 million), grading 1.4 percent copper, forms the basis for the heap-leaching operation which would have a life of 14 years. There is potential for expanding or extending production by adding conventional milling and flotation facilities at a later date to treat material from the underlying primary mineralization for the production of copper concentrate.

## **Marketing and Sales**

Cominco's long-term commitment to its customers and products is a key part of its success in maintaining and expanding its position as a leading metals supplier. Whether Cominco's customers are steel mills, general galvanizers, battery manufacturers or oxide producers, the Company strives to ensure its products are top quality and its service is superior.

Part of Cominco's marketing strength lies in its product and geographic diversity. Zinc, lead and specialty metals produced at Cominco's Trail Metallurgical Operations are marketed to customers located mainly in North America, the United Kingdom and Asia. Sales offices are located in Toronto, Vancouver and the United Kingdom. In addition, representative offices in Singapore and Tokyo position Cominco for strong participation in Asia, the fastest growing metal market in the world. The Tokyo office was established in 1990.

Cominco's zinc and lead concentrates are sold to smelters in Canada, the United States, Western Europe, Japan and South Korea. Copper concentrates from the Highland Valley Copper partnership are sold into world markets by the partnership's marketing organization, located in Vancouver.

Cominco is doing its share to safeguard the environment by recycling metals, which, unlike a number of other materials, have been recycled for years. In 1990, Cominco participated with the provincial Ministry of the Environment in the development of a program to facilitate the increased recycling of lead acid batteries in British Columbia.

Within Marketing, Cominco's Product Technology Centre (PTC) and its Market Development Group work together to provide technical service for customers, develop commercial opportunities for Cominco and expand the uses and markets for metals produced by the Company.

Progress was made on Cominco-initiated projects with potential for commercialization including its zinc bar stock project for industrial applications. Cominco-developed antimony-lead strip technology for battery grids will allow battery companies to lower costs and improve the quality of their batteries.



**Ole Qvist (right), Area Representative at Cominco's Singapore office, inspects a shipment of zinc galvanized anchors with a customer.**



Cominco, other Canadian zinc producers and the Canadian Government's Department of External Affairs are sponsoring the zinc façade for the Canada Pavilion at Expo '92 in Seville, Spain. About 55 tons (50) of zinc will be used in this unique architectural application.

In 1990, the major North American zinc producers individually withdrew their North American producer price and moved to an LME-based pricing system for refined metals and concentrates bought and sold in North America. The LME price is more indicative of world market conditions and is the basis for zinc business done outside North America. A similar move was also made for lead.

## The Metals Markets

The long period of economic growth since the severe 1982 recession caused metal consumption to move up steadily during the balance of the decade. In 1990, slowing economic growth resulted in a pause in this increasing consumption.

Due to the economic slowdown, 1990 metal prices were lower than in 1989. The price decline was cushioned by significant production disruptions in various parts of the world. Lead was an exception, the 1990 price being higher by 21 percent.

Real GNP in the 24 member countries of the Organization for Economic Cooperation and Development (OECD) advanced 2.3 percent in 1990, down a full percentage point from the previous year. Rising interest rates in most industrialized countries cooled economic expansion and had an impact on capital spending, construction and auto production.

The rate of economic expansion in North America slowed considerably during 1990 as construction and auto production tapered off. In Europe, most countries registered lower economic growth in 1990 with the exception of Germany. In Japan, higher growth was registered.

Consumer price inflation has been kept under control by close cooperation among the industrialized nations. In 1990, inflation in the OECD countries increased 5.3 percent compared with 4.8 percent in 1989. In the latter part of 1990, following the invasion of Kuwait by Iraq, higher oil prices added to inflation.

The U.S. dollar weakened during 1990 compared with the currencies of most other industrialized countries in western Europe and Southeast Asia. As a result, the prices of metals expressed in those other currencies are lower. This factor is encouraging for the demand side of the metals balance and it is also likely to discourage new mine and metal production in those areas, thereby providing some support to metal price levels.

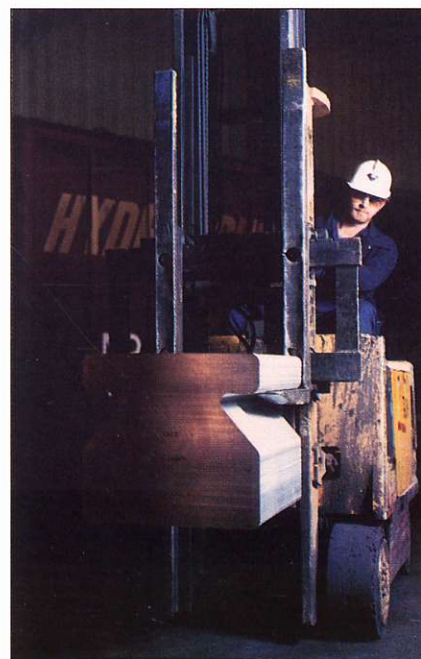
### Zinc

Western World consumption of refined zinc decreased in 1990 by 0.4 percent to 5,740,000 tons (5,210,000). Refined production declined 0.9 percent to 5,700,000 tons (5,170,000) due to a number of production disruptions, particularly in Canada and Peru. Western World stocks of refined zinc declined in 1990 and closed the year at levels equivalent to 5.5 weeks' consumption, compared with a normal of six weeks.

The monthly average LME price peaked in May 1990 at U.S. 80.6 cents/lb. and hit bottom at U.S. 57.4 cents/lb. in December. The average LME price for the year was U.S. 68.9 cents/lb. down from U.S. 77.7 cents/lb. in 1989.

### Copper

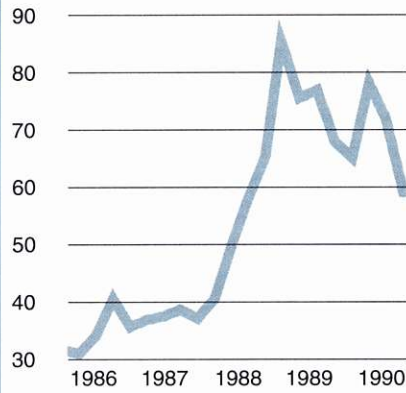
Western World consumption of refined copper increased in 1990 by 1.7 percent to a new record of 9,700,000 tons (8,800,000), caused by continued strength in the industrial output of electrical products for both power and communication applications. Refined production advanced 1.4 percent to a new record of 9,370,000



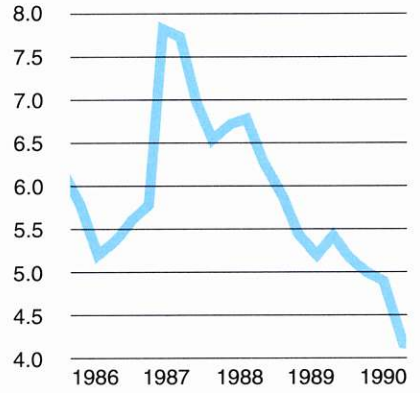
Cominco's C-Cast Zinc Jumbo is known throughout the industry as a premium quality product.

## Quarterly Average Metal Prices

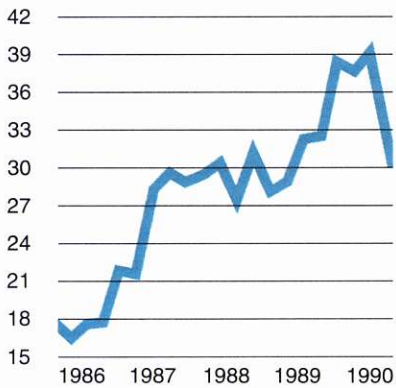
**Zinc – LME SHG**  
(U.S. cents/lb.)



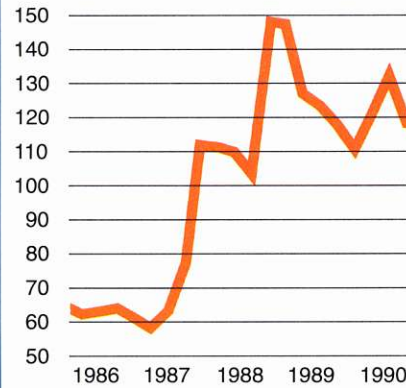
**Silver – New York Price**  
(U.S. dollars/troy ounce)



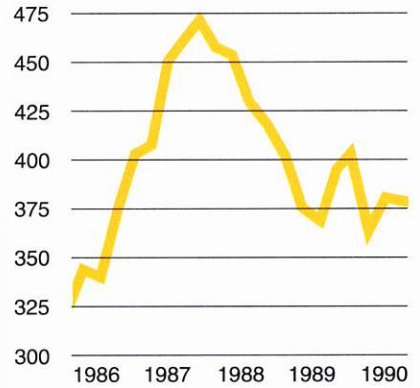
**Lead – LME Price**  
(U.S. cents/lb.)



**Copper – LME Price**  
(U.S. cents/lb.)



**Gold – London Price**  
(U.S. dollars/troy ounce)





tons (8,500,000). The shortfall in production was made up, to a large extent, by net imports from Eastern Bloc countries. Western World stocks of refined copper closed 1990 virtually unchanged from 1989 levels, at a level equivalent to 4.7 weeks' consumption, compared with a normal level of seven weeks.

The monthly average LME price peaked in September 1990 at U.S. \$1.37/lb. after hitting bottom in February at U.S. \$1.07/lb. The average LME price for the year was U.S. \$1.21/lb., down from U.S. \$1.29/lb. in 1989.

### **Lead**

Western World consumption of refined lead decreased in 1990 by 0.6 percent to 4,850,000 tons (4,400,000). Refined production declined 2.1 percent to 4,760,000 tons (4,320,000) and was restrained by disruptions to supply in Canada and Italy. Western World stocks of refined lead in 1990 increased somewhat and closed the year at a level equivalent to five weeks' consumption, which is normal.

The monthly average LME price peaked in March 1990 at U.S. 48.2 cents/lb. and bottomed in December at U.S. 28.3 cents/lb. The average LME price for the year was U.S. 36.8 cents/lb., up from U.S. 30.5 cents/lb. in 1989.

### **Nickel**

Western World consumption of refined nickel increased in 1990 by 3.4 percent to a new record of 1,500 million pounds. Refined production remained unchanged at 1,250 million pounds due to a number of production disruptions in New Caledonia, Indonesia and Canada. The shortfall in production was met by imports from Eastern Bloc countries, principally from the U.S.S.R. Western World stocks of refined nickel closed 1990 with little change from 1989 levels and were equivalent to six weeks' consumption, which is normal.

The monthly average LME price peaked in August 1990 at U.S. \$4.98/lb. after bottoming in February at U.S. \$3.17/lb. The average LME price for the year was U.S. \$4.02/lb., down from U.S. \$6.04/lb. in 1989.

### **Gold and Silver**

There was a downward trend in the price of gold in the first half of 1990 as investment demand continued to weaken. The price bottomed on June 14 at U.S. \$346/oz. after peaking on February 7 at U.S. \$424/oz. Prices in the second half of 1990 moved up gradually, based on a number of factors including turmoil in the Persian Gulf. The average price for the year was U.S. \$384/oz. compared with U.S. \$381/oz. in 1989.

Silver prices declined in 1990, particularly in the second half of the year. The high point was achieved on February 7 at U.S. \$5.39/oz. and the low occurred on December 18 at U.S. \$3.93/oz. Many factors, including a continued supply surplus which added to already huge stocks, some weakness in industrial demand and a perceived disenchantment by investors, contributed to the price decline. The average price for the year was U.S. \$4.82/oz. compared with U.S. \$5.50/oz. in 1989.

### **Specialty Metals**

Cadmium prices averaged U.S. \$3.38/lb. in 1990, down sharply from U.S. \$6.28/lb. in 1989. Environmental concerns have had an impact on non-essential uses of cadmium. The nickel cadmium battery market now accounts for more than 50 percent of annual consumption. The growth rate for nickel cadmium rechargeable batteries remains strong, growing in the 5-10 percent per year range.

Indium prices averaged U.S. \$7.68/oz. in 1990 versus U.S. \$9.04/oz. in 1989. Growth in indium consumption continues to be led by the electronics industry. Production increments are keeping pace with demand and prices were stable during 1990.



**Rick Taylor, Parting Plant Superintendent, records the precise weight of each silver bar at Trail.**





**A float plane delivers supplies to an exploration camp at Butterfly Lake, Manitoba. Grass-roots exploration is a key part of Cominco's quest for new mineral resources.**



Other diamond drill programs investigated base metal prospects in British Columbia, the Northwest Territories, Saskatchewan, Manitoba, and gold prospects in Ontario and Quebec, plus industrial mineral occurrences in Ontario.

## Ore Reserves

### Operating Mines (Measured and Indicated Ore unless otherwise noted<sup>1</sup>)

	1990				1989			
	Ore Tons x 1000	% Pb	% Zn	Ag oz./ton	Ore Tons x 1000	% Pb	% Zn	Ag oz./ton
Sullivan	22,800	4.5	7.3	0.8	23,300	4.5	7.2	0.8
Polaris	13,000	3.8	14.1	—	14,400	3.8	14.3	—
Magmont	3,500	8.2	1.3	0.3% Cu	3,690	7.5	1.2	0.3% Cu
Troya	1,749	0.8	11.3	—	1,630	1.2	12.9	—
Rubiales	660	1.1	6.6	—	1,320	1.1	6.8	—
Hellyer	15,700	6.4	12.4	4.37	16,430	6.6	12.7	4.37
Red Dog	67,000	5.4	18.5	2.7	85,000 <sup>3</sup>	5.0	17.1	2.4
	16,000 <sup>2</sup>	2.7	10.0	1.2				
Glenbrook	940 <sup>4</sup>	1.3% Ni						
Buckhorn	200	.056 oz. Au/ton			790	0.055 oz. Au/ton		
Highland Valley	761,300	0.41% Cu			856,000 <sup>3</sup>	0.41% Cu		
	34,700 <sup>2</sup>	0.44% Cu						
Warm Springs	6,900	30.0% P <sub>2</sub> O <sub>4</sub>			6,600	30.0% P <sub>2</sub> O <sub>4</sub>		
Vanscoy	125,000	25.0% K <sub>2</sub> O equiv.			127,300	25.3% K <sub>2</sub> O equiv.		
Owens Lake	33,000	Na <sub>2</sub> CO <sub>3</sub> equiv.			33,000	Na <sub>2</sub> CO <sub>3</sub> equiv.		
Marte	28,000	0.045 oz. Au/ton			30,000	0.045 oz. Au/ton		
Snip	870	0.85 oz. Au/ton			1,032 <sup>3</sup>	0.87 oz. Au/ton		
	170 <sup>2</sup>	0.75 oz. Au/ton						
Maria	510	12.8% Cu; 0.25% Mo		1.8	850	10.6% Cu; 0.26% Mo		

### Advanced Projects (Measured and Indicated Ore unless otherwise noted<sup>1</sup>)

Quebrada Blanca								
Enriched Zone	85,000	1.4% Cu			65,000	1.5% Cu		
Lobo	70,000	0.047 oz. Au/ton						
Alder	30,000	4% Garnet						
San Martin	800	65% Wollastonite						

<sup>1</sup> Mineral reserves of Cominco and Associated Companies are classified as measured, indicated and inferred. The reserves are reviewed annually by the Company's engineering and geological staff and are based upon individual evaluations of operating results, drilling, other engineering data and long-term metal price forecasts. The term "measured" is limited to those reserves at a mine which can be projected from one or more exposed faces on the basis of actual operating results. Reserves are classified as "indicated" where there is sufficient information about the deposit or a portion of it to form the basis of a mine production forecast. Reserves computed on the basis of more limited information but adequate geological data to form the basis of a preliminary mine production plan are classified as "inferred". Ore reserve figures are total reserves at the mines and are not limited to Cominco's interest.

<sup>2</sup> Inferred Ore.

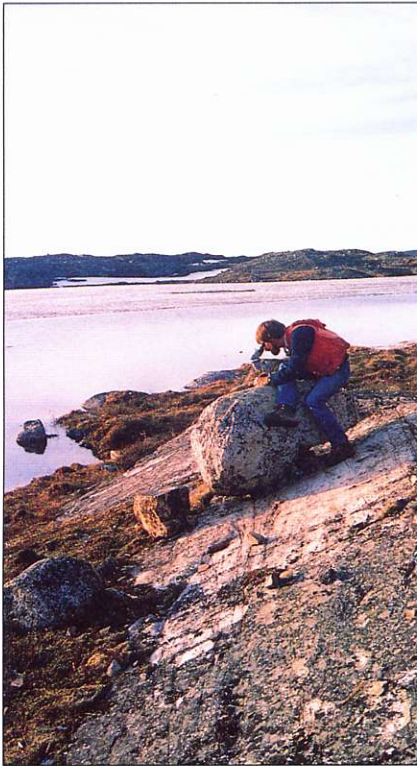
<sup>3</sup> Includes Inferred Ore.

<sup>4</sup> Approximately 518,000 tons have been included on the strength of advanced negotiations with property owners.

## Other Resources<sup>5</sup>

		1990			1989	
		Cominco Ltd. Interest	Ore Tons x 1000	Grade	Ore Tons x 1000	Grade
Pebble Beach	(Possible Resource)	100	200,000	.4% Cu; .012 oz. Au/ton		
Quebrada Blanca						
Protore	(Possible Resource)	70	250,000	.5% Cu		
Mariquita	(Probable Resource)	64.6	23,000	.53% Cu		
Maria Mo Zone	(Possible Resource)	31.7	400	1.8% Cu; .67% Mo		950
Sheep Creek	(Possible Resource)	32.3	5,000	4% Cu		
Pinchi	(Possible Resource)	100	1,200	6.4 lb. Hg/ton		1,200
						6.4 lb. Hg/ton

<sup>5</sup> The term "resource" is used for an estimate of mineralization of expected economic merit, but before complete geological, mine, metallurgical and cost data is available. The term "probable resource" is used when sufficient information is known about the geology, thickness, grade, continuity and extent of the deposit to permit defined grade and tonnage figures. "Possible resource" is a projection of mineralization computed on the basis of limited drilling but a reasonable understanding of the geology and the distribution and correlation of metal values.



**Bruce Coates, Geologist, examines a volcanic rock sample at Run Lake, NWT.**

### **Alaska**

Cominco American Incorporated, a wholly-owned Subsidiary, continued investigation of a number of interesting prospects in Alaska. Encouraging results were obtained from the Pebble Beach property in the Iliamna area, 200 miles (320 km) southwest of Anchorage. Results from an initial diamond drilling program in 1990 suggest a resource of approximately 200 million tons (180 million) averaging .4 percent copper and .012 ounces of gold per ton (.41 g/tonne). Within this area a 50 million ton (45) portion averages .5 percent copper and .015 ounces of gold per ton (.51 g/tonne). The size of the deposit and grade indications are based on early-stage drilling. Most drill holes are only 300 to 400 feet (91 m to 122 m) deep and are approximately 1,000 feet (305 m) apart. The zone is open to depth and to the northeast. A follow-up program of extensive detailed diamond drilling is planned for the 1991 field season. More detailed drilling and metallurgical work are required to determine the economic potential of the project, but these preliminary results are most encouraging. This is an entirely new discovery which was made through grass-roots exploration by Cominco Alaskan geologists.

### **Aberfoyle Limited**

Cominco Ltd. holds a 46 percent interest in this Australian mining company which maintains its own active exploration program. Exploration expenditures totalled \$11.5 million in 1990. Nearly half this amount was spent investigating base metal prospects in Queensland, New South Wales, South Australia and Tasmania. Other targets were gold occurrences in Western Australia and Queensland and heavy mineral sands deposits in the Murray Basin. Work is continuing on several of these projects where results have been encouraging. An exploration budget of approximately \$12.0 million has been set for 1991.

### **Cominco Resources International Limited**

Cominco Resources International Limited is a 64.6 percent-owned, international mineral exploration and development subsidiary of Cominco Ltd. Cominco Resources' head office is located in Vancouver with exploration offices in Spokane and Reno in the United States; Guadalajara and Hermosillo in Mexico; Santiago, Chile; Brussels, Belgium; and Ankara, Turkey. In 1990, Cominco Resources spent approximately \$14.0 million, including amounts capitalized, on exploration in the U.S.A., Mexico, Honduras, Chile, Bolivia, Ireland, Europe and Turkey.

Cominco Resources has arranged a number of joint ventures with Cominco covering gold and base metal properties in the United States, Turkey and Bolivia. Joint ventures with others are being considered for gold properties in Latin America. Under these agreements, Cominco Resources will retain majority ownership of its properties with provisions for future funding.

### **United States**

Cominco Resources' most advanced exploration project in the U.S.A. is the 50 percent-owned Sheep Creek copper project near Helena, Montana. Drilling completed in 1990 continued to intersect good grade copper mineralization and more work is planned in 1991. At the Alder Gulch garnet project, also in Montana, a bulk-sampling program successfully recovered good quality garnet product. The 1991 program on this 60 percent-owned project will consist of additional feasibility and marketing studies. Cominco Resources also conducted base metal and gold exploration programs in Nevada, Arizona, California, Oregon, Washington and Idaho. Several gold properties have recently been acquired in South Carolina.

### **Mexico**

The 100 percent-owned Mariquita copper project, near Cananea in northern Sonora, was the subject of a preliminary feasibility study, which focused on the



potential for open-pit mining, heap-leaching, solvent extraction and electrowinning to produce approximately 11,000 tons (10,000) per year of cathode copper. Further studies are warranted. The San Martin wollastonite deposit, also in Sonora, was bulk-sampled in 1990. Results of metallurgical tests have been favourable and a larger bulk-sampling program is planned for 1991, which could lead to a production decision later this year. A number of other early-stage gold and base metal exploration programs were carried out during the year and several targets in northwestern and western Mexico will be drill-tested in 1991.

### **Chile**

Cominco Resources announced that it has engaged a financial advisor to assist in the sale of its joint venture interests in the 50 percent-owned Lobo gold deposit and several other contiguous exploration properties in the Maricunga district. Elsewhere in the country, the main focus of exploration work was on copper and gold properties in the northern and central areas. One of the gold properties will be drill-tested in 1991 to follow up encouraging trenching results. A base metal exploration program was initiated in southern Chile.

### **Turkey**

Cominco Resources holds approximately 4,633 square miles (12,000 square km) of concessions covering many attractive gold and base metal targets. Exploration is being conducted primarily along the Black Sea coast and inland in the nearby Pontide Mountains. The war in the Persian Gulf has not interfered with the exploration, which is mainly in northeastern Turkey. Drilling in 1990 returned encouraging results from the Tac and Corak gold properties. These properties host significant high-grade and low-grade gold mineralization in a number of zones. Further drilling will be done in 1991 to determine the extent and continuity of mineralization.

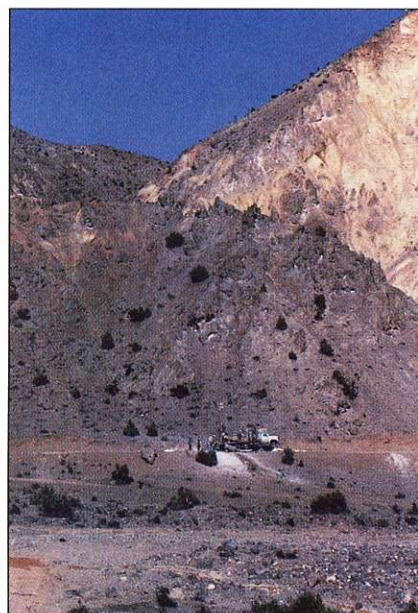
One of Cominco Resources' most exciting properties is the Cerattepe property, where a drill hole intersected a 10 foot interval (3 m) grading 0.23 ounces of gold per ton (8 g/tonne) and 9.3 ounces of silver per ton (320 g/tonne), followed by 33 feet (10 m) grading 0.04 ounces of gold per ton (1.4 g/tonne) and 16 percent copper. Further drilling is planned in 1991 to determine the extent of this new discovery. Drilling and surface exploration for base metal deposits have delineated a large number of targets which will be explored further in 1991.

### **Ireland**

Exploration activities in Ireland are focused on the Irish Midlands, where there are several significant zinc-lead deposits. There is good potential for the discovery of similar deposits on Cominco Resources' joint venture properties, which cover approximately 60 miles (100 km) of established prospective trends. Geological compilations, geophysical and geochemical surveys and drilling in 1990 identified a number of attractive target areas. Limited drilling intersected low-grade zinc-lead mineralization and extensive alteration similar to that found near several deposits in the region. A major drilling program is planned in 1991.

### **Other Areas of Activity**

Exploration for gold and base metals was conducted in a number of countries in Europe, Africa and Latin America. In Honduras, the Chapparales gold property has returned encouraging results and will be drill-tested in 1991. At the Sain Bel base metal property in France, several new drill targets were defined in 1990.



**Cominco Resources is carrying out diamond drilling on promising properties in Turkey.**

# FERTILIZERS

Cominco Fertilizers is a major producer and marketer of the three primary nutrients essential to plant growth: nitrogen, phosphate and potash. Cominco also produces sulphur, sulphuric acid, sulphur dioxide, copper sulphate, hydrofluosilicic acid and other industrial chemicals that are sold for use in pulp and paper manufacturing, waste water treatment, water fluoridation and a variety of other applications. Cominco Fertilizers is based in Calgary, Alberta. Operations are located at Trail, British Columbia; Carseland, Joffre and Calgary, Alberta; Vanscoy, Saskatchewan; and, through Cominco American Incorporated, at Garrison, Montana; Beatrice, Nebraska; Borger, Texas; and Lone Pine, California.

The price of natural gas is a major factor in the cost of production for nitrogen fertilizers. During 1990, the average gas price at Cominco Fertilizers' Nitrogen Operations was approximately the same as in 1989. The general oversupply of natural gas in both the United States and Canadian markets continued to depress gas prices. The Company's procurement strategy currently emphasizes one-year contracts with either fixed prices or spot-market-sensitive pricing. This approach has enabled Cominco to achieve prices which are consistent with the prevailing markets in Canada and the United States. Longer-term gas procurement options are being pursued to establish a competitive gas position for the future.

## Operations

### Alberta Nitrogen Operations

Under a joint venture agreement with Alberta Energy Company Ltd. (AEC), the plants at Calgary, Carseland and Joffre, Alberta and the Vanscoy Distribution Terminal in Saskatchewan, are operated by Cominco Fertilizers under the name of Alberta Nitrogen Operations. AEC owns the Joffre Nitrogen Operation and the Vanscoy Distribution Terminal while Cominco Fertilizers owns the Calgary and Carseland Nitrogen Operations. Cominco Fertilizers markets the product from all the operations. AEC receives a 25 percent share of the revenues, net of costs, from Alberta Nitrogen Operations.

### Calgary Nitrogen Operations

Production of ammonium nitrate continued at the Calgary Nitrogen Operations in Alberta, with the majority of the product being sold for industrial purposes. Production of ammonium nitrate was down slightly compared with the previous year as a result of reduced market demand.

### Carseland Nitrogen Operations

At Carseland Nitrogen Operations, located near Calgary, Alberta, production of ammonia and urea reached record levels as a result of the Fall 1989 retrofit of the ammonia converter internals, higher on-stream time due mainly to a shortened annual shutdown and higher daily operating rates. Urea production was limited somewhat by environmental considerations associated with the high-pressure carbamate stripper. This vessel is scheduled for replacement in mid-1991.

### Joffre Nitrogen Operations

At Joffre Nitrogen Operations, located near Red Deer, Alberta, production of ammonia was down from the previous year's record annual production, due to inventory control considerations associated with the market place and a feedstock interruption caused by mechanical problems at a supplier's operation.

The operation of the Vanscoy Distribution Terminal at Vanscoy, Saskatchewan was normal.

## Fertilizers

Revenues and Operating Profit (Loss)	Revenues		Operating Profit (Loss)	
	1990	1989	1990	1989
			(millions)	
Alberta Nitrogen Operations	\$121	\$118	\$ 7	\$ 8
Potash <sup>1</sup>	122	126	18	30
U.S. Nitrogen Partnership	55	56	9	6
Warm Springs	6	9	(4)	(1)
Purchased products resold and others	41	41	(1)	2
Unallocated Division Costs	—	—	(6)	(7)
	<b>\$345</b>	<b>\$350</b>	<b>\$ 23</b>	<b>\$ 38</b>
First Quarter	\$ 61	\$ 69	\$ 1	\$ 10
Second Quarter	116	130	18	31
Third Quarter	71	63	2	(2)
Fourth Quarter	97	88	2	(1)
	<b>\$345</b>	<b>\$350</b>	<b>\$ 23</b>	<b>\$ 38</b>

<sup>1</sup> Before deduction of the Province of Saskatchewan potash resource tax payments of \$4.1 million in 1990 and \$3.1 million in 1989.

*Revenues from the Trail Fertilizer Operations are included in the Mining and Integrated Metals segment because these operations form a part of the sulphur recovery process of the metallurgical operations.*



## U.S. Nitrogen Operations

Under a partnership agreement between Cominco American Incorporated and Alenco Petrochemicals Inc., a subsidiary of Alberta Energy Company Ltd., various facilities are operated by Cominco Fertilizers under the name of Cominco Fertilizers Nitrogen Partnership. They are the ammonia and urea plants at Borger, Texas, and the ammonium nitrate facility near Beatrice, Nebraska. Related storage and distribution facilities include a 40,000-ton (36,300) ammonia storage terminal at Leal, North Dakota, and a 20,000-ton (18,150) ammonia storage terminal at Friend, Kansas. Alenco owns the Leal facility while the other facilities are held by the Partnership with Alenco owning 25 percent and Cominco American 75 percent. The Friend storage and distribution facility, which also includes a 15,000-ton (13,600) urea ammonium nitrate solution tank, was acquired in November 1990 and will provide market access to western Kansas and eastern Colorado. Cominco Fertilizers markets the products from all of the plants.

### Borger Nitrogen Operations

The Borger Nitrogen Operations, located at Borger, Texas, consist of an ammonia plant which started production in 1968 and a urea plant which was started in 1980. The plant operated throughout 1990 except for a two-week maintenance period in the fourth quarter.

Ammonia production in 1990 established new records for the plant. Improvements made during a six-week major renovation in late 1989 resulted in increased plant capacity, better plant reliability and lower energy consumption. Urea production was higher than in 1989, but was restricted due to the limitations of a major piece of equipment which is scheduled to be replaced in March 1991.

The ammonia is distributed in the local market area directly from the plant and to much of the Midwest agricultural market via a 900-mile (1,440 km) pipeline system. Ammonia used for feedstock in making ammonium nitrate is also delivered by the pipeline to the Homestead Nitrogen Operations near Beatrice, Nebraska. A total of 120,000 tons (108,900) of ammonia storage capacity is utilized at Beatrice, Nebraska; Friend, Kansas; and at Early, Iowa. Urea production includes grades for agricultural use and for cattle feed supplements and is generally sold to consumers near the plant location.

### Homestead Nitrogen Operations

The Homestead Nitrogen Operations, located near Beatrice, Nebraska, manufacture and distribute agricultural-grade ammonium nitrate. Nitrate consumption in 1990 continued to be strong, allowing the plant to operate at essentially full capacity for the second consecutive year. Annual records were set for the production of nitric acid and nitrate liquor.

Development work to improve the quality of the ammonium nitrate resulted in the use of a new material for moisture protection of the product. Customer acceptance was excellent due to the reduction of fugitive dust during unloading and handling.

Additional automation aimed at improving plant performance and customer convenience in product availability was incorporated during 1990.

### Trail Fertilizer Operations

Ammonium phosphate and ammonium sulphate fertilizers are produced at Trail, B.C., from the sulphuric acid and ammonium sulphate solution by-product streams from the Trail Metallurgical Operations. These by-products are derived by the removal of sulphur dioxide from the gases generated during the processing of lead and zinc concentrates. The phosphate rock used for the production of ammonium phosphate fertilizer is supplied by Cominco American's Warm Springs mine in Montana. Trail's ammonia needs are supplied from the Joffre Nitrogen Operations.

Reduced availability of sulphuric acid and ammonium sulphate solution,

### CALGARY NITROGEN OPERATIONS

		1990	1989
Ammonium nitrate	tons	49,500	53,900
	(tonnes)	(44,900)	(48,900)
No. of employees at year-end		43	44

### CARSELAND NITROGEN OPERATIONS

		1990	1989
<b>Ammonia</b>			
Production	tons	477,700	442,400
	(tonnes)	(433,400)	(401,300)
<b>Urea</b>			
Production	tons	623,600	561,300
	(tonnes)	(565,700)	(509,200)
No. of employees at year-end		109	107

### JOFFRE NITROGEN OPERATIONS

		1990	1989
<b>Ammonia</b>			
Production	tons	356,200	388,500
	(tonnes)	(323,100)	(352,400)
No. of employees at year-end		34	35

### BORGER NITROGEN OPERATIONS

		1990	1989
<b>Ammonia</b>			
Production	tons	402,300	298,000
	(tonnes)	(365,000)	(270,300)
<b>Urea</b>			
Production	tons	72,000	58,400
	(tonnes)	(65,300)	(53,000)
No. of employees at year-end		69	66

### HOMESTEAD NITROGEN OPERATIONS

		1990	1989
<b>Granular nitrate</b>			
Production	tons	197,000	198,500
	(tonnes)	(178,700)	(180,100)
No. of employees at year-end		77	74



**Migrating Canada Geese make Carseland Nitrogen Operations' evaporation pond an annual stopover on their way to southern feeding grounds.**



due to lower production rates of lead and zinc, resulted in lower tonnages of all products compared with 1989 levels.

The construction of a new phosphoric acid evaporator and the modernization of a phosphate granulation unit are proceeding with completion scheduled in the first half of 1991. This project will increase plant capacity, thereby reducing the effect of potential restrictions in metallurgical production, and will improve product quality, plant hygiene and environmental factors.

In late 1990, approval was given for the construction of two new ammonium sulphate crystallizers in the sulphate plant. Completion of the project, scheduled for early 1992, will ensure the reliability of the operation to consume metallurgical sulphur and will produce a crystal size that is suitable for blending with other granular fertilizers.

Financial results for this operation are included in the Trail Metallurgical Operations results.

### Potash Operations

Potash Operations, located near Vanscoy, Saskatchewan, experienced a moderately disappointing year in 1990. Profits were well below the 1989 record level because of lower prices. However, production and sales levels were the third highest in the operation's history. Inventory remained well under control and there were no plant shutdowns or unscheduled production interruptions.

The lower net returns were the result of continued soft markets, relatively high industry inventories and unfavourable Spring weather. Unit costs continued to be high in 1990, the result of increased labour for maintenance and the relocation of the centre of mine production to an area about nine miles (15 km) from the shaft compared with 3.7 miles (6 km) in prior years. The relocation to a new mining block was necessary due to the depletion of ore reserves from the mining block closest to the shaft.

Sales in all major market areas remained close to 1989 levels. U.S. sales were down slightly, while sales to Canpotex Ltd., Eastern Canada and Western Canada were up. For most of the year, the plant was under pressure to maximize premium potash production and minimize non-premium production because of a slow recovery in offshore markets. In addition, the transition to the new mining area continued to create a tight ore supply for the first half of 1990. By Fall, increased sales of standard-grade potash to China and development of the new mining area led to higher-than-planned production during the last three months of 1990.

Work continues on a technically and economically viable method of disposing of the concentrator tailings and reducing or eliminating the need for surface storage of the tailings.

### TRAIL FERTILIZER OPERATIONS

		1990	1989
<b>Ammonium phosphate</b>			
Production	tons	102,000	140,500
	(tonnes)	(92,600)	(127,500)
<b>Ammonium sulphate</b>			
Production	tons	87,900	146,000
	(tonnes)	(79,800)	(132,500)
No. of employees at year-end		167	194

### POTASH OPERATIONS

		1990	1989
<b>Potash</b>			
Production			
Ore	tons	3,473,800	2,951,100
	(tonnes)	(3,151,300)	(2,677,200)
Production			
Product	tons	1,197,000	1,061,800
	(tonnes)	(1,085,900)	(963,300)
No. of employees at year-end		338	330

## Production and Sales Statistics (including interests of co-venturers)

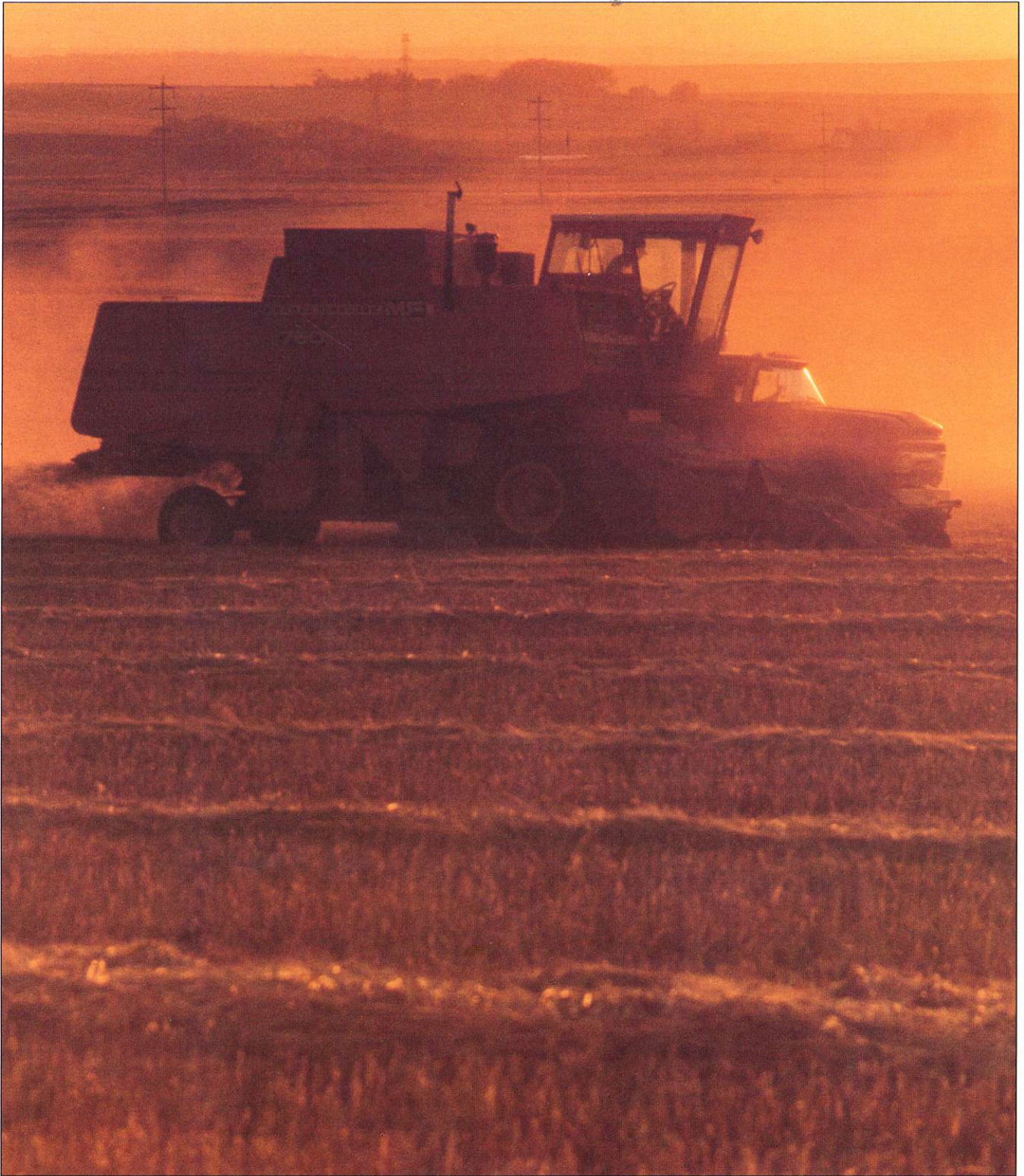
Twelve Months Ended December 31

		1990		1989	
		Sales	Production	Sales	Production
<b>Nitrogen Products<sup>1</sup></b>					
Alberta Nitrogen Operations <sup>2</sup>	tons	1,052,300	1,081,800	1,025,300	1,024,800
U.S. Nitrogen Operations <sup>3</sup>	tons	499,400	538,800	459,600	430,800
		1,551,700	1,620,600	1,484,900	1,455,600
<b>Phosphates</b>	tons	96,200	102,100	137,000	140,500
<b>Potash</b>	tons	1,152,100	1,196,900	1,126,600	1,061,700
<b>Other</b>	tons	128,600	107,300	210,100	181,000

<sup>1</sup> The nitrogen production statistics represent product available for sale and do not include the tonnage of ammonia consumed in the manufacture of alternate nitrogen products.

<sup>2</sup> The Alberta Nitrogen Operations comprise the Calgary Nitrogen Operations, the Carseland Nitrogen Operations and Joffre Nitrogen Operations.

<sup>3</sup> The U.S. Nitrogen Operations comprise the Borger Nitrogen Operations and Homestead Nitrogen Operations and associated distribution facilities.



**Farmers across the Canadian West, like this one near Red Deer, Alberta, harvest crops fertilized with Cominco's Elephant Brand products.**



## The Fertilizer Markets

The North American fertilizer industry approached 1990 with cautious optimism. The price downturn late in the previous year reversed and began a marginal recovery by Spring 1990. Despite poor farm commodity prices, demand for fertilizer early in 1990 increased marginally from the previous year.

Nitrogen fertilizer prices strengthened further in the second half of 1990. The war in the Persian Gulf fuelled an upward trend in nitrogen fertilizer prices that began early in 1991. Iraq and Kuwait account for eight percent of the world's urea trade. Furthermore, high production costs and economic difficulties have idled some antiquated fertilizer plants in Eastern Europe.

Corn accounts for approximately 44 percent of fertilizer used in the United States. Despite late plantings due to excess moisture during the normal planting season in the major corn growing areas, 1990 nitrogen demand in the United States was up by five percent over the previous year. Small increases in corn acreage suggest that the higher fertilizer demand was due to higher application rates. Urea demand alone was up as much as 10 percent. Potash and phosphate consumption rose in concert with nitrogen demand in 1990, but the increases were more modest than the increases for nitrogen. Application rates for fertilizer on other major U.S. crops were relatively unchanged.

In Western Canada, urea consumption increased by three percent for the first half of 1990. However, phosphate consumption for the same period declined by approximately two percent. Potash consumption, although relatively small in Western Canada, rose by 21 percent.

Poor soil moisture conditions in Western Canada carried over from 1989, but this condition was alleviated by adequate precipitation during the 1990 growing season. The result was one of the largest crops ever produced. However, poor grain prices combined with reduced export sales left much of the 1990 crop unsold. As a result, farm operating capital was scarce. By the end of 1990, fertilizer shipments in Western Canada decreased from 1989 levels by 10 percent for urea and as much as 25 percent for phosphate. Inadequate soil moisture conditions contributed to reduced Fall fertilizer applications.

Offshore nitrogen markets strengthened in 1990. China, the world's largest importer of urea, returned to the market place after curtailing its purchases in 1989 due to political turmoil. Furthermore, the distressed pricing aimed at reducing inventories in 1989 was less evident in the first quarter of 1990. Lower inventories and increased world prices yield an optimistic outlook for offshore urea sales in 1991.

Offshore markets for potash also recovered slightly in 1990. China's return to the potash market resulted in a five percent increase in North American potash exports.

The world grain trade has a significant effect on domestic fertilizer consumption. Grain prices dropped significantly in 1990, mostly due to the grain subsidy war between the United States and the European Economic Community. Talks aimed at negotiating an end to the subsidy broke down in 1990 and world grain prices will likely continue at low levels. This situation will shift seeded acreage away from wheat and corn towards oilseeds and does not suggest a further increase in fertilizer demand for 1991.

# ENVIRONMENT

Cominco has adopted the environmental policy of the Mining Association of Canada:

*Member companies of the Mining Association of Canada are committed to the concept of sustainable development which requires balancing good stewardship in the protection of human health and the natural environment with the need for economic growth. Diligent application of technically proven and economically feasible environmental protection measures will be exercised throughout exploration, mining, processing and decommissioning activities to meet the requirements of legislation and to ensure the adoption of best management practices. To implement this policy, whether in Canada or abroad, the member companies of the Mining Association of Canada will:*

- *assess, plan, construct and operate their facilities in compliance with all applicable legislation providing for the protection of the environment, employees and the public;*
- *in the absence of legislation, apply cost-effective best management practices to advance environmental protection and to minimize environmental risks;*
- *maintain an active, continuing, self-monitoring program to ensure compliance with government and company requirements;*
- *foster research directed at expanding scientific knowledge of the impact of the industry's activities on the environment, of environment/economy linkages, and of improved treatment technologies;*
- *work pro-actively with government and the public in the development of equitable cost-effective and realistic laws for the protection of the environment; and*
- *enhance communications and understanding with governments, employees and the public.*

A newly-created position, Director, Environmental Affairs, which reports to the Chief Executive Officer, is charged with the responsibility of administering this policy. The Director will ensure that Cominco's environmental objectives are being achieved and that emerging environmental issues and technical advances are incorporated into the planning process.

For more than 60 years Cominco Ltd. has been a world leader in the research and development of environmental technology in the mining, smelting and refining industry. The Company pioneered environmental control of sulphur emissions in the 1930s with the construction of chemical and fertilizer plants at Trail, B.C., which converted sulphur dioxide gas into agricultural and industrial chemicals. The expansion and refinement of these facilities over the years, combined with continuous monitoring, enables careful control of sulphur emissions. Atmospheric sensors, stack emission levels and impending weather patterns in the Columbia Valley are monitored 24 hours a day by waste control technicians. When necessary, production is curtailed to meet emission standards.

During the mid-1970s, Cominco began modernization of its lead and zinc smelting plants with emphasis on environmental protection. This began with a \$725 million program in 1977 incorporating advances in environmental management and emissions control. This program is still continuing.

Integral to the modernization program is Vision 2000, a comprehensive set of values and fundamental objectives that build upon the strengths of Cominco's human, natural and physical resources. In keeping with the goals of Vision 2000, environmental progress was made in several areas in 1990. Plant modernization, the management of intermediate materials and wastes and spill contingency planning continued.

Although the delay in the start-up of the new lead smelter has set back plans for several of the Vision 2000 goals, improvements were made on a number of environmental fronts at Trail. Paved storage pads were established for the storage of in-process materials, which are being covered to control dust during dry weather. A lagoon with an impermeable liner was constructed to capture runoff water from the storage areas, so that it can be treated to recover metals. A new system of in-plant haulage roads was built to facilitate materials handling and to improve dust control.

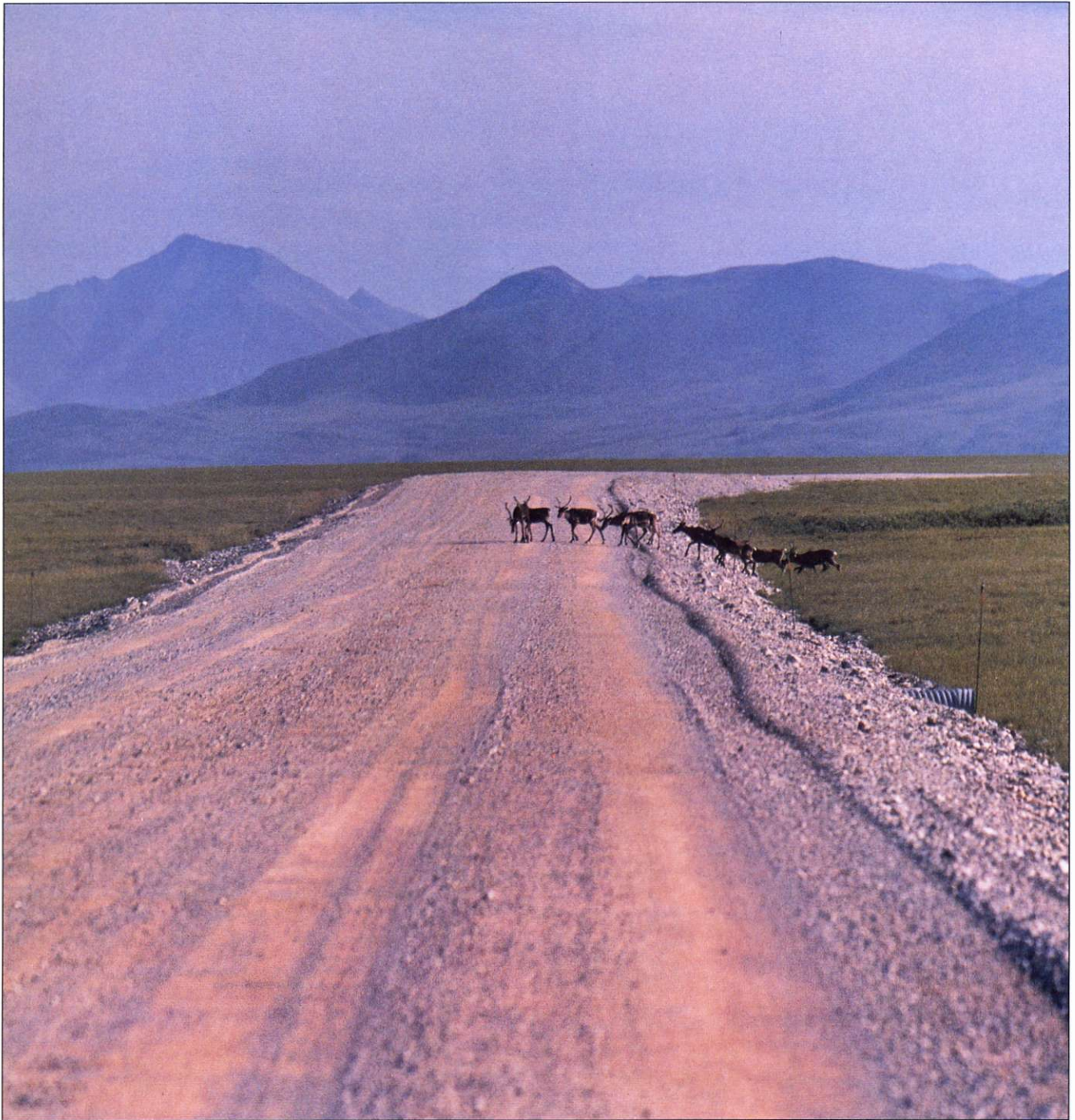
In Lead Operations, a more stringent worker hygiene program was introduced to further reduce employee exposure to in-plant lead.

Vision 2000 envisages large areas of reclaimed land at Trail where there now exist stockpiles and ponds of in-process materials. Current methods of dealing with in-process materials are no longer satisfactory and a management plan has been developed for their containment and removal. Operating regimes are being implemented for the plants to treat all by-products promptly and avoid accumulation of stockpiles.

In 1989, Cominco and the Government of British Columbia began a study on blood lead levels in children from the Trail area. The B.C. Ministry of Health contracted with the University of British Columbia to conduct the study and Cominco provided analytical laboratories. In 1990, the Trail Lead Study Report was released by the Provincial Ministries of Health and Environment. It found that average blood lead among children in the study group was 13.8 micrograms per decilitre, well below the average 22.5 micrograms per decilitre found in the last study conducted in 1975. The study also found that 98.4 percent of the children tested were below the government-set action level of 25 micrograms per decilitre. There is, however, disagreement among medical authorities regarding blood lead action levels and this level may be lowered in the future.

Since the study results were released, a Trail Lead Task Force has been established in the community. It includes civic leaders, parents and representatives from the Company, union and Provincial Health and Environment Ministries. They are working together to establish future study needs, to gather more data about lead in the community and to determine what steps may be necessary to minimize lead exposure among children. Cominco is supporting this work through funding and the contribution of technical expertise.





**The road linking the Red Dog mine and the port site on the Chukchi Sea has no effect on the thousands of migrating caribou that forage in the area.**





**This site, once used for overburden from the Lornex pit at Highland Valley Copper, is being reclaimed and turned into productive pasture land.**



Cominco sees its responsibility to the community as continued reduction of lead emissions to the lowest-possible levels by the application of the best available technology.

At all Cominco operations, efforts are being made to protect the environment. At the new Red Dog mine in Alaska, a fish biomonitoring facility was established and a system to protect water quality in Red Dog Creek is being implemented and will be in operation by Spring 1991. At Kimberley Operations and Highland Valley Copper in British Columbia, extensive reclamation programs are already under way on decommissioned areas even though mining operations are continuing. At Pine Point Mines, N.W.T., where mining and milling activities ceased in 1987, reclamation of town site lots and mining areas was largely completed in 1989. The most important reclamation project involves the tailings area where treatment of runoff will be continued for at least five years. Plant site reclamation will be completed in 1992.

At Cominco's fertilizer operations, water conservation is an important consideration. Borger Nitrogen Operations in Texas re-uses about one-third of plant liquid effluent and Joffre Nitrogen Operations, Alberta, uses an air cooling system which results in reduced water requirements for process purposes when compared with similar facilities.



**Top: A mother grizzly and her two cubs are among the many species of wildlife that live in the Red Dog area. Left: Hydro-seeding is part of the reclamation activity under way at Kimberley Operations.**



## **Management's Statement on Financial Reporting**

The accompanying consolidated financial statements of Cominco Ltd. and its Subsidiaries have been prepared in accordance with generally accepted accounting principles considered to be appropriate in the circumstances.

The statements and all of the information contained in the Annual Report are the responsibility of management and are approved by the Board of Directors of Cominco Ltd. Financial and operating information appearing throughout the Annual Report is consistent with that contained in the financial statements. The consolidated financial statements of Cominco Ltd. and its Subsidiaries are examined by Cominco's auditor, Peat Marwick Thorne, whose report follows.

## **Auditors' Report**

To the Shareholders  
of Cominco Ltd.

We have audited the consolidated balance sheets of Cominco Ltd. as at December 31, 1990 and December 31, 1989 and the consolidated statements of earnings, earnings reinvested in the business and changes in cash resources for each of the years then ended. These financial statements are the responsibility of the Corporation's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these consolidated financial statements present fairly, in all material respects, the financial position of the Corporation as at December 31, 1990 and December 31, 1989 and the results of its operations and the changes in its cash resources for the years then ended in accordance with generally accepted accounting principles.

Vancouver, Canada  
February 8, 1991

*Peat Marwick Thorne*

Chartered Accountants



## Summary of Significant Accounting Policies

The consolidated accounts of Cominco Ltd. (the "Corporation") are prepared using accounting principles generally accepted in Canada applied on a consistent basis.

To facilitate review of the consolidated financial statements contained in this report, the significant accounting policies followed by the Corporation and its Subsidiaries are summarized below.

### Principles of Consolidation

The accounts of the Corporation and its subsidiaries are consolidated in these financial statements except where the assets of a subsidiary have become economically impaired or where there is a formal plan in place to dispose of the investment. The differences between the cost of the investments and the underlying book values of the assets at the dates of acquisition have been allocated to assets on consolidation and are being amortized accordingly. Intercompany balances and transactions are eliminated.

Investments in partnerships and joint ventures are generally accounted for by the equity method except where the Corporation exercises significant influence and where the activities carried out are of a significant size and similar to other activities of the Corporation. In those cases the accounts of the partnership or joint venture are consolidated on a proportionate basis. Under this method, the Corporation includes in its accounts its proportionate share of the assets, liabilities, revenues and expenses. Intercompany balances and transactions are eliminated. The Corporation's proportionate share of assets is carried at cost.

Investments in Associated Companies (those companies in which the Corporation owns 50% or less of the shares and over which it has significant influence) are accounted for by the equity method. Under this method the Corporation includes in its earnings its share of the earnings or losses of Associated Companies. In measuring the Corporation's share of earnings or losses, amortization of differences between the cost of the investments and underlying book values is taken into account.

### Foreign Currency Translation

All foreign currencies are translated into Canadian dollars generally using weighted average rates for the year for items included in the consolidated statements of earnings, current rates for assets and liabilities included in the consolidated balance sheets, and historical rates for other items.

Translation gains or losses are included in the determination of earnings, except for (i) those arising on translation of accounts of foreign subsidiaries and associates considered financially and operationally self-sustaining, which are deferred as a separate component of shareholders' equity until there has been a realized reduction in the net investment, and (ii) those arising on translation of long-term mon-

etary items of Canadian and integrated foreign operations, which are deferred and amortized over the lives of those items.

### Inventories

Finished goods, raw materials and partially processed materials are valued generally at the lower of cost (determined on the monthly average method) and net realizable value except inventories of the Highland Valley Copper partnership consisting principally of copper concentrates and related by-products, which are determined on the last-in, first-out method and valued at estimated net realizable value at time of accumulation. Stores and operating supplies are valued at average cost less appropriate allowances for obsolescence.

### Land, Buildings and Equipment

Land, buildings and equipment are recorded at cost and include the cost of renewals and betterments. When assets are sold or abandoned, the recorded costs and related accumulated depreciation are removed from the accounts and any gains or losses are included in earnings. Repairs and maintenance are charged against earnings as incurred.

Depreciation is calculated on the straight-line method using rates based on the estimated service lives of the respective assets. In some integrated mining and manufacturing operations, assets are pooled and depreciated at composite rates. Depreciation is not provided on major additions until commencement of commercial operation.

### Mineral Properties and Development

Exploration expenditures are charged to earnings in the year they are incurred except for expenditures on specified properties having indicated the presence of a mineral resource with the potential of being developed into a mine, in which case the expenditures are capitalized.

Mine development costs incurred to maintain current production are included in operating costs. Mine development costs incurred to expand the capacity of operating mines, to develop new orebodies or to develop mine areas substantially in advance of current production are capitalized and charged to operations on a units-of-production or on a time basis related to the mineral reserves position. If it is determined that an investment in capitalized mine development or exploration is not recoverable over the productive life of the property, the unrecoverable portion is charged to earnings in the year such determination is made.

### Taxes on Income

Income tax laws in Canada and in some other countries permit the deduction of depreciation and other items from income to determine taxable income at times which do not

coincide with those used for financial reporting purposes. Income tax provisions are made on the basis of income for financial reporting purposes (the Tax Allocation method) and accordingly, the differences in timing of deductions result in taxes being provided for which are not currently payable.

Tax savings from the utilization of Investment Tax Credits are applied to reduce the cost of the related qualifying expenditures and as a result, are recognized in earnings at the time the related expenditures are charged to earnings.

Withholding taxes, where applicable, on earnings of foreign operations are provided in the accounts to the extent of dividends anticipated in the future.

### **Research and Product Development**

Research and product development costs are charged against earnings as incurred.

### **Interest**

Interest is charged to earnings except for interest on funds applied to major expenditures for fixed assets, which is capitalized during the construction period. Capitalization is based upon the actual interest on debt specifically incurred for the asset or on the average borrowing rate for all other debt except where shares are issued to cover the cost of the project.

### **Pension Costs**

The Corporation's defined benefit pension plans cover substantially all employees. Pension costs and obligations are determined using the projected benefit method of actuarial

valuation prorated on the projected length of employee service. Pension surpluses and deficiencies, experience gains or losses and the effects of changes in plan assumptions are amortized on a straight-line basis over the expected average remaining service life of the relevant employee group. The cumulative difference between amounts expensed or credited to income and funding contributions is recorded on the balance sheets.

### **Start-up Costs**

Start-up costs related to major projects are deferred until the facilities achieve commercial operation. These deferred costs are included in fixed assets and depreciated on a straight-line basis over a reasonable period of time.

### **Reclamation Costs**

A provision for future reclamation and site restoration is established for certain mining areas and operating facilities based upon estimated costs to comply with existing requirements. Provisions related to on-going operations are generally made on a basis related to the remaining life of the operation and commence when the probable end of the operation is determined and when a reasonably definitive estimate of cost can be made. Costs related to on-going programs are expensed when incurred.

### **Earnings per Share**

Earnings per Common Share are calculated by dividing net earnings less a provision for dividends on Preferred Shares by the weighted average number of shares outstanding during the year.



**Consolidated Statements of Earnings**

Years Ended December 31, 1990 and 1989

	1990	1989
	(thousands)	
<b>Revenue</b>		
Sales of products and services	\$1,403,479	\$1,591,324
Income from investments	14,066	18,380
	<b>1,417,545</b>	<b>1,609,704</b>
<b>Costs and Expenses</b>		
Costs of products and distribution	1,106,404	1,033,649
General, administrative and selling	65,953	61,696
Mineral exploration	36,963	30,634
Interest (Note 11)	23,636	9,782
Depreciation, depletion and amortization	87,137	69,964
	<b>1,320,093</b>	<b>1,205,725</b>
<b>Earnings Before the Following</b>	<b>97,452</b>	<b>403,979</b>
Add (deduct)		
Taxes on income including resource taxes (Note 12)	(46,802)	(156,353)
Minority interests in net earnings of Subsidiary Companies	(7,334)	(46,071)
Equity in earnings of Associated Companies	15,782	13,060
<b>Earnings From Continuing Operations</b>	<b>59,098</b>	<b>214,615</b>
Loss from discontinued operation (Note 13)	(4,342)	—
<b>Net Earnings</b>	<b>\$ 54,756</b>	<b>\$ 214,615</b>
<b>Earnings per Common Share</b>		
Basic		
Earnings from continuing operations	\$ 0.70	\$ 2.64
Net earnings	\$ 0.65	\$ 2.64
Fully diluted		
Earnings from continuing operations	\$ 0.68	\$ 2.57
Net earnings	\$ 0.63	\$ 2.57

**Consolidated Statements of Earnings Reinvested in the Business**

Years Ended December 31, 1990 and 1989

	1990	1989
	(thousands)	
<b>Amount at Beginning of Year</b>	<b>\$665,532</b>	<b>\$495,830</b>
Net earnings	54,756	214,615
	<b>720,288</b>	<b>710,445</b>
<b>Deduct</b>		
Premium on redemption of shares	—	67
<b>Dividends paid</b>		
Preferred — Series A \$2.00 per share	475	551
— Series B \$2.44 per share	2,999	3,016
— Series G (1989 - \$0.55 per share)	—	1,637
Common — \$0.50 per share	39,665	39,642
	<b>43,139</b>	<b>44,913</b>
<b>Amount at End of Year</b>	<b>\$677,149</b>	<b>\$665,532</b>

**Consolidated Balance Sheets**

At December 31, 1990 and 1989

	1990	1989
	(thousands)	
<b>Current Assets</b>		
Cash and short-term investments	\$ 48,201	\$ 182,681
Accounts receivable	198,517	242,774
Inventories (Note 2)	418,448	323,456
Prepaid expenses	6,510	12,152
	<b>671,676</b>	<b>761,063</b>
<b>Share Subscriptions Receivable</b> (Note 9(a))	—	11,000
<b>Investments</b>		
Associated Companies	80,146	85,693
Other investments (Note 4)	34,537	25,709
	<b>114,683</b>	<b>111,402</b>
<b>Fixed Assets</b> (Note 5)		
Land, buildings and equipment	1,468,221	1,359,232
Mineral properties and development	189,210	192,928
	<b>1,657,431</b>	<b>1,552,160</b>
<b>Other Assets</b> (Note 6)	46,561	44,296
	<b>\$2,490,351</b>	<b>\$2,479,921</b>
<b>Current Liabilities</b>		
Bank loans and notes payable	\$ 110,781	\$ 41,613
Accounts payable and accrued liabilities	207,686	211,562
Income and resource taxes	13,264	39,561
Long-term debt due within one year	43,262	5,189
	<b>374,993</b>	<b>297,925</b>
<b>Long-Term Debt</b> (Note 7)	428,369	421,832
<b>Deferred Liabilities</b> (Note 8)	93,791	93,355
<b>Income Taxes Provided But Not Currently Payable</b>	262,058	245,175
<b>Minority Interests</b>	18,277	118,252
<b>Shareholders' Equity</b>		
Capital (Note 9)	646,603	647,758
Earnings reinvested in the business	677,149	665,532
Cumulative translation adjustment (Note 10)	(10,889)	(9,908)
	<b>1,312,863</b>	<b>1,303,382</b>
<b>Commitments and Contingencies</b> (Note 15)	\$2,490,351	\$2,479,921

Approved by the Board:



N.B. Keevil

Director



R.E. Hallbauer

Director



**Consolidated Statements of Changes in Cash Resources**

Years Ended December 31, 1990 and 1989

	1990	1989
	(thousands)	
<b>Cash From (Used In) Operations</b>		
Earnings from continuing operations	\$ 59,098	\$214,615
Add(deduct) items not involving cash		
Depreciation, depletion and amortization	87,137	69,964
Deferred income taxes	24,889	92,483
Minority interest	7,334	46,071
Earnings from associates in excess of dividends	(5,443)	(2,450)
Other items	3,298	(2,129)
(Increase) Decrease in non-cash working capital items	(69,277)	63,483
	<b>107,036</b>	482,037
Add interest, a financing activity	23,636	9,782
Cash from continuing operations	130,672	491,819
Cash used by discontinued operation	(311)	—
	<b>130,361</b>	491,819
<b>Cash From (Used In) Financing Activities</b>		
Interest charged to earnings	(23,636)	(9,782)
Dividends — to preferred shareholders	(3,474)	(5,204)
— to common shareholders	(39,665)	(39,642)
— to minority shareholders	(83,287)	(6,940)
	<b>(150,062)</b>	(61,568)
Redemption of preferred shares	(1,085)	(76,598)
Issue of common shares	36	4,065
Issue of common shares by Cominco Resources	6,373	6,779
Issue of preferred shares	11,000	11,000
Repayment of long-term debt	(85,265)	(106,106)
Additions to long-term debt	128,123	197,111
	<b>(90,880)</b>	(25,317)
<b>Cash From (Used In) Investing Activities</b>		
Investments in associated and other companies	(11,066)	(37,754)
Land, buildings and equipment	(228,939)	(343,433)
Mineral properties and development	(8,733)	(37,152)
Proceeds from disposal of assets and investments	9,361	6,492
Other items	(3,752)	(2,339)
	<b>(243,129)</b>	(414,186)
<b>Increase (Decrease) In Cash Resources</b>	<b>(203,648)</b>	52,316
<b>Cash at Beginning of Year</b>	<b>141,068</b>	88,752
<b>Cash (Net Borrowings) at End of Year</b>	<b>\$ (62,580)</b>	\$141,068

Cash comprises cash and short-term investments net of short-term borrowings.

Years Ended December 31, 1990 and 1989

**1. Accounting Policies**

The significant accounting policies followed by the Corporation and its subsidiary companies are summarized under the caption "Summary of Significant Accounting Policies." Certain 1989 figures have been reclassified to conform with the 1990 presentation.

**2. Inventories**

	1990	1989
	(thousands)	
Finished goods	\$228,952	\$149,135
Raw materials and partially processed materials	81,965	75,187
Stores and operating supplies	107,531	99,134
	<b>\$418,448</b>	<b>\$323,456</b>

**3. Partnerships and Joint Ventures**

The Corporation consolidates its proportionate share of the assets, liabilities, revenues and expenses of the following partnerships and joint ventures:

**(a) Highland Valley Copper Partnership**

The Corporation has a 50% interest in the Highland Valley Copper Partnership which owns and operates the Highland Valley Copper Mine. The comparative summary of the proportionate amounts included in the consolidated accounts is as follows:

	1990	1989
	(thousands)	
Current assets	\$ 56,191	\$ 41,975
Current liabilities	(28,405)	(29,026)
Working capital	27,786	12,949
Property, plant and equipment (net)	175,673	186,210
Mining property (net)	79,460	84,179
Other (net)	(455)	(130)
	<b>\$282,464</b>	<b>\$283,208</b>
Revenues	\$224,185	\$178,697
Expenses	(147,507)	(107,602)
Earnings before income and resource taxes	<b>\$ 76,678</b>	<b>\$ 71,095</b>

**(b) Pine Point Mines Limited and Polaris Operations Joint Venture**

Effective August 31, 1990, the Corporation exchanged its 50.1% common share interest in Pine Point Mines Limited for a 50.1% interest in the assets and liabilities of that company which included a 45% interest in the Polaris Joint Venture. Thus, Cominco's direct (55%) and indirect (22.5%) interest in that Joint Venture became a direct 77.5% interest. In 1989 the accounts of the Joint Venture were fully consolidated; from August 31, 1990 they have been included on a proportionate basis. A summary of the amounts included in the consolidated accounts is set out below.

	1990	1989
	(thousands)	
Current assets	\$ 41,335	\$ 50,176
Current liabilities	(31,717)	(25,805)
Working capital	9,618	24,371
Property, plant and equipment (net)	85,244	116,655
Mining property (net)	10,296	14,269
Minority interest	—	(34,942)
	<b>\$105,158</b>	<b>\$120,353</b>
Revenue	\$141,588	\$159,441
Expenses	(67,501)	(72,193)
Minority interest	(9,731)	(19,631)
Earnings before income and resource taxes	<b>\$ 64,356</b>	<b>\$ 67,617</b>

**(c) Fertilizer Operations**

*Alberta Nitrogen Joint Venture*

The Corporation manages and operates three nitrogen fertilizer plants under the Alberta Nitrogen Joint Venture. Working capital, revenue and expenses are shared 75% by the Corporation and 25% by Alberta Energy Company Ltd. Alberta Energy owns the Joffre plant and Cominco owns the Carseland and Calgary plants which are included in the accounts at original cost.

*U.S. Nitrogen Partnership*

A subsidiary, Cominco American Incorporated and Alenco Petrochemicals Inc., (subsidiary of Alberta Energy Company Ltd.) has a partnership which allows Alenco to participate in Cominco American's nitrogen-based fertilizer business. Under the partnership agreement, Cominco American contributed its fertilizer plants and facilities at Borger, Texas and Beatrice, Nebraska together with its storage and distribution facilities and Alenco contributed cash to earn a 25% interest in the partnership. Cominco American is responsible for management and marketing activities.

A comparative summary of the Corporation's proportionate interest in the above operations included in the consolidated accounts is as follows:

	1990	1989
	(thousands)	
Current assets	\$ 44,208	\$ 32,792
Current liabilities	(20,501)	(27,090)
Working capital	23,707	5,702
Property, plant and equipment (net)	89,926	94,936
	<b>\$ 113,633</b>	<b>\$ 100,638</b>
Revenues	\$ 232,610	\$ 217,171
Expenses	(216,607)	(202,792)
Earnings before income taxes	<b>\$ 16,003</b>	<b>\$ 14,379</b>

**4. Other Investments**

	1990	1989
	(thousands)	
Aur Resources Inc. (10.7% owned; 1989 — 8.1%)	\$22,833	\$16,636
Geddes Resources Ltd. (17.9% owned; 1989 — 19.7%)	8,679	8,679
Other	3,025	394
	<b>\$34,537</b>	<b>\$25,709</b>

**5. Fixed Assets**

**(a) Land, buildings and equipment**

	1990	1989
	(thousands)	
Land, buildings and equipment	\$2,033,161	\$1,581,996
Less accumulated depreciation	764,347	690,774
	<b>1,268,814</b>	<b>891,222</b>
Construction in progress	199,407	468,010
	<b>\$1,468,221</b>	<b>\$1,359,232</b>

**(b) Mineral Properties and Development**

Operating mines	\$ 171,839	\$ 145,452
Less accumulated depletion	48,506	41,834
	<b>123,333</b>	<b>103,618</b>
Mine under development	48,055	52,859
Exploration properties	17,822	36,451
	<b>\$ 189,210</b>	<b>\$ 192,928</b>



6. Other Assets

	1990	1989
	(thousands)	
Sundry loans	\$ 6,061	\$ 7,867
Recoverable investment tax credits	9,732	7,783
Deferred project and bond financing costs (net)	10,468	9,669
Recoverable road and port costs	9,275	9,255
Advance royalties	8,812	8,794
Other	2,213	928
	<b>\$46,561</b>	<b>\$44,296</b>

7. Long-Term Debt (excluding amounts due within one year)

	1990	1989
	(thousands)	
Cominco Ltd.		
10% Serial Notes due 1992 to 1996 (U.S. \$16,670,000)	\$ 19,342	\$ 23,160
8½% Sinking Fund debentures due 1991	—	37,718
10½% Sinking Fund debentures due 1995	24,734	28,404
13.4% Extended Term Bonds due 2089 (note 7[a])	128,300	—
Bank loans and other loan facilities due 1992 to 1996 with interest related to prime bank rates	20,000	93,000
Cominco Alaska Incorporated		
Bank loans due 1992 to 2003 (U.S. \$200,000,000) (Note 7[b])	232,060	231,560
Cominco Resources International Limited		
Gold loan due 1992 to 1993 (Note 7[c])	3,501	5,239
Other Subsidiary Companies		
Bank loans and other long-term debt due 1992 to 2000		
U.S. Funds (U.S. \$372,000)	432	2,643
Canadian funds	—	108
	<b>\$428,369</b>	<b>\$421,832</b>

(a) On November 16, 1990 the Corporation issued \$125,000,000 of 13.4% bonds due November, 2089. The bonds were issued at a premium and realized \$128,300,000 which reduced the effective interest rate to 13.1%. Under the terms of this 99-year issue, no principal payments are required before maturity and the holders of interest coupons maturing beyond the tenth year of the term of indebtedness may elect to require the Corporation to prepay on November 16, 1990 future interest entitlements at a discount. At year-end, all bondholders had elected the prepayment option amounting to \$41,107,500 which will be repaid from other long-term loan facilities. In the event of default as defined under the terms of the issue, the then net present value of the prepaid interest at the date of the default may be deducted from the original principal amount outstanding. The bonds are not redeemable by the Corporation before maturity. Interest expense over the term of the debt will be calculated by applying the interest rate inherent in the borrowing and repayment arrangements to the amount of the obligation from time to time.

(b) The Corporation has guaranteed a U.S. \$200,000,000 term loan repayable 1992 through 2003, and a U.S. \$100,000,000 working capital loan facility for the Red Dog mine in Alaska. Interest rates vary and are based on the London Interbank Offered Rate (LIBOR).

(c) Cominco Resources International Ltd. has a loan facility with a Canadian chartered bank for 13,888 troy ounces of gold which at the point of drawdown was the equivalent of U.S. \$6,000,000. The proceeds of the loan were used to finance the Corporation's share of the equity contributions to the company developing the Marte Gold Mine. The term of the loan is five years with quarterly repayments of 868 ounces of gold beginning in April, 1990. The interest rate varies with the market price of gold and averaged 2.27% in 1990 (1989 — 2.48%).

(d) Payments required on long-term debt after allowing for prepayments, and assuming the conversion of certain revolving bank loans into five-year term loans are: 1991 — \$43,262,000; 1992 — \$33,023,000; 1993 — \$37,373,000; 1994 — \$43,658,000; 1995 — \$67,363,000.

8. Deferred Liabilities

	1990	1989
	(thousands)	
Provisions arising from the 1986 restructuring plan	\$ 6,550	\$ 8,611
Provision for reclamation costs	33,121	32,163
Provision for Workers' Compensation claims	18,308	18,305
Accrued pension obligation	14,748	13,864
Deferred income and other items	21,064	20,412
	<b>\$93,791</b>	<b>\$93,355</b>

9. Capital

The Corporation is incorporated under the *Canada Business Corporations Act* and is authorized to issue an unlimited number of Common and Preferred Shares.

(a) Share Capital

	1990	1989
	(thousands)	
Common		
79,333,353 shares (1989 — 79,331,100)	\$441,722	\$441,683
Common Share Purchase Warrants		
4,824 warrants (1989 — 5,311)	30	33
Preferred — issued and fully paid		
Series A — \$2.00 Tax Deferred Exchangeable Preferred Shares		
223,996 shares (1989 — 255,796)	5,600	6,395
Series B — \$2.4375 Preferred Shares		
1,226,138 shares (1989 — 1,241,938)	30,653	31,049
Series E — Redeemable Preferred Shares		
790,000 shares	79,000	79,000
Series F — Redeemable Preferred Shares		
550,000 shares (1989 — 440,000)	55,000	44,000
Series H — Deferred Preferred Shares		
2,944,500 shares	34,598	34,598
	<b>204,851</b>	<b>195,042</b>
Preferred — subscribed for and allotted		
Series F — Redeemable Preferred Shares (1989 — 110,000)		
	—	11,000
	<b>\$646,603</b>	<b>\$647,758</b>

At December 31, 1990 the Stated Capital Account of the Corporation, as defined in the *Canada Business Corporations Act*, for Common Shares issued and outstanding is \$474,724,000 and for Preferred Shares is \$204,851,000.

**(b) Preferred Shares**

The Corporation has constituted the following Preferred Shares:  
 2,000,000 shares as "\$2.00 Tax Deferred Exchangeable Preferred Shares Series A"  
 2,000,000 shares as "\$2.4375 Preferred Shares Series B"  
 790,000 shares as "Redeemable Preferred Shares Series E"  
 550,000 shares as "Redeemable Preferred Shares Series F"  
 3,000,000 shares as "Floating Rate Preferred Shares Series G"  
 3,000,000 shares as "Deferred Preferred Shares Series H"

Each Series A Preferred Share is entitled to a fixed cumulative cash dividend of \$2.00 per annum payable semi-annually and is exchangeable by the holders into Series B Preferred Shares.

Each Series B Preferred Share is entitled to a fixed cumulative cash dividend of \$2.4375 per annum payable semi-annually.

Each Series E Preferred Share and Series F Preferred Share is entitled to a cumulative cash dividend and is redeemable or subject to cancellation not earlier than March 31, 1997 based upon a rate of return index governed by world prices for lead and silver. The Series E Preferred Shares and the Series F Preferred Shares may be purchased for cancellation or redeemed at the option of the Corporation at the issue price.

Under the terms of the Series E and F Preferred Share Subscription Agreements, the Corporation has committed to complete the first phase of a lead smelter modernization capital project by December 31, 1992. In the event that Phase 1 is not completed by December 31, 1992, or is terminated on or before that date, or if the Corporation fails to authorize Phase 2 by January 1, 1993, the holders may require the Corporation to reimburse them for a rateable proportion of the difference between the actual capital expenditures on the project to December 31, 1993 and \$260,000,000 (the "Overinvestment"), plus interest calculated at 8% per annum from the date that the Overinvestment in the project is deemed to first arise. The Corporation has the option of satisfying this obligation by redeeming a portion of the Preferred Shares, issuing a replacement series of Preferred Shares or Common Shares of equivalent value to the amount of the Overinvestment.

The Series G Preferred Shares were redeemed on March 31, 1989. Each Series G Preferred Share was entitled to a quarterly cumulative cash dividend which was related to the daily prime rate of interest charged by The Royal Bank of Canada.

Each Series H Preferred Share will be retractable at the holders' option on or after August 14, 1992 at a redemption price of \$18.00 that includes a premium of \$6.25 representing a deferred return. The Corporation may elect to pay the redemption price by issuing Common Shares at 95% of the five trading day moving average market price of Common Shares at the date of redemption.

**(c) Shares and warrants issued during the year**

	Issued and Fully Paid			
	Number of Shares		Thousands of Dollars	
	1990	1989	1990	1989
Common				
Exchanged for Common Share Purchase Warrants	253	2,943	\$ 3	\$ 18
Stock option plans	2,000	243,350	36	4,065
	<b>2,253</b>	<b>246,293</b>	<b>\$ 39</b>	<b>\$ 4,083</b>
Common Share Purchase Warrants Exchanged for Common Shares	487	2,900	\$ 3	\$ 18
Preferred				
Series B	22,300	60,050	\$ 558	\$ 1,501
Series F	110,000	110,000	11,000	11,000
			<b>\$11,558</b>	<b>\$12,501</b>

**(i) Preferred Shares Series B**

During 1990, 22,300 Series A Preferred Shares were exchanged for 22,300 Series B Preferred Shares. During 1989, 60,050 Series A Preferred Shares were exchanged for 60,050 Series B Preferred Shares (see note 9(b)).

**(ii) Preferred Shares Series F**

Under the terms of a 1986 financing agreement, 550,000 Preferred Shares Series F were subscribed for and allotted to the Government of the Province of British Columbia. In 1990, 110,000 (1989 — 110,000) Preferred Shares Series F were issued and fully paid.

**(iii) Deferred Preferred Shares Series H and Commodity-Indexed Common Share Purchase Warrants**

In July, 1987 the Corporation received gross proceeds of \$54,000,000 from the sale of 3,000,000 units, each unit consisting of a Deferred Preferred Share Series H and a Commodity-Indexed Common Share Purchase Warrant, at \$18.00 per unit. Proceeds of \$35,250,000 were allocated to the Deferred Preferred Shares Series H (\$11.75 per share) and \$18,750,000 to the Commodity-Indexed Common Share Purchase Warrants (\$6.25 per warrant).

At December 31, 1990 there were 4,824 Common Share Purchase Warrants outstanding. Each warrant entitles the holder to exchange the warrant on or before August 14, 1992 for a number of Common Shares of the Corporation, based on the price of zinc or copper and on the price of Common Shares on the date of exercise. In 1990, 487 warrants were exchanged for 253 Common Shares. In 1989, 2,900 warrants were exchanged for 2,943 Common Shares. Fully diluted earnings per Common Share have been calculated on the assumption that all warrants were exercised at the beginning of the year.

**(iv) Stock Option Plans**

The Corporation has 384,000 Common Shares remaining available for issuance under stock option plans in favour of certain executives in the full-time employment of the Corporation or a subsidiary. Options outstanding are exercisable within five years of issue at a minimum of 90% of the market price on the day prior to the day when granted.

Outstanding options at December 31, 1990 are as follows:

Granted	Minimum Price	Outstanding	Exercised in 1990
1986	\$12.04	103,000	—
1987	\$15.19	13,000	1,000
1988	\$17.33	31,000	1,000
		147,000	2,000

**(d) Shares purchased for cancellation**

During 1990, the Corporation purchased for cancellation 9,500 Series A, and 38,100 Series B Preferred Shares with an issued value of \$1,190,000 for \$1,085,000 cash. During 1989, the Corporation purchased for cancellation 12,250 Series A, 23,600 Series B Preferred Shares and 55,500 Series H Preferred Shares with an issued value of \$1,548,000 for \$1,598,000 cash.

**(e) Shares redeemed**

In 1990, there were no shares redeemed. On March 31, 1989, 3,000,000 Series G Preferred Shares were redeemed for \$75,000,000.

**10. Cumulative Translation Adjustment**

This adjustment represents the net unrealized foreign currency translation loss on the Corporation's net investment in self-sustaining foreign operations, principally in the United States and Australia.



Changes during the years are as follows:

	1990	1989
	(thousands)	
Cumulative unrealized gain (loss) at beginning of year	\$ (9,908)	\$ 3,753
Unrealized loss for the year on translation of net assets	(1,390)	(13,784)
	(11,298)	(10,031)
Realized loss on dividends paid by foreign operations	409	123
Cumulative unrealized loss at end of year	\$(10,889)	\$ (9,908)

**11. Interest**

	1990	1989
	(thousands)	
Interest charges were as follows:		
Long-term debt	\$51,503	\$34,028
Short-term debt	2,187	1,909
	53,690	35,937
Less interest capitalized	30,054	26,155
Charged to earnings	\$23,636	\$ 9,782

**12. Taxes on Income and Resource Taxes**

The major factors which cause variations from the Corporation's combined federal and provincial statutory Canadian income tax rates of 42.88% (1989 — 42.72%) were the following:

	1990	1989
	(thousands)	
Income tax at statutory tax rates	\$ 41,787	\$172,580
Tax effect of:		
Resource allowance and earned depletion net of resource taxes	(1,812)	(24,605)
Differences in foreign tax rates	(459)	(1,233)
Non-deductible costs	7,034	6,583
Other items	252	3,028
Taxes on income included in statements of earnings	\$ 46,802	\$156,353

**13. Loss From Discontinued Operation**

In December 1990, Cominco Resources International Limited, a subsidiary company, announced its intention to dispose of its gold properties in the Maricunga district of Chile. The 1990 results associated with these properties is set out below, there were no operations in 1989.

	1990
	(thousands)
Sales	\$ 2,630
Loss before minority interest	\$ 6,811
Minority interest	(2,469)
Loss from discontinued operation	\$ 4,342

The carrying value of the assets to be disposed of at December 31, 1990 amounted to \$8,300,000 and consisted primarily of an investment in mineral properties. The Corporation expects to realize a net gain from the disposition.

**14. Pensions**

The Corporation and its subsidiaries have defined benefit pension plans which are mainly non-contributory and which cover substantially all employees. Benefits from these plans are based on either years of service and highest average remuneration in a specified period or a stated amount for each year of service. The pension costs are determined annually by independent actuaries and include current service costs and a provision for the amortization of prior service costs. Pension costs for current services are charged to earnings in the year incurred. The liability for past ser-

vice is charged to earnings over the remaining service lives of the employees.

Total pension expense including past service costs was \$9,600,000 for 1990 and \$9,700,000 for 1989.

The date of the most recent actuarial valuation for most pension plans is December 31, 1989. At December 31, 1990, actuarial estimates of the present value of accumulated pension benefits amounted to \$438,000,000 and the actuarial value of assets calculated on adjusted market values was \$411,000,000.

**15. Commitments and Contingencies**

(a) The Corporation and its subsidiaries are contingently liable for commitments and performance guarantees arising in the ordinary course of business. The Corporation's operations are affected by federal, provincial, state and local laws and regulations regarding environmental protection. The outcome or timing of environmental matters or the full impact, if any, of legislative or regulatory developments on future operations is not currently estimable. In the opinion of management, finalization of these matters will not have a material adverse effect on the Corporation's consolidated financial position or results of operations.

(b) Under the terms of an agreement between the Alaska Industrial Development and Export Authority (AIDEA) and Cominco Alaska Incorporated (CAK) a subsidiary Company, the Corporation has provided a 14-year letter of credit for U.S. \$120,000,000 as collateral security to permit AIDA to finance the road and port facilities to service the Red Dog mine in north-western Alaska. The agreement gives CAK certain non-exclusive priority rights for the transportation of concentrates for a minimum term of 50 years with a renewal provision of five additional ten-year terms. Once commercial production commences, CAK will be charged a minimum annual user fee based on AIDEA's cost to construct the system plus an investment return. After the earlier of 35 years or repayment of AIDEA's investment base plus interest, the toll fee will be recalculated as defined in the agreement. The Company has estimated that the minimum annual toll fee will approximate U.S. \$12,000,000.

Agreements have also been entered into for the transportation of concentrates from the mill site. These agreements have varying terms ranging from 15 to 20 years and include provisions for extensions. There are minimum tonnage requirements and annual fees with provisions for payment adjustments based on variable cost factors.

Estimated minimum fees under all the agreements excluding AIDEA will be as follows:

	U.S. Dollars
	(thousands)
1991	\$ 10,635
1992	11,124
1993	12,390
1994	12,657
1995	11,174
Thereafter (total)	82,793
	\$140,773

**(c) Investment in Glenbrook Nickel Smelter**

The Company holds a 82.3% joint venture interest in a nickel smelter. The Corporation's proportionate interest in the assets excluding working capital at December 31, 1990 was \$24,300,000. For the year ended December 31, 1990 the Corporation's share in the net loss of the joint venture was \$11,900,000 (1989 — \$800,000). The loss resulted from the processing of low grade ores and production difficulties associated with those ores.

At current nickel prices, the grade of the known ore reserves located near the smelter currently being mined and reserves potentially available, is not sufficient to maintain production for the period of time necessary to allow the joint venture to recover its capital

investment. A feasibility study for the importation of higher grade ore commencing in 1992 has been completed and negotiations have begun to secure a long-term supply contract and project financing. The study indicates that capital expenditures of approximately \$25,600,000 and working capital of \$10,200,000 will be required. The recovery of the Corporation's interest in the assets of the joint venture excluding working capital will depend upon the successful implementation of the ore importation project.

**(d) Trail Lead Smelter**

In 1986, the Corporation committed to modernize its Trail lead smelter at an estimated cost of \$126,000,000 for the first phase of the modernization project. Expenditures of \$133,360,000 at December 31, 1990 included in Fixed Assets as Construction in Progress cover revisions to a number of systems and processes including installation of the new QSL smelter process. Start-up of the new smelter commenced in late 1989 and in March 1990 the Corporation announced the temporary shut-down of the new lead smelter pending correction of a number of production-limiting deficiencies that were identified in the plant. In December 1990, the Corporation announced that the startup of the new lead smelter had been further delayed pending the results of tests to be undertaken early in 1991 by Lurgi GMBH, the supplier of the QSL smelter process. These tests are designed to establish the equipment modifications and operating parameters necessary for full-scale production with concentrates of varied metallurgy. Most of the plant's equipment, systems and structure are not dependent on the technology of the QSL reactor. Although the scope of the modifications and the start-up date are not yet established, as a backup, the Corporation is continuing to investigate and have test work done on other commercial scale lead smelter processes. Lead production rates from the old lead smelter are at about 80% of traditional levels and these rates will be maintained until the new lead smelter is fully operational.

(e) At December 31, 1990 unexpended amounts remaining on approved major capital projects were \$49,500,000 most of which is expected to be spent in 1991.

(f) At December 31, 1990 the aggregate minimum payments under operating leases are estimated at \$117,591,000 with annual payments in each of the next five years of: 1991 — \$28,411,000; 1992 — \$20,992,000; 1993 — \$17,434,000; 1994 — \$13,116,000; 1995 — \$8,914,000.

**16. Related Party Transactions**

Related parties consist of the Corporation's associated companies and Teck Corporation, Metallgesellschaft AG, M.I.M.Holdings Limited and their respective subsidiary and Associated Companies.

Sales to and purchases of goods and services from related parties, all at fair market prices, amounted to \$82,775,000 (1989 — \$67,100,000) and \$14,900,000 (1989 — \$10,800,000), respectively.

**17. Segmented Information**

(a) The Corporation's business operations are grouped into two industry segments:

*Mining and Integrated Metals:*

Principally the mining and processing of mineral ores, the production and sale of zinc, lead and copper concentrates, the smelting and refining of concentrates to produce zinc, lead, nickel, silver, gold and various by-products, including fertilizers and engineering services.

*Fertilizers:*

Principally the production of ammonia, urea, potash, ammonium nitrate, ammonium phosphate, ammonium sulphate and sulphuric acid.

(b) Sales to other segments are accounted for at prices which approximate market.

(c) Investment income and certain corporate expenditures and assets relating to the overall direction and management of the Corporation's activities are not allocated to industry segments.

(d) Canadian export sales amounted to \$904,480,000 (1989 — \$1,074,832,000).



## Segmented Information

Years ended December 31, 1990 and 1989  
(millions)

By Industry Segment	Mining and Integrated Metals		Fertilizers		Corporate & Unallocated		Consolidated	
	1990	1989	1990	1989	1990	1989	1990	1989
<b>Revenue</b>								
Sales to external customers	\$1,065	\$1,251	\$ 338	\$ 340			\$1,403	\$1,591
Sales to other segments	—	—	7	10				
	\$1,065	\$1,251	\$ 345	\$ 350				
<b>Earnings (Loss)</b>								
Operating profit before unallocated items, below	\$ 134	\$ 408	\$ 23	\$ 38			\$ 157	\$ 446
Mineral exploration					\$ (37)	\$ (31)	(37)	(31)
Interest expense					(24)	(10)	(24)	(10)
Corporate (net)					1	(2)	1	(2)
Income and resource taxes					(47)	(156)	(47)	(156)
Earnings (loss) before minority interest, equity in earnings of associates	\$ 134	\$ 408	\$ 23	\$ 38	\$(107)	\$(199)	\$ 50	\$ 247
<b>Identifiable Assets</b>								
Operating	\$1,795	\$1,418	\$ 263	\$ 270	\$ 176	\$ 207	\$2,234	\$1,895
Undeveloped properties and construction in progress	162	99	3	5	91	481	256	585
	\$1,957	\$1,517	\$ 266	\$ 275	\$ 267	\$ 688	\$2,490	\$2,480
<b>Depreciation, Depletion and Amortization</b>	\$ 68	\$ 53	\$ 18	\$ 16	\$ 1	\$ 1	\$ 87	\$ 70
<b>Capital Expenditures</b>	\$ 188	\$ 153	\$ 15	\$ 29	\$ 35	\$ 198	\$ 238	\$ 380

By Geographic Region	Canada		United States		Other Countries		Consolidated	
	1990	1989	1990	1989	1990	1989	1990	1989
<b>Revenue</b>								
Sales to external customers	\$1,047	\$1,319	\$ 353	\$ 271	\$ 3	\$ 1	\$1,403	\$1,591
Intercompany sales to other regions	99	96	15	9	—	—		
	\$1,146	\$1,415	\$ 368	\$ 280	\$ 3	\$ 1		
<b>Earnings</b>								
Operating profit before unallocated items	\$ 134	\$ 429	\$ 22	\$ 17	\$ 1	\$ —	\$ 157	\$ 446
<b>Identifiable Assets</b>								
Operating	\$1,391	\$1,598	\$ 755	\$ 198	\$ 88	\$ 99	\$2,234	\$1,895
Undeveloped properties and construction in progress	214	131	17	442	25	12	256	585
	\$1,605	\$1,729	\$ 772	\$ 640	\$ 113	\$ 111	\$2,490	\$2,480
<b>Depreciation, Depletion and Amortization</b>	\$ 64	\$ 64	\$ 23	\$ 6	\$ —	\$ —	\$ 87	\$ 70
<b>Capital Expenditures</b>	\$ 152	\$ 152	\$ 81	\$ 219	\$ 5	\$ 9	\$ 238	\$ 380



# Principal Offices, Operations, Subsidiaries and Associated Companies

## PRINCIPAL OFFICES

**Registered and Head Office**  
2600-200 Granville Street  
1 Vancouver, British Columbia  
V6C 2R2

## COMINCO METALS

**Head Offices**  
2600-200 Granville Street  
1 Vancouver, B.C.  
V6C 2R2  
In U.S.A.  
Cominco American Incorporated  
West 601 Riverside Avenue  
P.O. Box 3087  
2 Spokane, Washington 99220

**Sales Offices**  
Cominco Ltd.  
120 Adelaide Street West  
Suite 1500

3 Toronto, Ontario M5H 1T1

Cominco (U.K.) Limited  
Emerson Court  
56 Alderley Road  
4 Wilmslow  
Cheshire SK9 1NX  
England

Singapore  
(Representative Office)  
65 Chulia Street #13-04  
OCBC Centre

5 Singapore 0104  
Republic of Singapore

Tokyo  
(Representative Office)  
Nihon Metallgesellschaft KK  
Hibiya Pk. Bldg. 328  
1-8-1 Yuraku-Cho

6 Chiyoda-Ku, Tokyo  
Japan

## COMINCO FERTILIZERS

**Head Offices**  
426-10333 Southport Road S.W.  
7 Calgary, Alberta T2W 3X6

In U.S.A.  
Cominco American Incorporated  
West 601 Riverside Avenue  
P.O. Box 3087

2 Spokane, Washington 99220

**Sales Offices**  
Cominco Ltd.  
426-10333 Southport Road S.W.

7 Calgary, Alberta T2W 3X6  
Cominco American Incorporated  
West 601 Riverside Avenue  
P.O. Box 3087

2 Spokane, Washington 99220  
also

8 Amarillo, Texas;

9 Chicago, Illinois;

10 Lincoln, Nebraska;

11 Minneapolis, Minnesota

## PRINCIPAL SUBSIDIARIES AND ASSOCIATED COMPANIES (Cominco ownership in parentheses)

Aberfoyle Limited (46%)

12 Melbourne, Australia

Cominco American Incorporated (100%)

2 Spokane, Washington, U.S.A.

Cominco Alaska Incorporated (100%)

13 Anchorage, Alaska, U.S.A.

Cominco Engineering Services Ltd. (100%)

1 Vancouver, British Columbia

Cominco Europe Limited (100%)

14 London, England

Cominco (U.K.) Limited (100%)

4 Wilmslow, England

Cominco Resources International Limited (64.6%)

1 Vancouver, British Columbia

Exploración Minera Internacional España S.A. (48%)

Villafraanca del Bierzo, León, Spain

15 León, Spain

Highland Valley Copper (50%)

16 Logan Lake, British Columbia

Mitsubishi Cominco Smelting Company Limited (45%)

6 Tokyo, Japan

## METALS

### OPERATING MINES

Buckhorn

17 Nevada, U.S.A.

Hellyer

18 Tasmania, Australia

Highland Valley Copper

16 Logan Lake, British Columbia

Magmont

19 Missouri, U.S.A.

Maria

20 Sonora, Mexico

Marte

21 Region III, Chile

Polaris

Little Cornwallis Island

22 Northwest Territories

Red Dog

23 Alaska, U.S.A.

Rubiales

24 Lugo, Spain

Snip

25 Bronson Creek, British Columbia

Sullivan

26 Kimberley, British Columbia

Troya

27 Guipúzcoa, Spain

### METAL PRODUCTION

Cominco Ltd.

28 Trail, British Columbia

Glenbrook Nickel Company

29 Riddle, Oregon

Mitsubishi Cominco Smelting Company Limited

30 Naoshima, Japan

## FERTILIZERS

### OPERATING MINES

Cominco Ltd.

31 Vanscoy, Saskatchewan

Cominco American Incorporated

32 Garrison, Montana, U.S.A.

Lake Minerals Corporation

33 Lone Pine, California, U.S.A.

### PLANTS

Cominco Ltd.

28 Trail, British Columbia

7 Calgary, Carseland, and Joffre, Alberta

Cominco American Incorporated

34 Beatrice, Nebraska, and

35 Borger, Texas, U.S.A.

### RESEARCH CENTRES

28 Trail, British Columbia

Sheridan Park

3 Mississauga, Ontario.

## EXPLORATION OFFICES

Cominco Ltd.

1 Vancouver and

36 Cranbrook, British Columbia

3 Toronto, Ontario.

Cominco American Incorporated

13 Anchorage, Alaska

Aberfoyle Limited

37 Hawthorn, Australia

38 Burnie, Tasmania

39 Perth and

40 Kalgoorlie, Western Australia

41 Adelaide, South Australia

Cominco Resources International Limited

1 Vancouver, British Columbia

2 Spokane, Washington and

42 Sparks, Nevada, U.S.A.

43 Santiago, Chile

44 Guadalajara, Jalisco and

45 Hermosillo, Sonora, Mexico

46 Brussels, Belgium

47 Ankara, Turkey



## Directors and Officers (as at February 25, 1991)

### Directors

JOHN L. ANDERSON  
President  
Cominco Fertilizers  
Calgary, Alberta

LLOYD I. BARBER, O.C.  
President Emeritus  
University of Regina  
Regina, Saskatchewan

KENNETH H. DREDGE<sup>1</sup>  
Executive General Manager,  
Lead and Zinc, and Director  
M.I.M. Holdings Limited  
Chapel Hill, Australia

ROSS G. DUTHIE  
Corporate Director  
Pender Island, B.C.

J. EDWARD FLETCHER  
Senior Vice President and  
Chief Operating Officer  
Cominco Metals  
Richmond, B.C.

MEINHARD FORSTER  
Member of the Executive Board  
Metallgesellschaft AG  
Dreieich, Germany

ROBERT E. HALLBAUER<sup>1</sup>  
President and  
Chief Executive Officer  
Cominco Ltd.  
West Vancouver, B.C.

ROLF HOUGEN, O.C.  
President  
Hougen's Limited  
Whitehorse, Yukon

NORMAN B. KEEVIL<sup>1</sup>  
Chairman of the Board  
Cominco Ltd.;  
Chairman, President and  
Chief Executive Officer  
Teck Corporation  
West Vancouver, B.C.

DENHAM J. KELSEY<sup>2</sup>  
Consultant and  
Corporate Director  
Thetis Island, B.C.

JACK F. McOUAT  
President  
Watts, Griffis & McOuat Limited  
Willowdale, Ontario

JOHN MIDDLETON<sup>2</sup>  
Director  
M.I.M. Holdings Limited  
Kenmore, Australia

DAVID A. THOMPSON<sup>2,3</sup>  
Senior Vice President and  
Chief Financial Officer  
Teck Corporation  
West Vancouver, B.C.

KLAUS M. ZEITLER<sup>1,2</sup>  
President and  
Chief Executive Officer  
Metall Mining Corporation  
Toronto, Ontario

---

<sup>1</sup> Member of Executive Committee

<sup>2</sup> Member of Audit Committee

<sup>3</sup> Alternate Member of Executive Committee

### Officers

NORMAN B. KEEVIL  
Chairman

ROBERT E. HALLBAUER  
President and  
Chief Executive Officer

JOHN L. ANDERSON  
President, Cominco Fertilizers

J. EDWARD FLETCHER  
Senior Vice President and  
Chief Operating Officer,  
Cominco Metals

JOHN GIOVANETTO  
Vice President, Human Resources

DAVID L. JOHNSTON  
Vice President, Mine Operations,  
Cominco Metals

DALE W. MASSIE  
Vice President, Marketing,  
Cominco Fertilizers

OWEN E. OWENS  
Vice President, Exploration

WILLIAM J. ROBERTSON  
Vice President, Metal Production,  
Cominco Metals

HANS J. RUESS  
Vice President, Marketing and  
Sales, Cominco Metals

ROBERT R. STONE  
Vice President, Finance and  
Chief Financial Officer

JOHN M. VAN BRUNT  
Vice President, Operations,  
Cominco Fertilizers

ROGER H. WATSON  
Operating Vice President, Trail,  
Cominco Metals

G. LEONARD MANUEL  
General Counsel and Secretary

MICHAEL J. HARDIN  
Senior Counsel and  
Assistant Secretary

L. DOUGLAS MARGERM  
Treasurer

A. DONALD MILLER  
Comptroller and  
Assistant Secretary

## Shareholder Information

### Transfer Agents and Registrars

#### The Royal Trust Company

Concourse Level  
1177 West Hastings Street  
Vancouver, British Columbia V6E 2K3

333-7th Avenue S.W.  
Calgary, Alberta T2P 2Z1

330 St. Mary Avenue<sup>1</sup>  
Winnipeg, Manitoba R3C 3Z5

4th Floor  
74 Victoria Street  
Toronto, Ontario M5C 2A5

630 Boul. Rene Levesque  
Montreal, Quebec H3B 1S6

One King Street<sup>2</sup>  
St. John, New Brunswick E2L 1G1

#### Bank of Montreal Trust Company

2 Wall Street<sup>3</sup>  
New York, New York 10005 U.S.A.

### Stock Exchanges

Vancouver, Montreal, Toronto  
American (U.S.A.)<sup>3</sup>

<sup>1</sup> Series A and B Preferred Shares only  
<sup>2</sup> Series H Preferred Shares and Common Shares only

<sup>3</sup> Common Shares only  
Stock Symbol: CLT

### Share Valuation

For Canadian capital gains tax purposes the value of Cominco Ltd. Common Shares on Valuation Day, December 22, 1971, as established by the Department of National Revenue, was \$22.88 per share. (The Common Shares were subdivided on a 3-for-1 basis on May 4, 1984 making the adjusted value \$7.63.)

### Stock Holdings

On December 31, 1990 there were 9,499 registered holders of the Company's Common Shares. The geographic distribution of the registered shareholders on that date was as follows:

- 88.29% Canada
- 10.44% United States
- 0.41% United Kingdom
- 0.86% Other Countries

The degree to which this information reflects the actual distribution amongst beneficial shareholders is affected by the fact that a significant percentage of the Company's Common Shares are registered in the names of nominees or financial intermediaries.

### Dividends

Unless otherwise directed by shareholders, cash dividends are paid in Canadian dollars to all Common shareholders who reside in Canada and in U.S. dollars to all other Common shareholders. Common shareholders resident in Canada may elect to receive dividends in U.S. dollars and Common shareholders not resident in Canada may elect to receive dividends in Canadian dollars upon forwarding a written request to any office of the Royal Trust Company, the Company's principal Registrar and Transfer Agent, shown in this report.

On June 30, 1990, Cominco paid a dividend of \$0.25 per Common Share to holders of record on June 11, 1990, and on December 31, 1990, Cominco paid a dividend of \$0.25 per Common Share to holders of record on December 11, 1990.

### Sources of Shareholder Information

The Annual Report is one of several sources of information available to Cominco shareholders. Other regularly published sources are the following:

- Quarterly interim reports, which are mailed in May, August and November. These reports contain unaudited financial results and current information about the Company.
- The Management Proxy Circular, Proxy and Annual Report are mailed to each registered shareholder in March. The Management Proxy Circular describes the matters to be considered at the Annual Meeting of Shareholders.
- The Company has been qualified under the Prompt Offering Qualification System for securities of senior Canadian issuers. Upon written request to the Secretary, shareholders may receive a copy of the Company's current Annual Information Form that has been filed under this system.
- In accordance with requirements of regulatory agencies, Cominco's financial reports will be provided to shareholders whose shares are registered in their own names. Shareholders whose shares are registered in the names of nominees or financial intermediaries may have copies of published information provided to them, by responding appropriately to the inquiries they will receive from those intermediaries. Others may be placed on a special mailing list upon request to the Secretary, Cominco Ltd., 2600-200 Granville Street, Vancouver, B.C. V6C 2R2.



Nels Nolo - 374-4359

Comet Industries

Jack Wylie

Cominco Ltd.

2600 - 200 Granville Street  
Vancouver, British Columbia

V6C 2R2

(604) 682-0611

