

Copper

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2003 production:	\$1.3 billion
Rank (mine production):	Eighth
Exports (concentrates and unwrought):	\$978 million

Canada	2002 (p)	2003 (e)	2004 (f)
		(000 t)	
Mine production	604	558	560
Refined production	495	455	500
Refined use	274	257	260

(e) Estimated; (f) Forecast; (p) Preliminary.

Copper's properties, particularly its high electrical and thermal conductivity, good tensile strength, elevated melting point, non-magnetic properties and resistance to corrosion, make it and its alloys very attractive for electrical transmission, water tubing, castings and heat exchangers. Copper is the most efficient conductor of electrical power, signals and heat of all the industrial metals. In Canada, more than half of the refined copper used annually is for electrical applications, mostly in wire.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

2000	2001	2002	2003	2004 (e)
(US\$/t)				
1 813	1 578	1 560	1 779	2 815

(e) Estimated.

CANADIAN OVERVIEW

Newfoundland and Labrador

- Aur Resources will make a final decision to proceed with the construction of the Duck Pond deposit in central Newfoundland once it receives a commitment from the Government of Newfoundland and Labrador to provide financial support for the surface infrastructure. Aur expected to receive a decision in mid-November 2004. Projected copper production from the Duck Pond deposit is 14 500 t/y of copper in concentrate over eight years (4.1 Mt grading 3.3% copper, 5.7% zinc, 0.9% lead, 59 g/t silver and 0.9 g/t gold of proven plus probable reserves).
- The first shipments of concentrate from Inco Limited's Voisey's Bay mine are expected in November 2005. Production from the mine is planned to average 50 000 t/y of nickel, 2300 t/y of cobalt and 6800 t/y of copper from the concentrate to be smelted at Inco's Ontario and Manitoba plants; in addition, about 32 000 t/y of copper in copper concentrate will be sold to third parties for processing.

Quebec

- Campbell Resources Inc. is bringing the Copper Rand mine back into production in early 2005. The Chibougamau area copper-gold mine was closed in 1997 due to poor economics. Campbell Resources has spent \$58 million on infrastructure renewal, including centralizing milling facilities for both the Copper Rand ore and the nearby Joe Mann mine. Projected average annual production is 6800 t of copper and 992 t of gold.
- In October 2003, Noranda Inc. announced that it would reduce its processing rate from 840 000 t/y to 630 000 t/y at the Horne smelter effective June 2004 in order to reduce its reliance on low-margin offshore concentrates. Anode production rates will drop from 186 000 t/y to 140 000 t/y. Noranda Inc.'s Bell-Allard copper-zinc mine, located in the Matagami region of northern Quebec, ceased operation on October 15, 2004, due to the depletion of ore reserves.

- Breakwater Resources Ltd. intends to re-open the Langlois copper-zinc mine in 2006. Production from Langlois, as well as Breakwater's acquisition of the Myra Falls mine (see British Columbia), will help offset the impact of the closure of the Bouchard Hébert mine in early 2005 and the Bougrine zinc mine in Tunisia.
- The Selbaie copper-zinc mine, owned by BHP Billiton, ceased production in March 2004 after 23 years of operation due to the depletion of ore reserves.

Ontario

- Falconbridge Limited is bringing the Montcalm nickel-copper orebody into production in early 2005. Probable mineral resources are 5.11 Mt grading 1.46% nickel, 0.71% copper and 0.06% cobalt. The ore will be mined at a rate of 750 000 t/y and will be milled and concentrated at the Kidd Creek operations in Timmins. The nickel concentrate produced will be shipped to the Sudbury smelter for processing and the copper concentrate will be processed at the Kidd Creek smelter. Production from Mine D began in the fourth quarter of 2004. The Mine D project is the depth extension of the Kidd Creek orebody beyond the limits of the No. 3 mine at 6800 feet to a depth of 10 200 feet.
- Inco Limited expects 2004 copper production from its Ontario mines to total 120 000 t, up 32% from 2003 output of 91 100 t. Output in 2003 was negatively affected by a three-month strike and subsequent ramp-up problems.

Manitoba/Saskatchewan

- In October 2004, OntZinc Corporation entered into an agreement to acquire 100% of Hudson Bay Mining and Smelting from Anglo American International S.A. for \$325 million, conditional on securing financing for the purchase. OntZinc intends to finance the purchase through a combination of an equity offering and debt financing.

British Columbia

- Teck Cominco increased its share of the Highland Valley copper mine to 97.5% effective January 3, 2004, by exercising its right of first refusal with respect to BHP Billiton's 33.57% interest. Teck Cominco will decide in 2006 whether to go ahead with an expansion, which would extend the mine life a further five years to 2013. Revenues from copper production accounted for 55% of Teck Cominco's operating profit during the first three quarters of 2004.

- In July, Breakwater Resources Ltd. acquired the assets of Boliden Westmin (Canada) Limited, which include the Myra Falls zinc-copper-gold-silver mine located on Vancouver Island, B.C. Breakwater has stated that the acquisition will lessen the company's sensitivity to the zinc price. In 2003, the Myra Falls mine produced 10 700 t of copper in concentrate.
- In October, Northgate Minerals Corporation completed a feasibility study on the development of the Kemess North project. The development scenario has ore production from the Kemess North pit commencing in late 2006 at an annual rate of 9.4 t of gold and 50 450 t of copper. The plan would include increasing mill capacity from 86 000 t/d to 96 000 t/d. Kemess North ore would be processed with ore from the existing Kemess South deposit from 2007 until Kemess South reserves are exhausted in 2012. The total capital investment required is US\$190 million. Should the project proceed, the mine life of the Kemess operation would be extended from 2012 to 2019. Northgate is continuing with the permitting process and is looking at various alternatives for financing the project, including the possibility of selling a stake in the project to groups in Asia in conjunction with a concentrate supply agreement. Production in 2004 from the Kemess South deposit is expected to total 11 t of gold and 34 000 t of copper.
- Production resumed at the Gibraltar copper-gold mine near Williams Lake in October. The mine was put on care and maintenance in 1998 due to low copper prices. Annual output is planned at 31 750 t of copper and 438 t of molybdenum.
- Redcorp Ventures Ltd. continued to develop its zinc-copper-gold Tulsequah project in northwestern British Columbia through its wholly owned subsidiary, Redfern Resources Limited. The deposit comprises measured and indicated reserves of 5.9 Mt containing 2.59 g/t gold, 107 g/t silver, 1.42% copper, 6.72% zinc and 1.26% lead. There are a further 3 Mt of inferred resources at similar grades as those in the measured and indicated category. The 2004 exploration program focused on converting the inferred resources to the indicated category through the completion of in-fill drilling. Redfern Resources was granted a Project Approval Certificate from provincial and federal authorities in December 2002 to develop the deposit, but must satisfy two conditions before project construction and development can proceed. The first relates to further characterization of sediments underlying the proposed tailings impoundment and the second relates to completion of chronic toxicity test work on effluent from the proposed water treatment plant. Redfern anticipates obtaining official notice of satisfaction of these conditions prior to the end of 2004. A 1997 feasibility study estimated average annual metal output

at 45 000 t of zinc, 9980 t of copper, 1.8 t of gold and 72 t of silver based on a 2500-t/d mine output.

- DRC Resources Corporation continues to advance the Afton copper-gold project to final feasibility. The company is spending \$18 million on a program to upgrade the Afton mineral resource to the reserve category. As of October 2004, DRC has outlined a measured and indicated resource of 68.7 Mt grading 1.08% copper, 0.85 g/t gold, 2.63 g/t silver and 0.12 g/t palladium. The resource is adjacent to the previously mined Afton open pit, 10 km west of Kamloops. An advanced scoping study completed in February 2004 indicates that a 51.5-Mt resource could be mined at a rate of 9000 t/d to produce an average 34 000 t of copper and 2.5 t of gold per year.
- Imperial Metals is planning to re-open the Mount Polley open-pit copper-gold mine in 2005 on the strength of positive drilling results at the recently discovered Northeast zone and improved metal prices. The mine closed in 2001 due to low metal prices. During 2004, Imperial Metals updated the reserve estimate for the Northeast, Bell and Springer zones and obtained a permit amendment to include mining of the Northeast zone. At the time of publication, the updated mine plan was not yet available. Prior to shutting down in September 2001, average annual production was 16 300 t of copper.

WORLD OVERVIEW

Chile

- BHP Billiton is investing US\$495 million in the Escondida sulphide leach project, which involves the bio-assisted leaching of low-grade run-of-mine (ROM) sulphide ore from the Escondida pit and low-grade ROM sulphide and oxide ore from the Escondida Norte pit. The project is expected to produce 180 000 t/y of cathode and is scheduled to begin during the second half of 2006. Total ore reserves are estimated at 1.134 billion t of sulphide ore grading 0.52% copper. Outokumpu will design the solvent extraction plant using its Vertical Smooth Flow technology.
- In October, BHP Billiton announced plans to develop its Spence SX-EW project in northern Chile at a cost of US\$990 million. Planned annual production is 200 000 t of cathode over a 19-year mine life. First cathode production is scheduled for the fourth quarter of 2006.
- Codelco may begin developing a full-scale bio-leaching plant at Mansa Mina in 2005. Targeted production is 100 000 to 200 000 t/y of copper by 2008. It has invested US\$60 million in a pilot plant since 2000.

Codelco released an environmental impact statement of its smelting/refining project at Mejillones in Chile; the US\$1.25 billion operation would produce 1.4 Mt/y of cathode.

Peru

- Xstrata has been selected as the winning bidder by the Government of Peru for the Las Bambas project. Las Bambas comprises four known deposits with proven reserves of 40.5 Mt grading around 2% copper and an indicated resource of 500 Mt containing copper grades of over 1% plus gold. Xstrata will have a period of up to six years to complete exploration and feasibility work.

China

- Jianxi Copper is to increase cathode production by 31% to 450 000 t/y in 2005 compared to 343 000 t/y in 2003. The expansion will be financed from internal cash flows.
- Yunnan Copper Industry is planning to spend US\$60 million per year over the next six years on exploration and development of copper and zinc projects.

United States

- Production at the Bagdad and Sierrita mines ramped back up to full capacity. The Chino concentrator and the Cobre mine were restarted. Newmont announced it has started development of its Phoenix gold-copper project in Nevada. Planned annual production is 12-14 t of gold and 8000-9000 t of copper over 15 years starting in 2006. Production at Quadra Mining's Robinson mine began in September. Robinson is expected to produce 75 000 t/y of copper over 10 years.

Zambia

- First Quantum Minerals' Kansanshi copper-gold project was commissioned in late 2004 and commercial production is expected in early 2005. Equinox Resources is developing the Lumwana mine. Production of 140 000 t/y copper is expected by 2006.
- Vedanta Resources has acquired a 51% stake in Konkola Copper Mines (KCM) in Zambia for US\$48.2 million. Vedanta's subsidiary, Sterlite Industries, will operate KCM. Sterlite will focus on improving operations at KCM's Nkana smelting and refining complex and plans to increase output to the 225 000 to 250 000-t/y level. Production in 2003 was 188 000 t of copper.

Democratic Republic of Congo

- The Democratic Republic of Congo has granted conditional approval to American Minerals Fields' subsidiary Congo Mineral Developments to develop the Kolwezi copper-cobalt tailings project. Planned production is 42 000 t/y of copper and 7000 t/y of cobalt over a 38-year mine life starting in the fourth quarter of 2006 (112.8 t of oxide tailings grading 1.49% copper and 0.32% cobalt). AMF owns 82.5%, Gecamines owns 12.5%, and the government owns 5%.

The International Copper Study Group's (ICSG) September forecast of production (in 000 t) was:

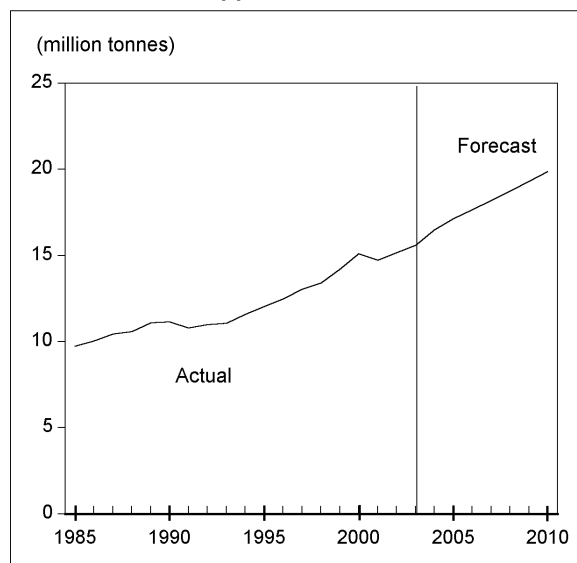
	2002	2003	2004	2005
Mine production	13 554	13 657	14 554	15 626
Refined production	15 266	15 210	15 868	17 094
Copper usage	15 142	15 586	16 473	17 146
Refined copper balance	124	-376	-704	-220

The long decline in treatment and refining charges, (TC/RCs) or the price charged to smelt copper concentrates and to produce refined copper, that began in early 2001 came to an abrupt end in the second quarter of 2004 thanks to an improved concentrate supply situation. Declining copper prices from mid-2000 to late 2002 led to mine cut-backs and closures, pushing the supply/demand balance for concentrate (the difference between production and consumption of concentrates) into a deficit from 2001 through 2003 in the range of 100 000-200 000 t of copper in concentrate. Average annual spot TC/RCs declined from a level of US\$62.50/t (TC) and US6.25¢/lb (RC) in 2001 to US\$17.30/t and US1.73¢/lb in 2003 (c.i.f. Shanghai delivery terms). The concentrate balance for the full year (2004) is expected to be at around a 400 000 to 500 000-t surplus. Spot TC/RCs bottomed out at below US\$15/t and US5¢/lb during the first quarter and then rose to the US\$130/t and US13¢/lb level by the third quarter (c.i.f. Shanghai). Annual TC/RCs (terms agreed to by mines and smelters under long-term concentrate supply agreements) are settling at the US\$85/t and US8.5¢/lb level compared to US\$46/t and US4¢/lb in 2003 (c.i.f. Japan).

DEMAND OUTLOOK

The ICSG forecast in late September (see data above) that world use of refined copper would increase 5.7% to 16.47 Mt in 2004 from 15.6 Mt in 2003; in 2005, use is forecast to rise by 4.1%, or 573 000 t, to 17.15 Mt. The ICSG forecasts continued strong growth in Asia in 2005, slowing growth in North America in 2005 compared to 2004, and modest growth in Europe in both 2004 and 2005.

Figure 1
World Refined Copper Use, 1985-2010



Source: Natural Resources Canada.

CANADIAN PRODUCTION OUTLOOK

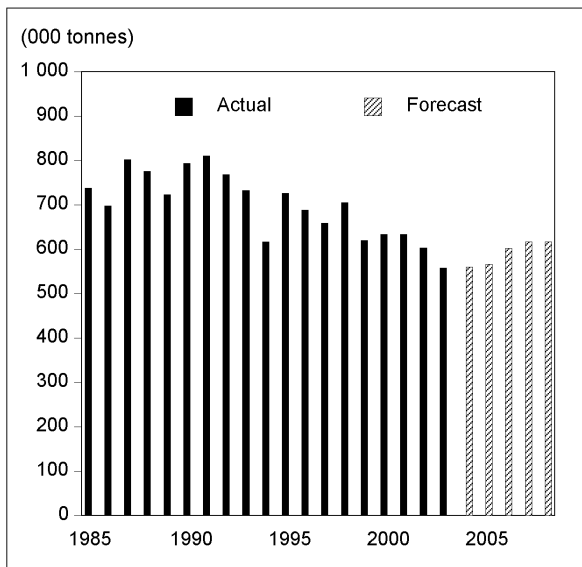
Following two years of declining production due to closures/shut-downs, Canadian mine production is expected to increase slightly in 2004 over 2003 as output from the re-start at Gibraltar offset closures at Selbaie and Bell Allard. Mine production is expected to increase during 2005-08 as new output from Voisey's Bay and Copper Rand 5000, as well as increased output from the Kemess North project, will more than offset the closure of Louvicourt. There is potential for further increases in the forecast period if production from projects such as Afton, Duck Pond and Mt. Polley comes on stream.

Canadian refined production of copper is forecast to increase to 500 000 t in 2004 from 455 000 t in 2003. Strikes at Noranda's Horne smelter and Inco's Ontario operations contributed to the lower 2003 output.

PRICE OUTLOOK

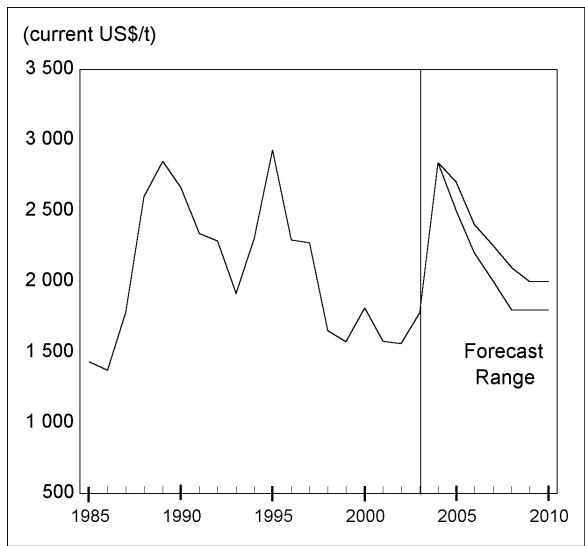
The average London Metal Exchange (LME) settlement price for copper for November of US\$3122.80/t represents a 15-year high. The LME settlement price for Grade A copper varied between US\$2348/t on January 2 and US\$3262/t on November 30; for the year it appears likely to average US\$2840/t (US128.8¢/lb). LME inventories began 2004 at 431 000 t and had declined to below 60 000 t at the end of November.

Figure 2
Canadian Mine Production of Copper,
1985-2008



Source: Natural Resources Canada.

Figure 3
Copper Prices, 1985-2010
Annual LME Grade A Copper Settlement



Source: Natural Resources Canada.

Copper prices should remain firm into 2005, possibly averaging as high as US\$2700/t, based on several factors. Demand growth in 2005 is forecast in the 4-5% range, which, although down from the 5.7% level estimated for 2004, is nonetheless very strong. In addition, it will take time for increased smelter and refinery production to translate into increased cathode output; therefore, cathode stocks will remain extremely tight in the first half of 2005. However, global industrial production (IP) growth seems to have peaked in the second quarter of 2004 and, should demand for copper slow, prices could decline to the US\$2400/t level into 2006. Prices should range between US\$2000 and US\$2400/t over the period 2006-07. Beyond 2007, increased supply from several new large mine/smelter projects could result in a better match between supply and demand; therefore, a levelling out of prices around the US\$1900/t level is forecast for the period 2007-10.

ADDITIONAL INFORMATION

More information about Canadian companies is available on the Internet at www.sedar.com/issuers/issuers_en.htm. Canadian monthly copper statistics are available in Table 3 at http://mmsd1.mms.nrcan.gc.ca/mmsd/data/default_e.asp. For an indepth review of exploration trends in Canada, see the report entitled *Overview of Trends in Canadian Mineral Exploration* at www.nrcan.gc.ca/mms/pubs/explor_e.htm.

Notes: Forecasts and projections are subject to change by such factors as changing copper prices, exploration successes or failures, ability to arrange financing, technological developments, and environmental permitting. Information in this article was current as of November 30, 2004.

NOTE TO READER

The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The author and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.

TABLE 1. COMPANY WEB SITES FOR FURTHER INFORMATION

Company	Web Site Address
CANADA	
Agnico-Eagles Mines Limited	www.agnico-eagle.com
Aur Resources Inc.	www.aurresources.com
Barrick Gold Corporation	www.barrick.com
Billiton Metals Canada Inc. (see BHP Billiton Plc)	www.bhpbilliton.com/bb/home/home.jsp
Breakwater Resources Ltd.	www.breakwater.ca
Callinan Mines Limited	www.callinan.com
Campbell Resources Inc.	www.ressourcescampbell.com/en/index.html
DRC Resources Corporation	www.drcresources.com/s/Home.asp
Expatriate Resources Ltd.	www.expatriateresources.com/start.htm
Falconbridge Limited	www.falconbridge.com
Getty Copper Corporation	www.gettycopper.com
Highland Valley Copper (see Teck Cominco Limited)	www.teckcominco.com
Hudson Bay Mining and Smelting Co., Ltd. (see OntZinc Corporation)	www.ontzinc.ca
Imperial Metals Corporation	www.imperialmetals.com/s/Home.asp
Inco Limited	www.inco.com
Inmet Mining Corporation	www.inmetmining.com
Noranda Inc.	www.noranda.com
North America Palladium Ltd.	www.napalladium.com
Northgate Exploration Ltd.	www.northgateexploration.ca
Placer Dome Inc.	www.placerdome.com/index.jsp
Redcorp Ventures Ltd.	www.redcorp-ventures.com
Taseko Mines Limited	www.tasekominer.com/tko/Home.asp
Teck Cominco Limited	www.teckcominco.com
Voisey's Bay Nickel Company Limited	www.vbnc.com and www.inco.com
AUSTRALIA	
M.I.M. Holdings Limited	www.mim.com.au
WMC Resources Ltd.	www.wmc.com
BELGIUM	
Umicore Group (Olen refinery/Pirdop smelter)	www.um.be
BRAZIL	
Companhia Vale do Rio Doce (CVRD)	www.vale.com.br
Chile Antofagasta Holdings	www.aminerals.cl
Compañía Minera Doña Inés de Collahuasi	www.collahuasi.cl
Corporación Nacional del Cobre de Chile	www.codelco.com
Empresa Nacional de Minería (ENAMI)	www.enami.cl
Minera Escondida Limitada	www.escondida.cl
CHINA	
Hindustan Copper Ltd. (HCL)	www.hindustancopper.com
India Birla Copper	www.birlacopper.com
Jiangxi Copper Company Limited	www.jxcc.com/english/engfgs/enindex.htm
Jinchuan Group Limited	www.jnmc.com/default.asp
Yunnan Copper Industrial Corp. Ltd.	www.yunnan-copper.com/ehhtml/copper.html
INDONESIA	
Freeport-McMoRan Copper & Gold Inc.	www.fcx.com
JAPAN	
Dowa Mining Co., Ltd.	www.dowa.co.jp
Furukawa Electric Co., Ltd.	www.furukawa.co.jp/english/index.htm
Mitsubishi Group	www.mitsubishi.or.jp/e/contents/contents_2.html
Mitsubishi Materials Corporation	www.mmc.co.jp/english/top_e.html
Mitsui & Co., Ltd.	www.mitsui.co.jp/tkabz/english/index.html
Nippon Mining & Metals Co., Ltd.	www.nikko-metal.co.jp
Nittetsu Mining Co., Ltd.	www.nittetsukou.co.jp
Onahama Smelting and Refining Co., Ltd.	www.group.mmc.co.jp/osr/eng
Sumitomo Metal Mining Co., Ltd.	www.smm.co.jp/index_E.html
KOREA	
LG-Nikko Copper Inc.	www.lgnikko.com/eng/#

TABLE 1 (cont'd)

Company	Web Site Address
MEXICO	
Grupo México S.A. de C.V.	www.gmexico.com
PAPUA NEW GUINEA	
Ok Tedi Mining Limited	www.oktedi.com
PERU	
Centromin Peru S.A.	www.centromin.com.pe
Southern Peru Copper Corporation	www.southernperu.com/pages/home.htm
PHILIPPINES	
Philippine Associated Smelting & Refining Corp.	www.pasar.net.ph
POLAND	
KGHM Polska Miedz S.A.	www.kghm.pl/en/index.php
RUSSIA	
MMC Norilsk Nickel	www.nornik.ru/en
UNITED KINGDOM	
Anglo American plc	www.angloamerican.co.uk
BHP Billiton Plc	www.bhpbilliton.com
Rio Tinto plc	www.riotinto.com
UNITED STATES	
ASARCO Incorporated	www.asarco.com
Kennecott Utah Copper Corporation	www.kennecott.com
Phelps Dodge Corporation	www.phelpsdodge.com
