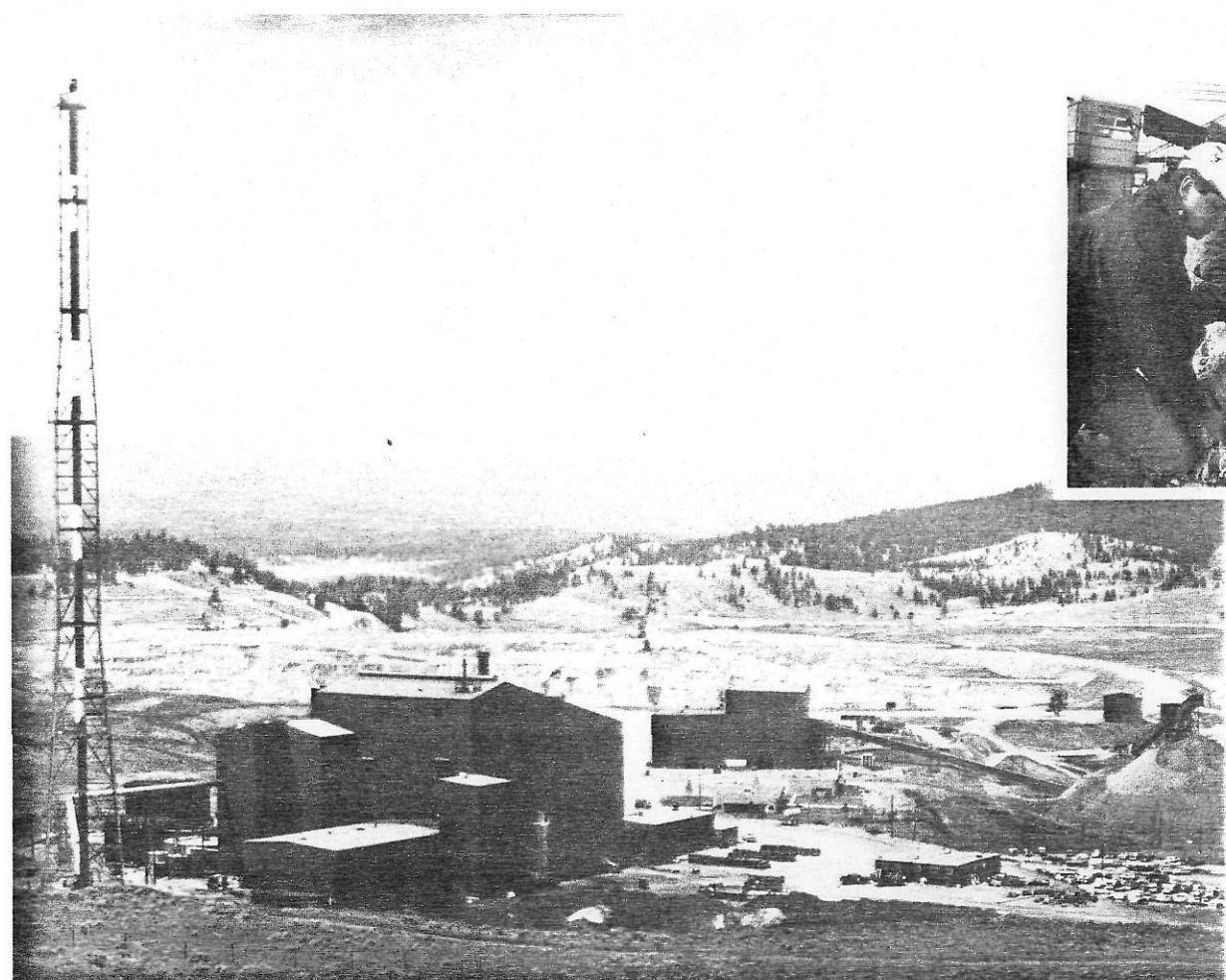


# AFTON COPPER-GOLD MINE

Teck Corporation



The Afton plant is located 15 km west of Kamloops in the south-central interior of British Columbia. This copper concentrator commenced production in December, 1977 and since then mining has been carried out in four pits — the Afton, Pothook, Crescent, and currently the Ajax. The Ajax pit, in which Cominco has a 30% interest, has reserves sufficient for 7 years, after which the deep extension of the original Afton orebody may be developed by underground methods.

Mining is by electric shovels and drills with a 12 km haul to the concentrator.

The Afton concentrator employs two stage grinding utilizing semiautogenous grinding as well as ball milling. The recovery circuit employed for the Afton native copper ore was unique in that it contained both a gravity and a flotation circuit. Only the flotation circuit is required for the Ajax ore, which consists of normal copper sulphides.

Concentrates averaging 21% copper are trucked to Ashcroft and then transported by rail to Vancouver and shipped to Japanese smelters.

The Afton plant, with the smelter in the left foreground and the concentrator building on the right, and inset examination of ore at the new Ajax open pit.

Capital cost, \$	90,000,000
Annual production, lb. Cu	27,000,000
Mill capacity, tonnes/day	9,000
Head grade, % Cu	0.46
Head grade, oz/tonne Au	0.01
Recovery, %	83
Concentrate grade, % Cu	21
Construction start	March, 1976
Construction completion	December, 1977
Teck equity, %	73
Number of employees	204

TECK CORPORATION  
ANNUAL REPORT '89



Panorama of  
Highland Valley  
Copper mine, near  
Logan Lake, B.C.

		Afton Copper, Gold		Beaverdell Silver		Newfoundland Zinc		Niobec Niobium	
		1989	1988	1989	1988	1989	1988	1989	1988
Ore milled	(tonnes)	2,547,554	3,111,330	36,560	37,259	435,137	435,540	800,793	787,204
Milling rate	(t/day)	6,982	8,479	100	102	1,192	1,193	2,194	2,158
Grade	(% or oz/tonne)	0.43	0.32	9.87	10.94	7.10	7.96	0.70	0.71
Recovery	(%)	80	68	86	87	98	98	63	61
Production:									
Metallurgical coal	(tonnes)								
Copper	(lbs)	19,394,638	14,872,045						
Gold	(oz)	14,592	27,721						
Zinc	(lbs)					67,047,000	75,185,000		
Silver	(oz)	42,385	86,211	311,868	356,362				
Molybdenum	(lbs)								
Niobium pentoxide	(lbs)							7,722,192	7,422,409
Operating costs	(\$/tonne) (\$Cdn/oz)	9.10	5.77	67.86	69.18	35.52	36.44		
Average price main product	(\$Cdn/oz or lb)	1.25	1.42	6.87	8.21	0.97	0.63		
Open pit reserves	(tonnes)	23,400,000	26,375,000						
Grade	(%)	0.46	0.46						
	(oz/tonne)	0.01	0.01						
Underground reserves	(tonnes)	9,500,000(D)	9,500,000			200,000	431,000	11,000,000	11,031,000
Grade	(%)	1.50	1.50			7.90	8.40	0.65	0.65
	(oz/tonne)	0.03	0.03						
Teck's interest	(%)	73.19	73.19	100	100	63.44	63.44	50	50
Teck's share of net earnings (loss)	(\$Cdn)	(1,790,000)	2,614,000	(548,000)	(108,000)	8,037,000	2,274,000		

## OPERATIONS

In 1990, operations in which Teck has a direct interest produced gold, silver, copper, zinc, lead, molybdenum, niobium and coal. All of these mines are in Canada.

Mining revenues for the year were \$433 million, up from \$390 million in 1989. Combined mine operating profit was \$203 million, accounting for 93% of the company's total operating profit of \$219 million.

1990 was again a record year for both gold and copper production. Gold was the single largest source of revenue and operating profit, with both mines at Hemlo having excellent years. Teck's own share of gold production was a record 504,340 ounces, up significantly from the previous record of 442,600 ounces produced in 1989.

Copper production was 68 million pounds, up from the previous record of 49 million pounds set last year, as Highland Valley Copper reported its first full year of production since Teck acquired a direct 14% interest at the start of 1989.

Teck has also started to report direct zinc production from its 11.2% interest in the Polaris zinc-lead mine in the

Arctic Islands, in addition to equity earnings from Cominco's 77.5% interest in that project. The acquisition as of September 1, 1990 was timely, since it occurred in the month following the closure of Teck's Newfoundland Zinc mine after 15 years of production.

Production of coal and other metals was relatively unchanged in 1990 and should continue at roughly the same levels in 1991, except that operations at the Beaverdell silver mine are being suspended pending an improvement in silver prices or the discovery of higher-grade reserves.

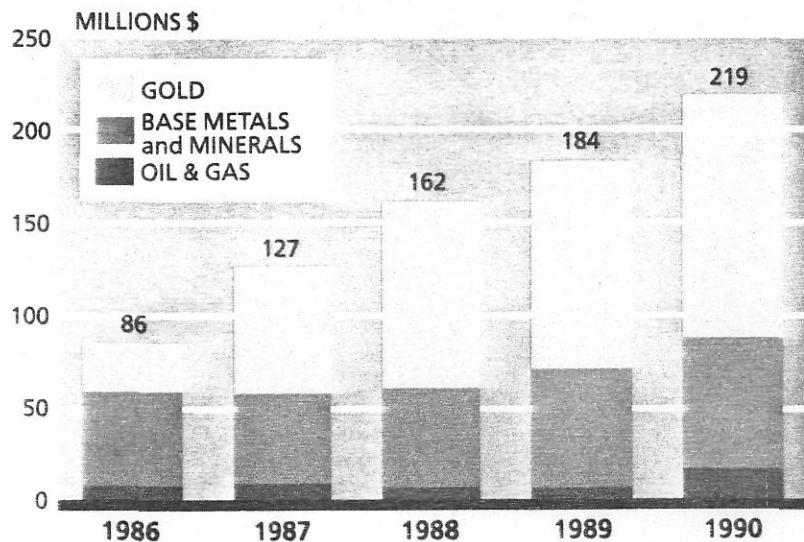
The accompanying chart illustrates the relative contributions to Teck's operating profit by gold, other metals and minerals, and oil and gas.

### AFTON (copper, gold)

The Afton operation is located just west of Kamloops in the south-central interior of British Columbia. It is a partnership between Teck, which holds a 73% interest, and an affiliate of Metall Mining Corporation.

The copper concentrator commenced production in late 1977 and since then mining has been carried out in four pits

### OPERATING PROFIT BY COMMODITY



— the Afton, Pothook, Crescent and currently the Ajax. The Ajax pit, in which Cominco and Imperial Metals share a 30% net profits interest, has reserves sufficient for seven years, after which the deep extension of the original Afton orebody might be developed by underground methods, if economically feasible at the time.

Afton's contribution to Teck's operating profit increased by \$3 million to \$3.7 million, primarily due to higher production. Copper production was 24.1 million pounds, almost 25% higher than the 19.4 million pounds produced in 1989, and gold production was up 73% to 25,179 ounces. Higher copper and gold mill feed grades were the primary reasons for the increase.

When processing of Ajax ore began in mid-1989, it was expected that the daily mill throughput would approach 10,000 tonnes. However, the Ajax ore has proved to be difficult to grind because of an unusually high percentage of pebble-size material generated in the primary mill. Accordingly, the

actual daily throughput was only 6,200 tonnes during the first few months of production.

The addition of a crushing circuit in late 1989 resulted in increased throughput to 8,000 tonnes per day, which was subsequently increased to 8,500 tonnes per day by adding a screen which maximized the ball mill feed rate. The down time resulting from these modifications resulted in an average milling rate of 7,275 tonnes per day in 1990. However, the target rate for 1991 is 8,500 tonnes per day, with copper and gold production expected to be 26.3 million pounds and 27,000 ounces, respectively.

Afton's workforce stood at 216 at year end. The current collective agreement with the USWA, which covers approximately 150 employees, expires on April 30, 1991.

Ajax reserves at year end are estimated to be 20.7 million tonnes averaging 0.45% copper and 0.01 ounces of gold per tonne. Underground geological re-



Aerial view of Ajax pit near Kamloops, B.C.

1990 Annual Report

## OPERATIONS



**Wolf P. Nickel, Mine Manager,  
Afton copper mine, B.C.**

serves remain unchanged, at 9.5 million tonnes of 1.5% copper and 0.033 ounces of gold per tonne. The underground reserves are not included in the present mine production program.

Much of the land in the vicinity of the Afton operation is used for cattle ranching and Afton itself operates two ranches acquired in connection with the mine properties. As soon as mining activities have been completed in a particular area, land reclamation activities commence. For example, the waste dumps associated with the Afton, Pothook and Crescent pits have been re-sloped and seeded with a mixture of grasses which will be suitable for cattle grazing.

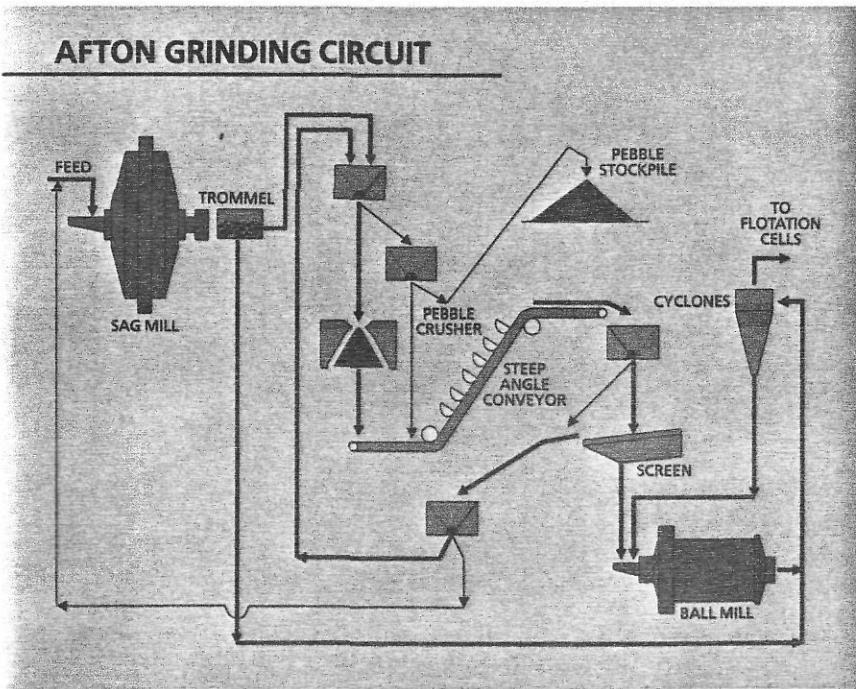
### BEAVERDELL (silver)

The Beaverdell silver mine is one of the oldest operating mines in Canada, having a history of continuous production since the turn of the century. It is wholly owned by Teck and is located on the West Kettle River, south of Kelowna, British Columbia.

The Beaverdell mine is a small underground operation which produced 368,669 ounces of silver in 1990, compared with 311,868 ounces the prior year.

Employees at Beaverdell did their utmost to improve productivity during the year and succeeded in improving the ore recovery rate and reducing operating costs. Unfortunately, due to declining silver prices and a high Canadian dollar exchange rate, the Beaverdell mine suffered a small operating loss for the third consecutive year.

The price of silver has declined from an average of US\$7.01 per ounce in 1987, the last year in which Beaverdell was profitable, to an average of US\$4.82 per ounce in 1990. The price of silver is not expected to increase in the immediate future since current stocks are sufficient to meet consumption for many years and high levels of by-product silver are expected to continue.



→ Ajax/Aft.

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(46) 88

100%	1995	1996
Waste mined (000's tonnes)	9,486	9,802
Low grade stockpile (000's tonnes)	298	717
Strip ratio	3.2	3.5
Ore milled (000's tonnes)	2,930	2,973
Grade (% copper)	0.46	0.46
Copper recovery (%)	77.9	83.9
Copper production (000's lbs)	23,331	25,169
Gold production (ounces)	24,933	25,290
Operating cost (\$/tonne milled)	9.82	10.15
Operating profit (Teck's share \$mln)	8.2	4.1
Reserves (000's tonnes)	5,800	1,217
Grade (% copper)	0.46	0.49

#### Afton Mine Statistics

Capital expenditure totalled \$11.2 million. The planned capital expenditures for 1997 is \$5.6 million, including \$3.4 million for primary underground development work and \$600,000 for exploration.

Production in 1997 is expected to be 121 million pounds of copper and 37 million pounds of zinc.

#### Afton Mine

The Afton mine near Kamloops, British Columbia had an excellent year with copper and gold production above both plan and 1995 levels primarily as a result of improved recovery.

However, the fall in copper prices and the low grade of the remaining ore make it uneconomical to continue operations. The mine is expected to close permanently by mid-year.

Reclamation of disturbed land will be completed by late summer. Reclamation maintenance and water quality monitoring will continue indefinitely to ensure permanent compliance with all regulations.

#### Polaris Mine

Teck has a 22.5% joint venture interest in the Polaris zinc, lead mine, located in the Canadian Arctic Islands. Polaris contributed \$8.5 million towards Teck's operating profit in 1996 and 1995.

Mill throughput, feed grades, recovery and operating costs were all essentially on plan.

Seven shipments of zinc and lead concentrates totalling 224,600 tonnes were made to Europe during the limited Arctic shipping season from July through November 1996.

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Mineable Reserves and Mineral Resources (Teck's share) at December 31, 1996

		Mineable Reserves (1)				Mineral Resources (2)			
		Teck's Direct Share (%)	tonnes (000's)	grade (oz/tonne)	ounces (000's)	Mine Life (years)	tonnes (000's)	grade (oz/tonne)	ounces (000's)
Gold	Williams	50	15,504	0.161	2,543	14	3,900	0.134	524
	David Bell	50	2,528	0.321	812	11			
	Quarter Claim	25	210	0.256	54	3			
	Klondike	100	280	0.020	6	1			
	Afton	100		0.010	<u>12</u>				<u>524</u>
					3,427				
Copper				%	million pounds			%	million pounds
	Highland Valley	13.9	74,782	0.42	692	13	27,900	0.40	246
	Quebrada Blanca	29.25	26,968	1.20	713	16	65,812	0.50	725
	Louvicourt	25	3,118	3.64	250	8			
	Afton	100	1,217	0.49	<u>13</u>	1			<u>971</u>
					1,668				
Zinc	Polaris	22.5	900	14.30	283	4	314	12.5	87
	Louvicourt	25		1.52	<u>104</u>				
					387				
Niobium	Niobec	50	5,900	0.51	66	15	650	0.52	7
Coal				%	million tonnes			%	million tonnes
	Bullmoose	61			6.6	6			8.7
	Elkview	106			138.5	30			113.5

- (1) Mineable reserves are supported by sufficient data to obtain an accurate tonnage, grade and dilution estimate, for which a mining plan based on probable economic criteria has been developed.
- (2) Mineral resources are of possible economic interest but information on geology, mining plan and/or costs is insufficient to reclassify the resource into a mineable category.