

Nickel

Bill McCutcheon

Nonferrous Division

Telephone: (613) 992-5480

E-mail: bmccutch@nrcan.gc.ca

1996 mineral production: \$1.96 billion^P
World rank: Second
1996 exports: \$2.1 billion

Canada	1996	1997 ^e	1998 ^f
	(tonnes)		
Mine production	193 000	191 000	209 000
Refined production	126 600	129 000	142 000
Consumption	17 000	17 500	16 800

^e Estimated; ^f Forecast; ^P Preliminary.

Note: Mineral production refers to recoverable content in concentrates shipped, whereas mine production refers to metal content in concentrates produced.

Nickel's resistance to corrosion, high strength over a wide temperature range, pleasing appearance, and suitability as an alloying agent are characteristics that make it useful in a wide variety of applications. Major markets for nickel include stainless steel (65%), nickel-based alloys, electroplating, alloy steels, foundry products, and copper-based alloys. The major nickel markets of the United States, Japan and Western Europe account for close to 80% of nickel demand in the Western World.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

1993	1994	1995	1996	1997 ^e
(US\$/lb)				
2.40	2.88	3.74	3.40	3.14

^e Estimated.

CANADIAN OVERVIEW

- In September, Inco announced a minimum one-year delay in completion of its Voisey's Bay nickel-copper-cobalt property in northern Labrador following a court decision that halted construction of the infrastructure needed for underground exploration. The possibility of reducing the scale of the US\$1.4 billion project was raised in the press. Drilling outlined more details of the ore zones, but definition drilling of deeper zones was delayed and the projected resource remains at 150 Mt of ore. Inco is expected to file environmental information by December to a five-person assessment panel. Separate negotiations between the company and Aboriginal groups for a benefits agreement, and between the federal and provincial governments and Aboriginal groups on land claims, both entered more intensive phases in October.
- Work continued at Inco's Victor advanced exploration project near Sudbury, which is scheduled to be completed, along with a feasibility study, in the third quarter of 1998. Its estimated reserves in 1996 were 5.4 Mt grading 0.54% copper and 2.26% nickel in the upper zone (1500 m below surface), and 6.4 Mt grading 5.1% copper and 1.9% nickel in the lower zone more than 2100 m below surface. Production could begin in 2001.
- Both Inco's Ontario Division (26 days in June) and Falconbridge (24 days in August) experienced labour strikes until union contracts were renegotiated; the combined production losses were about 10 000 t of nickel.
- Falconbridge plans to begin production at its 20 800-t/y Raglan nickel mine in northern Quebec in late 1997. Raglan's reserves exceed 18 Mt averaging 3.13% nickel, 0.88% copper, and precious metals. Concentrate from Raglan will be sent to Falconbridge's Sudbury smelter, which was recently expanded to handle this additional material. A feasibility study looking at a mine expansion to 30 000 t/y of nickel will begin in 1998.
- Canadian exploration activities for nickel were mainly concentrated in four areas: in Labrador around Voisey's Bay; in the Lac Volant region of Quebec; and in Sudbury, Ontario, and Thompson, Manitoba, near existing nickel mines.

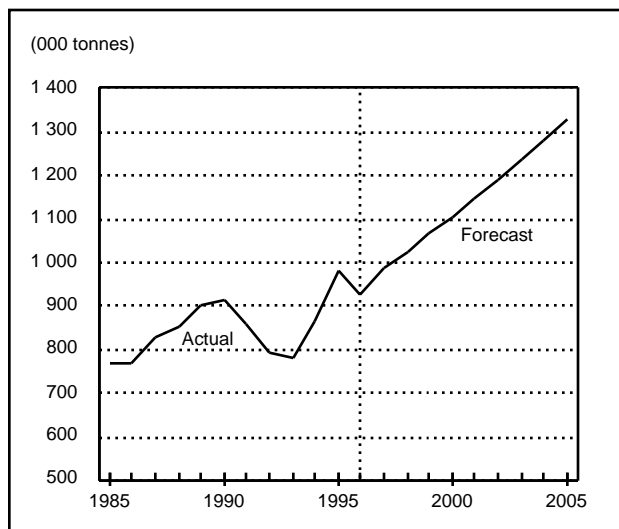
WORLD OVERVIEW

- In Australia, the Silver Swan mine owned by Outokumpu Oyj and Mining Project Investors started up in June. The high-grade orebody will produce 12 000 t/y of nickel in concentrate for five years.
- Four projects or expansions were announced in New Caledonia in 1997. Inco plans to build a pilot plant in 1998 to further assess its proprietary hydrometallurgical technology for its 167-Mt Goro deposit grading 1.6% nickel and 0.16% cobalt. Inco expects to decide in 1999 whether to construct the plant for its first phase (13 600 t/y of nickel and 1360 t/y of cobalt). Société Métallurgique Le Nickel (SLN) and QNI Ltd. will complete a feasibility study in 1998 of a 25 000-t/y plant to process limonitic ore for QNI's Yabulu refinery in Australia and SLN's Sandouville refinery in France. Controversy continued over plans by Société Minière du Sud Pacifique and Falconbridge to build a 54 000-t/y ferronickel plant in northern New Caledonia. SLN announced plans to increase mine production and to increase the capacity of its Doniambo smelter from 55 000 t/y to 65 000 t/y by 2003.
- P.T. Inco continued work on its US\$580 million expansion to boost capacity by 50% to 68 000 t/y by late 1998. Drought conditions reduced electrical generation, reduced production, and forced a shut-down to modify the hydro-electric generating installation. Production for 1997 is scheduled at 34 000 t.
- Numerous projects were under way in Australia in 1997, including: Murrin Murrin (45 000 t/y) to start up in late 1998, followed by an expansion (30 000 t/y); Yakabindie (13 300 t/y) to start up in late 1999, and a subsequent expansion (18 700 t/y) planned for 2001; Bulong (9000 t/y) to start up in mid-1998; Cawse (8000 t/y) to start up in mid-1998; the Calliope Metals Corp. refinery (initially 20 000 t/y), which could start up in 2000 to process ore imported from New Caledonia; and a feasibility study for Maggie Hays (15 000 t/y), which started in late 1997. These projects will also produce significant amounts of cobalt. Active exploration continues at many other sites in Australia that are at various stages of development.
- Russian nickel exports increased in 1997 due to increased scrap exports and increased primary production at Norilsk Nickel, despite labour unrest and debt problems. Russian exports of nickel were reported at 142 000 t during the first eight months of 1997, up 36.9%. Nickel tonnage contained in scrap exported was estimated at 50 000 t/y.
- KWG Resources Inc. of Canada agreed to participate in the completion of the Cupey deposit in Cuba and to build a 30 000-t/y refinery in Quebec, subject to being able to raise financing of US\$300 million.

CONSUMPTION OUTLOOK

World primary nickel consumption is forecast at 990 000 t in 1997, compared to 924 000 t in 1996. The increase reflects higher production by stainless steel producers. Scrap continued to be an important source of nickel for stainless steel producers, accounting for about 45% of all nickel used to produce stainless steel. Primary nickel consumption is expected to increase in 1998 to 1 025 000 t; thereafter, consumption should increase at an annual average rate of about 3.75%, but with year-to-year production varying from the trend line depending upon industrial activity in OECD countries and Southeast Asia. The long-term outlook for nickel consumption remains optimistic, despite economic pressures in some Asian countries in late 1997. Possible regulatory policies restricting nickel use could reduce the expected growth in certain markets, perhaps by creating a negative image for nickel. The trend line for projected world consumption of primary nickel is shown in Figure 1; actual consumption will vary about this trend line.

Figure 1
World Nickel Consumption, 1985-2005



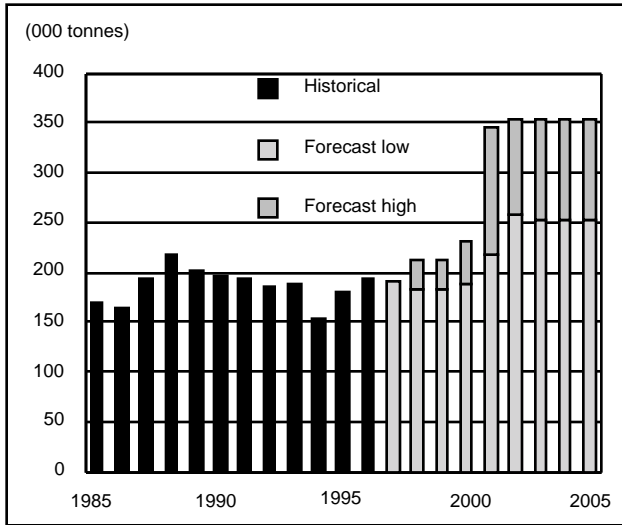
Source: Natural Resources Canada.

PRODUCTION OUTLOOK

Canadian primary nickel mine production is expected to reach 191 000 t in 1997 and to increase to 213 000 t in 1998 as Falconbridge's Raglan project reaches capacity, and assuming no unforeseen production interruptions occur. Canada's mine production of nickel is expected to reach 215 000 t/y by the end of the century. After that, Canadian nickel production is expected to increase substantially once the Voisey's Bay property begins production. Canada's mine production of nickel could reach 335 000 t/y by 2005.

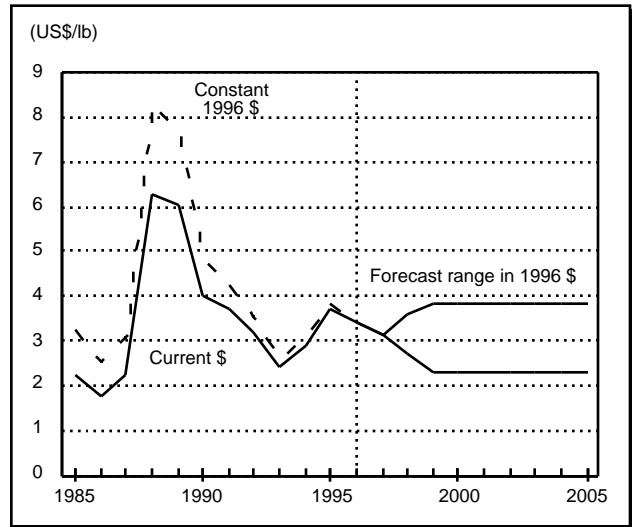
(Figure 2). Outside of Canada, the principal sources of additional primary nickel production are expected to be Australia, New Caledonia, Russia and Cuba. Refined production in Canada is forecast at 129 000 t for 1998. Increases thereafter are contingent on output from Voisey's Bay (up to 122 500 t/y) and a possible KWG refinery in Quebec (30 000 t/y).

Figure 2
Canadian Mine Production of Nickel, 1985-2005



Source: Natural Resources Canada.

Figure 3
Nickel Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

PRICE OUTLOOK

Higher-than-expected Russian exports of both primary and secondary nickel more than offset production losses due to strikes and unforeseen technical problems. The average London Metal Exchange settlement price for 1997 is estimated at US\$3.14/lb, down from US\$3.40/lb in 1996. The nickel price for 1998 is projected at US\$3.50/lb in current terms, assuming continuing strong demand by stainless steel and assuming that Russian scrap exports are not higher than 1997 levels. The long-term nickel price will depend in part on whether the new lateritic capacity under construction is as cost-effective as forecast. Voisey's Bay remains a major unknown factor – its entry into the market will have significant implications for the nickel industry. The long-term nickel price is not expected to remain outside the range of US\$2.00-\$4.00/lb (in 1997 U.S. dollars) for extended periods; there is a greater potential for prices to periodically exceed this range due to possible unpredictable supply interruptions than for the price to be less than the indicated range for extended periods. The longer-term trend price is expected to be US\$3.10/lb; the expected range of variation is shown in Figure 3.