# Copper

#### Maureen Coulas

Metal Materials Division Telephone: (613) 992-4093

E-mail: maureen.coulas@nrcan.gc.ca

2004 production: \$2.0 billion Rank (mine production): 8th

Rank (mine production): Exports (concentrates and

unwrought): \$1.5 billion

Canada	2003 (p)	2004 (e)	2005 (f)
		(000 t)	
		, ,	
Mine production	557	557	582
Refined production	455	527	534
Refined use	257	368	246

(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.

# ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

2001	2002	2003	2004	2005 (f)	2006 (f)
(US\$/t)					
1 578	1 560	1 780	2 868	3 620	3 400

(f) Forecast.

#### **METAL EXCHANGE STOCKS** (1)

2003	2004	Q1 05	Q2 05	Q3 05
		(000 t)		
806	93	85	43	86

(1) LME, Comex, and Shanghai.

### CANADIAN OVERVIEW

## **Merger Activity**

- On March 8, the boards of Noranda Inc. (Noranda) and Falconbridge Limited (Falconbridge) announced their decision to combine the two companies by way of a share exchange (merger). Under the agreement, each Falconbridge shareholder received 1.77 Noranda shares for each Falconbridge share. The new company was renamed Falconbridge Limited.
- In October, the boards of directors of Falconbridge Limited and Inco Limited announced the approval of the acquisition of all the outstanding common shares of Falconbridge by Inco by way of a friendly takeover bid. The combined organization will be known as Inco Limited once the transaction is completed at the end of December. The two companies anticipate realizing approximately US\$350 million/y in cost savings by the end of 2007, mainly from efficiency gains in overlapping operations, particularly in the Sudbury area where both companies operate copper and nickel mines and metallurgical facilities.

#### **Newfoundland and Labrador**

- Aur Resources Inc. announced it would develop its
   Duck Pond copper-zinc deposit in Newfoundland and
   Labrador on a fast-track basis with production expected
   to begin in late 2006. Aur expects to produce about
   18 600 t/y of copper contained in concentrates plus
   by-products of about 34 000 t/y of zinc, 16 t/y of silver
   and 127 kg/y of gold over a seven-year period.
- The Voisey's Bay mine and concentrator became operational in the August/September period and the first shipments of concentrate were expected to leave Argentia in early November. On October 20, the hydromet demonstration plant became operational and is scheduled to conclude in late 2007, at which time Inco will complete its assessment of the feasibility of using hydromet technology to treat Voisey's Bay nickel concentrates. Construction of the commercial processing plant would begin in 2009 and be completed by the end of 2011. Planned average annual

output from the mine during the first phase of the project is approximately 50 000 t/y of nickel and 38 550 t/y of copper (31 750 t from copper concentrate and 6800 t from nickel concentrate).

#### Quebec

- Campbell Resources Inc. brought the Copper Rand mine back into production in March. 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. Start-up problems, mainly due to poor ground conditions, prevented the company from producing at planned rates. Resulting cash flow problems led to a suspension of development work by mid-year. The mine continues to produce at reduced levels and the company is seeking strategic partners to secure additional capital. Production for the first three quarters was 1655 t of copper and 123 kg of gold. Planned average annual production was 6800 t of copper and 992 t of gold.
- Noranda Inc. announced during the second quarter that
  it would ramp up production at the Horne smelter to
  170 000 t/y of anode by the end of 2005. In June 2004,
  Noranda reduced the processing rate from 840 000 to
  630 000 t/y and its anode production from 186 000 to
  140 000 t/y to reduce its reliance on low-margin, offshore concentrates.
- Breakwater Resources Ltd.'s Bouchard-Hébert mine ceased production in February 2005 due to the depletion of economic reserves.

#### Ontario

Inco Limited announced in June that it has entered into a long-term agreement with Falconbridge Limited (Falconbridge) under which Inco will send the copper anodes produced at its Sudbury copper smelter to the former Noranda Inc.'s **CCR refinery** in Montréal for processing into refined copper and precious metals. Under the 10-year agreement, Falconbridge will purchase and pay Inco for the copper, gold and silver recovered, less treatment and related charges, and Inco will receive back the nickel and platinum group metals recovered from the anodes subject to certain treatment charges. Falconbridge expects to receive between 104 000 and 122 000 t/y of copper in anode form from Inco. Inco had indicated earlier in the year that it would be closing its copper refinery in Sudbury, citing the facility's size and high-cost structure relative to the leading copper refineries as the major factor in the decision.

 A four-week strike at Falconbridge Limited's Kidd Creek metallurgical division was resolved on October 30 when workers from two unions ratified a new three-year agreement.

#### Manitoba/Saskatchewan

HudBay Minerals Inc. reached an agreement in October with White Pine Copper Refinery Inc. to acquire the White Pine copper refinery for US\$13 million.
 Located in White Pine, Michigan, the refinery processes the anodes produced at HudBay's Flin Flon copper smelter into cathode.

#### **British Columbia**

- Teck Cominco Limited announced it will proceed with a plan to extend the mine life at the **Highland Valley Copper** mine, near Kamloops, by approximately five years to September 2013. The mine-life extension will be achieved by pushing back the pit wall of the Valley mine to release additional ore. The capital cost of the project is \$40 million.
- Vancouver-based Redcorp Ventures Ltd. announced in May that it will curtail development work on the Tulsequah project near Aitlin, B.C., following preliminary results from an ongoing feasibility update study indicating that, due to the combination of increased capital and operating costs estimate, and a reduced resource estimate, additional work will be required in order to develop a financeable project. All work has been put on hold while the company considers options to expand the resource base or reduce capital and operating costs. The deposit contains measured and indicated resources totaling 5.38 Mt with grades of 1.42% copper, 1.32% lead, 6.73% zinc, 2.73 g/t gold and 100.8 g/t silver. Redcorp received a provincial Certificate of Authorization to proceed in November 2004 and a screening-level environmental assessment approval under the Canadian Environmental Assessment Act (CEAA) in July 2005.
- The **Mount Polley** mine restarted operations in March 2005 on the strength of positive drilling results at the recently discovered Northeast zone and improved 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. Total proven and probable reserves in the Wight, Bell and Springer open pits are 44 Mt grading 0.45% copper and 0.30 g/t gold, which contain approximately 200 000 t of copper and 13 t of gold. The mine life as of February 2005 was 6.75 years.

## WORLD OVERVIEW

#### **Brazil**

• Companhia Vale do Rio Doce (CVRD) is building a 10 000-t/y plant at a cost of US\$58 million to prove out using hydrometallurgy to process copper sulphide concentrate into copper metal. The plant will use a process developed by Cominco Engineering Services Ltd. (CESL) that is based on pressure oxidation, followed by atmospheric leaching, solvent extraction and copper electrowinning. Feed material will come from the Sossego mine, which is expected to start up by the second quarter of 2007 and run for two years. Should the pilot plant prove to be successful, CVRD plans to use the technology to process ore from the much larger Salobo deposit, which is scheduled to come on stream in 2009 at a rate of 100 000 t/y of copper.

#### Chile

• Codelco unveiled plans to expand production at its El Teniente mine to 300 000 t/d of throughput. The expansion will lift production from 424 000 t/y of copper expected in 2005 to 563 000 t/y in 2020. Codelco also plans to bring the 150 000-t/y Gaby SX/EW¹ copper project into production in 2007 at a cost of US\$478 million. China MinMetals may provide capital for the project in exchange for a share of the production. Gaby is an oxide deposit located 100 km south of Chuquicamata and has reserves of 545 Mt at 0.44% copper.

# Mongolia

• Ivanhoe Mines released the development plan for its wholly owned **Oyo Tolgoi** copper-gold project. According to the study, the deposit has the potential to produce over 454 000 t/y of copper and 10 t/y of gold over a 35-year mine life. The first stage of the project involves developing an open-pit mine at the near-surface Southern Oyu deposit and a 70 000-t/d processing plant. A decision to initiate a second-stage development of the Hugo North deposit via underground block caving would be taken in year 3. If Stage 2 proceeds, the processing plant would be expanded to 140 000 t/d by year 7. The capital costs for Stage 1 are estimated at US\$1.5 billion. Production could start in 2007.

#### Peru

• Phelps Dodge Corporation (92.5%) and Compania de Minas Buenaventura S.A.A. (9.2%) launched a US\$850 million expansion project at the Cerro Verde SX/EW mine, which will access 907 Mt of sulphide reserves lying below the oxide orebody. A new concentrator will produce 180 000 t/y starting in late 2006. Bueneventura will increase its share in the project to 20% and Sumitomo is taking a 21% stake.

#### China

- In October, the National Development and Reform Commission (NDRC) issued a document stating that it intends to prevent over-investment and redundant construction in copper smelting projects in a bid to safeguard the sustainable and steady development of the Chinese copper industry. Chinese smelting capacity in 2004 totalled about 2.014 Mt/y and is expected to increase to 2.29 Mt/y in 2005. According to the publication China Metals Market, published by Antaike, there are currently 18 ongoing or planned copper smelting projects with a combined capacity of 2.05 Mt/y. In its November monthly report, Antaike stated that if all these projects were to come on stream, Chinese copper smelting capacity would reach 3.7 Mt/y at the end of 2007, a level that approaches the total estimated annual global supply of custom concentrates. In its press release, the NDRC stated it is concerned that the blind investment in the copper smelting industry will put high pressure on copper resources, environment and energy, and will create overcompetition in the industry. The statement was short on details, but Antaike reported it was likely that future copper smelting industry policies would be modelled after policies recently put in place to control the aluminum industry and could therefore include the strengthening of approval over brownfield and greenfield projects and the strict control on the export of copper and copper-related products.
- The Metal Recycling Branch of China Nonferrous Metals Industry Association (CNI-A) submitted an application to various Chinese government authorities to remove the current 1.5% tariff on imported copper and aluminum scraps in a bid to promote and develop the domestic recycling industry. According to CNI-A statistics, China used 1.16 Mt of copper scrap (metal content) in 2004, up 14% from 2003.

#### India

• Birla Copper is doubling the capacity of its **Dahej** smelter/refinery from 250 000 t/y to 500 000 t/y by the end of 2005. At the expanded capacity, Dahej will become the world's largest copper smelter.

<sup>&</sup>lt;sup>1</sup> SX/EW = solvent extraction/electrowinning.

 Sterlite Industries (India) Ltd. received environmental permits to operate its new 300 000-t/y smelter in the southern port city of **Tuticorin**. The new smelter will replace an existing 180 000-t/y furnace.

#### **United States**

- Phelps Dodge Corp. announced that it will spend US\$210 million to construct a commercial-scale copper concentrate leaching and direct electrowinning facility at its copper mine in Morenci, Arizona. The facility will employ proprietary pressure leaching technology developed by Phelps Dodge and under demonstration at its copper mine in Bagdad, Arizona, to process copper ores containing a mix of primary and secondary copper sulphide minerals. A restart of the idled Morenci concentrator is included in the cost and project development. The new concentrate leaching facilities will be incorporated into the existing leaching and electrowinning complex at Morenci. The production from these facilities, slated for start-up in 2007, will replace an expected decline in Morenci's heap leach output later in the decade.
- A 19-week strike at Asarco LLC's copper operations in the United States ended in November after Asarco and union leaders reached a tentative agreement that extends the previous agreement through to the end of 2006. The tentative deal also includes a successorship clause requiring any potential buyer of the company to recognize the union and to negotiate a new contract before the company is sold. The successorship clause became a key issue for the union after Asarco filed for Chapter 11 bankruptcy protection on August 10. During the strike, the Hayden, Arizona, smelter ran at around 55% capacity and the Amarillo, Texas, rod mill was completely shut. Output in 2005 is expected to be 150 000 t, down 70 000 t from previous estimates.
- Vancouver-based Quadra Mining Ltd. bought the Carlota SX/EW copper project in Arizona from Montréal-based Cambior Inc. for US\$37.5 million. Quadra plans to produce 30 000 t/y of cathode over an 11-year mine life starting in 2007.

#### Japan

• Dowa Mining Co., Ltd. plans to build a 150 000-t/y greenfield furnace in **Kosaka**, adjacent to the company's 72 000-t/y copper smelter. The new plant will process scrap and other secondary materials to produce 19 kinds of nonferrous metals, including copper, nickel, zinc, tin, gold and bismuth. Dowa plans to bring the plant on stream by the end of March 2007.

## Spain

 Toronto-based Inmet Mining Corporation acquired a 70% indirect interest in the Las Cruces SX/EW project. Expected production is 66 000 t/y over 15 years starting in 2008.

## **Thailand**

• Thai Copper Industries Public Co., Ltd. shut down its Rayong copper smelter in Rayong in late July for about three months due to equipment failure and other operating problems. The plant was also down for most of March. As a result, the company revised its 2005 production forecast to 80 000 t of copper, down from 120 000 t. Planned output in 2006 has been revised to 135 000 t from 165 000 t.

#### Zambia

- Konkola Copper Mines (KCM), controlled by Vedanta Resources plc, formally announced that it will develop the Konkola Deep orebody at a cost of US\$400 million. The project, due to be completed in 2009, includes the construction of a new 3-Mt/y concentrator. Copper production is expected to increase from 170 000 t/y to around 350 000 t/y.
- Equinox Minerals Ltd. received environmental approvals, subject to the completion of financing, for its Lumwana project. Equinox plans to start work on the US\$483 million project by the end of 2005. Expected average production is 150 000 t/y of copper in concentrate over a 17-year mine life.

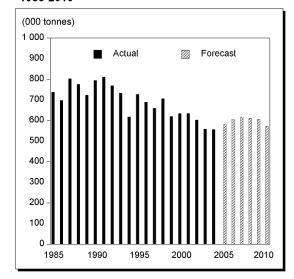
#### **Democratic Republic of Congo**

• Phelps Dodge Mining Co. announced it is exercising an option to take a controlling interest in the **Tenke Fungurume** copper-cobalt project. Phelps Dodge will have a 57.5% interest and a subsidiary will be the operator of the project. The other partners are Tenke Mining Corp. (24.75%) and the DRC state-owned mining company Gecamines. According to Phelps Dodge, Tenke Fungurume is one of the largest highest-grade undeveloped copper-cobalt projects in the world. Planned start-up is in 2008 at an initial rate of 50 000-100 000 t/y of copper and 4000-8000 t/y of cobalt.

## CANADIAN PRODUCTION OUTLOOK

Following two years of declining production due to closures/shut-downs, Canadian mine production rose in 2004 and 2005 as output from re-starts at Gibraltar, Mount

Figure 1 Canadian Mine Production of Copper, 1985-2010



Source: Natural Resources Canada.

Polley and Copper Rand and the start-up at Voisey's Bay offset closures at Bouchard-Hébert and Louvicourt. Mine production is expected to increase further in 2006 and 2007 as Voisey's Bay reaches full production and Duck Pond comes on stream. Looking to the end of the decade, Canadian copper mine output in 2010 is projected to be lower than in 2000 as output from new mines will not sufficiently replace output from mines that are expected to exhaust their reserves. This forecast could change should the world copper price remain strong over an extended period of time.

Canadian refined production is forecast to increase slightly to 534 000 t in 2005 from 527 000 t in 2004.

# MARKET REVIEW AND OUTLOOK

# **Smelter Treatment and Refining Charges**

Spot market concentrate treatment and refining charges (TC/RCs)<sup>2</sup> continued to trend upward in the first quarter of 2005 thanks to a continuation of the surplus in the global concentrate supply that emerged in 2004. Spot terms achieved by Chinese buyers in April peaked at

around US\$185/t and US18.5¢/lb compared to indicative end-of-2004 buying terms of US\$135/t and US13.5¢/lb. With several smelter maintenance shut-downs completed and the announcement that the new smelter at Tuticorin in India had received approval to start up operations, supply started to ease by mid-year and spot terms began to trend downwards.

Mid-year custom smelting contracts (i.e., July 2005-June 2006) reportedly settled at terms of US\$105-\$110/t and US\$10.5\$\psi-11.0\$\psi/lb\$ with positive price participation (pp)\$\frac{3}{2}\$ above 90\$\psi/lb\$ in Western Europe, at US\$111-\$112/t and 11.1\$\psi-11.2\$\psi/lb\$ in China, and at US\$112.5-\$115/t and 11.25\$\psi-11.5\$\psi/lb\$ with full positive and negative pp +/-90\$\psi/lb\$ in Japan.

The concentrate market is expected to be more balanced in the second half of 2005 and will likely move into a deficit in 2006 as smelter capacity utilization increases.

#### **Cathode Premiums**

Cathode premiums in the major consuming regions trended downwards from 2004 levels. Spot premiums for refined copper c.i.f. Shanghai deliveries were reported to be around US\$120-\$130/t in the first quarter, down \$10-\$20/t from their February 2004 peak. In Europe, spot premiums of US\$30-\$50/t were well below the February 2004 peak levels of \$110-\$125/t, reflecting sluggish demand. U.S. premiums were around US6.0¢-6.5¢/lb over Comex, down about 25% from their mid-May 2004 peak.

Codelco announced a premium for 2006 deliveries to China of US\$128/t, \$10/t lower than the 2005 level. Chile is China's largest source for cathode imports, accounting for 53% of Chinese cathode imports for the period January to September 2005. Codelco has settled its 2006 annual premium for cathode delivery to Europe at US\$105/t, also down \$10/t from the 2004 level.

# **Supply/Demand Outlook**

The International Copper Study Group's (ICSG) November forecast of production (000 t) showed:

	2003	2004	2005	2006	04/05	05/06
	(000 t)			(%)		
Mine production	13 676	14 527	14 983	15743	3.1	5.1
Refined production	15 234	15 844	16 344	17814	3.2	9.0
Copper usage	15 642	16 687	16 450	17355	-1.4	5.5
Refined copper balance	-408	-843	-122	295		

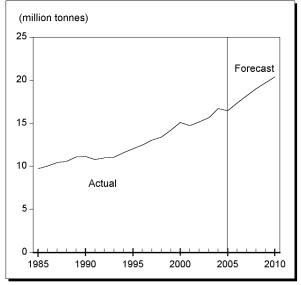
<sup>&</sup>lt;sup>3</sup> Price participation (PP) is a feature of long-term contracts between smelters and miners of concentrate. For example, if a contract includes price participation above 90¢/lb of copper, it means that miners pay smelters 1¢/lb for every 10¢/lb the copper price is above an agreed threshold price.

<sup>&</sup>lt;sup>2</sup> TC/RCs are the amounts charged by smelters to miners to smelt copper concentrates and to produce refined copper. Treatment charges are expressed as a dollar amount per tonne of concentrate received. Refining charges are expressed as a dollar amount per pound of copper contained in the concentrate received. TC/RCs are deducted from the value of the metal in concentrates paid by the smelter to the miner.

After very low growth in mine production in 2002/03, supply has been increasing since 2004 and this should help ease the tightness in the copper market. Supply growth in the first half of 2005 was slower than anticipated due to a series of supply disruptions at several mines and smelters, which took up to 600 000 t of output out of the market according to some estimates. These included strikes (Asarco's U.S. operations, Kidd Creek), technical problems (Collahuasi, Grasberg, Kosaka smelter, Rayong smelter), earthquakes (Quebrada Blanca), and grade flexing in favour of molybdenum at large copper-molybdenum mines. These problems have mostly been resolved, with the possible exception of the Rayong smelter, and supply growth in 2006 is expected to be much stronger than in 2005. The ICSG forecast in November indicates refined production growth of 3.2% in 2005 and 9.0% in 2006.

The ICSG forecasted that world use of refined copper would decrease 1.4% to 16.45 Mt in 2005 from 16.69 Mt in 2004. In 2005, strong growth in China and India was more than offset by declines in use in North America and the European Union. The overall downturn in demand is, in part, due to a slowdown in economic activity, but also due to destocking by copper consumers anxious to avoid rising and volatile prices. In 2006, use is forecast to rise by 5.5%, or by 900 000 t to 17.36 Mt. Stronger growth is anticipated in all consuming regions in 2006 according to the ICSG.

Figure 2 World Refined Copper Usage, 1985-2010



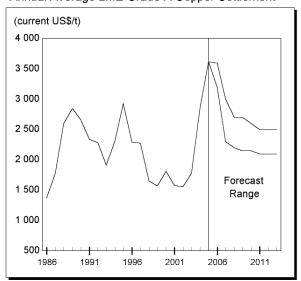
Source: Natural Resources Canada.

# **PRICE OUTLOOK**

A series of very positive fundamentals has sent copper prices to new all-time highs in 2005. The October monthly average settlement price on the London Metal Exchange (LME) for Grade A copper of US\$4059/t (US\$1.84/lb) was 22% higher than the January average price of US\$2368/t (\$1.07/lb). By mid-2005, record high prices and tight supply led some fabricators to substitute copper with other metals (e.g., aluminum in copper tubing applications). On November 18, the LME daily cash settlement price reached US\$4420.50/t, or \$2.00/lb, a new all-time high (in real terms), buoyed by rumours that the Chinese State Reserve Bureau has open short positions of up to 200 000 t of metal on the LME and Shanghai Futures Exchange (SFE). The ICSG forecast a metal balance deficit of around 122 000 t for 2005 at its November regular meeting.

The 2005 average LME price is forecast at US\$3620/t (\$1.64/lb). Given the extremely low level of visible stocks, prices will likely be quite volatile and there could be spikes above US\$4400/t before year-end. For 2006 as a whole, the refined copper supply/demand balance is forecast to swing into a small surplus, and this should lead to a decline in prices. To what level prices will decline in 2006 and beyond will depend on the timing of the expected increase in supply and on demand levels. Based on the supply/demand outlook described above, prices in

Figure 3
Copper Prices, 1986-2013
Annual Average LME Grade A Copper Settlement



Source: Natural Resources Canada

2006 could range between US\$3200 and \$3600/t (US\$1.45-\$1.63/lb). The main factors supporting prices at the high end of this range are the degree of restocking required by consumers and the extremely low level of commercial and exchange stocks. Beyond 2006, there is a potential for a growing metal surplus as a number of new mine and smelter projects are scheduled to come on stream. Rising stocks will have a dampening effect on prices; consequently, annual average prices are forecast to range between US\$2150 and US\$3000/t (US\$0.98-\$1.36/lb) over the period 2007-10.

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 in-depth review of exploration trends in Canada, see the report entitled *Overview of Trends in Canadian Mineral Exploration* (2003) 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 18, 2005.

#### 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)	www.bhpbilliton.com
Breakwater Resources Ltd.	www.breakwater.ca
Callinan Mines Limited	www.callinan.com
Campbell Resources Inc.	www.ressourcescampbell.com
DRC Resources Corporation	www.drcresources.com
Expatriate Resources Ltd.	www.expatriateresources.com
Falconbridge Limited	www.falconbridge.com
Getty Copper Corporation	www.gettycopper.com
Highland Valley Copper (see Teck Cominco)	www.teckcominco.com
HudBay Minerals Inc.	www.hudbayminerals.com
Imperial Metals Corporation	www.imperialmetals.com
Inco Limited	www.inco.com
Inmet Mining Corporation	www.inmetmining.com
North America Palladium Ltd.	www.napalladium.com
Northgate Minerals Corporation	www.northgateminerals.ca
Placer Dome Inc.	www.placerdome.com
Redcorp Ventures Ltd.	www.redcorp-ventures.com
Taseko Mines Limited	www.tasekomines.com
Teck Cominco Limited	www.teckcominco.com
Voiseys Bay Nickel Company Limited	www.vbnc.com
AUSTRALIA	
M.I.M. Holdings Limited	www.mim.com.au
WMC Resources Ltd	www.wmc.com
BELGIUM	

www.um.be

Umicore Group (Olen refinery/Pirdop smelter)

# TABLE 1 (cont'd)

Phelps Dodge Corporation

TABLE 1 (cont'd)	
Company	Web Site Address
BRAZIL Companhia Vale do Rio Doce (CVRD) Chile Antofagasta Holdings Corporación Nacional del Cobre de Chile Compañía Minera Doña Inés de Collahuasi Empresa Nacional de Minerià (ENAMI) Minera Escondida Limitada	www.vale.com.br www.aminerals.cl www.codelco.com www.collahuasi.cl www.enami.cl www.escondida.cl
CHINA Jiangxi Copper Company Limited Jinchuan Group Limited Yunnan Copper Industrial Corp. Ltd.	www.jxcc.com www.jnmc.com www.yunnan-copper.com
INDIA India Birla Copper Hindustan Copper Ltd. (HCL)	www.birlacopper.com www.hindustancopper.com
INDONESIA Freeport-McMoRan Copper & Gold Inc.	www.fcx.com
JAPAN  Dowa Mining Co., Ltd. Furukawa Electric Co., Ltd. Mitsubishi Materials Corporation Mitsubishi Group Mitsui & Co., Ltd. Nippon Mining & Metals Co., Ltd. Nittetsu Mining Co., Ltd. Onahama Smelting and Refining Co., Ltd. Sumitomo Metal Mining Co., Ltd.	www.dowa.co.jp www.furukawa.co.jp www.mmc.co.jp www.mitsubishi.or.jp www.mitsui.co.jp www.nikko-metal.co.jp www.nittetsukou.co.jp www.group.mmc.co.jpg www.smm.co.jp
KOREA LG-Nikko Copper Inc.	www.lgnikko.com
MEXICO Grupo México S.A. de C.V. PAPUA NEW GUINEA	www.gmexico.com
Ok Tedi Mining Limited	www.oktedi.com
PERU Centromín Peru S.A. Southern Peru Copper Corporation	www.centromin.com.pe www.southernperu.com
PHILLIPINES Phillipine Associated Smelting & Refining Corp.	www.pasar.net.ph
POLAND KGHM Polska Miedz S.A.	www.kghm.pl
RUSSIA MMC Norilsk Nickel	www.nornik.ru
UNITED KINGDOM Anglo American plc BHP Billiton Plc Rio Tinto plc	www.angloamerican.co.uk www.bhpbilliton.com www.riotinto.com
UNITED STATES ASARCO Incorporated Kennecott Utah Copper Corporation Phelos Dodge Corporation	www.asarco.com www.kennecott.com www.phelpsdodge.com

www.phelpsdodge.com