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nonferrous metals outlook

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Preface

The Minerals and Metals Sector is the focus of federal expertise for mineral and metal commodity information. Within the Sector, the Industry Analysis and Business Development Branch acts as the federal government's main source of in-depth knowledge, intelligence and expertise on mineral and metal commodity markets. One of its tasks is to forecast mineral and metal demand, supply and price.

Within the Branch, the Metal Materials Division is responsible for the major nonferrous metals, precious metals, certain associated minor by-products, and recycled materials such as scrap. The commodity specialists of the Division maintain close contacts with industry on a wide range of topics and issues. This year-end publication represents a more formal means to disseminate metal market developments through the first three quarters of the year and forecasts to the year 2012.

We would appreciate your feedback and encourage you to contact the specialists directly with your comments by telephone, facsimile or electronic mail (telephone numbers and e-mail addresses are provided at the beginning of each chapter). You can also provide feedback to the coordinator of this publication, Patrick Chevalier, at telephone 613-992-4401, fax 613-943-8450, or e-mail patrick.chevalier@nrcan.gc.ca.

NOTE TO READER

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Introduction

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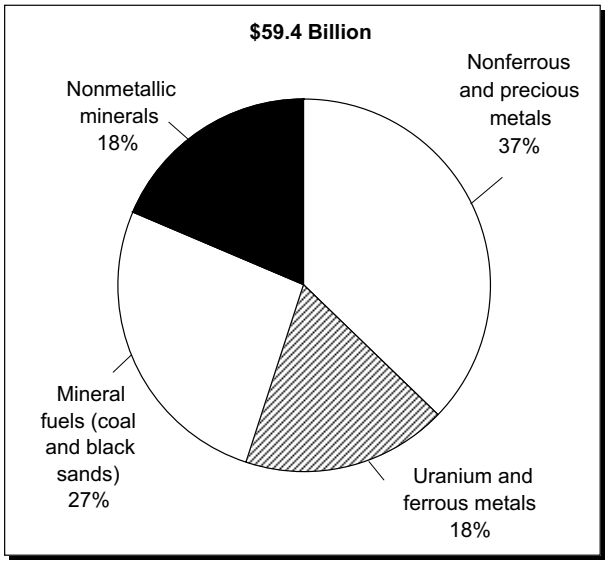
This outlook for the major nonferrous metals was prepared by staff of the Metal Materials Division in December 2006 and reflects the market conditions and expectations at that time.

Canada is currently the only Group of Seven (G7) country to report a total government surplus and is projected to be the only G7 country to be in surplus again in 2006 and 2007, according to the Organization for Economic Co-operation and Development (OECD). Canada's debt burden has declined from the second highest to the lowest among G7 countries. In terms of growth in the Canadian economy, the Canadian economy (real Gross Domestic Product [GDP]) grew by 1.7% in the third quarter of 2006, following increases of 2.0% in the second quarter and 3.6% in the first. Domestic demand continues to be rooted in favourable fundamentals – low, but rising, interest rates; record employment levels and high commodity prices; strong demand for our exports; and high personal incomes and corporate profits. Real GDP in Canada is expected to grow by 2.7% in 2006 and by about 2.7% in 2007 and 2.8% in 2008. The Canadian dollar climbed to close at a 28-year high of US91.05¢ on June 12 as commodity prices remained high. Since then, it has eased and closed at US85.81¢ on December 29.

The total value of all mineral commodities produced in Canada, including metals, nonmetals and mineral fuels (including oil sands mining), rose from $46.8 billion in 2004 to an estimated $59.4 billion in 2005 (Figure 1). Exports of crude minerals (excluding petroleum and natural gas), coal, smelted and refined outputs, and mineral products contributed $64.2 billion to the value of Canada's domestic exports in 2005, an 11% increase compared with 2004. This represented 15% of Canada's total exports of $436.2 billion. Metallic minerals and mineral product domestic exports accounted for 77.3% ($47 billion) of the total non-fuel (including coal) value, nonmetal domestic exports (including structural materials) accounted for 19.2% ($11.7 billion), and coal accounted for 3.5% ($3.4 billion). The United States remains Canada's principal trading partner with domestic exports of non-fuel minerals and mineral products, including coal, to that country valued at $41.7 billion. Exports to the European Union totaled $8.7 billion; to Japan, $2.5 billion; and to Mexico, $0.4 billion. Canadian imports of non-fuel minerals and mineral products, including coal, reached $56.6 billion.

Figure 1
Value of Canadian Minerals and Metals Production, 2005



Source: Natural Resources Canada.

Nonferrous metals generated a net trade surplus equivalent to about 10% of that of mineral fuels (excluding coal). Canada's overall merchandise export surplus was due in large part to the net surplus generated by the Canadian mining and metals industry. Non-coal fuel minerals generated a net surplus of $51.1 billion. The major nonferrous and precious metals (including scrap), with exports of $31.4 billion and imports of $25.6 billion, generated a net Canadian trade surplus of $5.8 billion. Other mineral products generated a combined net trade surplus of $1.8 billion (Figures 2 and 3).

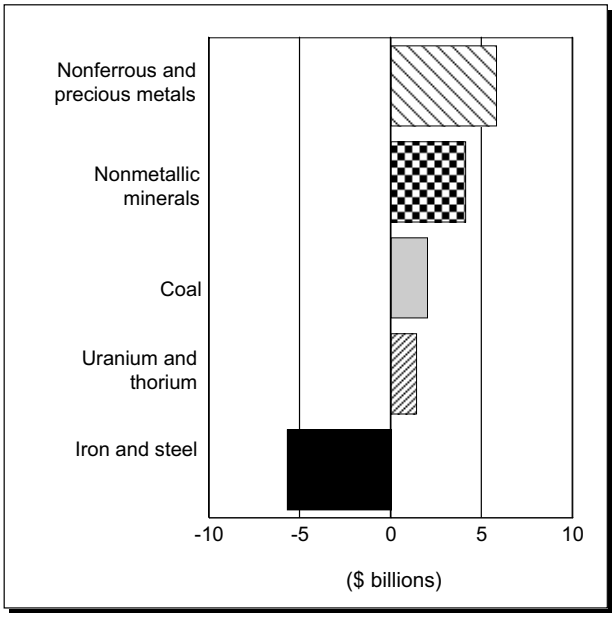
Mergers and acquisitions by and for Canadian companies reached record levels in 2006. Several well-known names in the Canadian mining industry have disappeared while others, particularly in the gold sector, have consolidated their positions and grown into major world leaders. Among the major Canadian companies to disappear in 2006 were Falconbridge Limited, Placer Dome Inc., Inco Limited, and Cambior Inc. Canadian companies that grew significantly as a result of mergers and acquisitions in 2006 include Barrick Gold Corporation, Goldcorp Inc., Kinross Gold Corporation, and IAMGOLD Corporation. More details are available within each of the following commodity chapters.

Reviews and forecasts for aluminum, copper, gold, nickel and zinc are included in the following pages. Trade tables covering the value of minerals and mineral products for 2004, 2005, and the first 11 months of 2006 follow these commodity reviews.

We would appreciate your feedback and encourage you to contact the specialists directly with your comments or questions by telephone, facsimile, or electronic mail.

Note: Information in this article was current as of December 31, 2006.

Figure 2
Net Export Earnings, 2005
Mineral Commodities Net = $4.9 Billion



Source: Natural Resources Canada.

NOTE TO READERS

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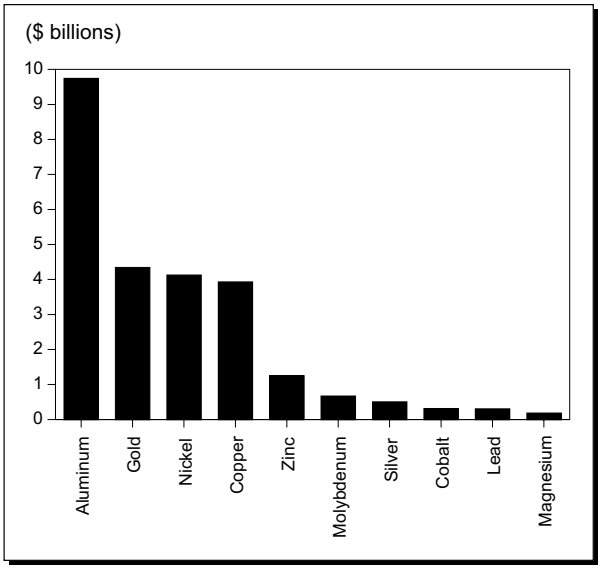
Figure 3
Value of Exports, All Stages, 2005



Source: Natural Resources Canada.

Aluminum

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	2005	**2006** (f)
Primary metal production:	$6.65 billion (e)	$8.8 billion (e)
World rank:	Third	Third
Exports (unwrought):	$5.4 billion	$7 billion
Exports (HS 76):	$9.5 billion	$12 billion
Installed capacity:	3.08 Mt/y	3.09 Mt/y

Canada	2005	2006 (e)	2007 (f)
		(000 tonnes)	
Primary aluminum			
Production	2 890	3 040	3 050
Use	1 100	1 170	1 220

(e) Estimated; (f) Forecast.

ANNUAL AVERAGE ALUMINUM PRICES, LONDON METAL EXCHANGE (CASH SETTLEMENT)

2003	2004	2005	2006	2007 (f)
		(US$/t and [US¢/lb])		
1 431 (65¢)	1 716 (78¢)	1 880 (84¢)	2 530 (115¢)	2 400 (110¢)

(f) Forecast.

Aluminum, in both its pure and alloyed form, is used to make a wide variety of products for the consumer and capital goods markets. **Alcan** reports[1] that aluminum's largest markets are transportation (27%), packaging (16%), building and construction (20%), electrical (10%), consumer durables (7%), and machinery and equipment (8%). China accounts for 22% of global demand, North America for 24%, Western Europe for 22%, and Asia, excluding China, for 21%.[1]

[1] www.alcan.com (annual report).

CANADIAN OVERVIEW

Canada's production of primary aluminum is expected to increase by 5% to 3.04 Mt in 2006 from 2.89 Mt in 2005. Monthly Canadian production statistics can be obtained on Natural Resources Canada's Internet site at http://mmsd1.mms.nrcan.gc.ca/mmsd/production/default_e.asp.

Alcan announced its intention to modernize its Kitimat Works primary aluminum smelter in British Columbia through a US$1.8 billion investment. The project would replace existing Söderberg cells with AP35 technology and expand the smelter from its current 277 000-t/y capacity to 400 000 t/y.

Alcan announced that it would build a US$180 million, 80 000-t/y spent pot lining recycling plant in the Saguenay–Lac-Saint-Jean region of Quebec. The plant is expected to begin operations in the second quarter of 2008.

Alcan announced plans for a US$550 million, 60 000-t/y pilot plant of its new AP50 smelting technology in Jonquière, Quebec.

Alcan and employees in Quebec, represented by the Canadian Auto Workers Union (CAW) and the United Steel Workers (USW), ratified new collective labour agreements for an initial term of five years, with possible four-year extensions if Alcan decides to make major investments in the Jonquière Complex (CAW) and at Alma (USW) during the first term.

The Alouette smelter, after completion of its expansion in early 2005, operated at full capacity during all of 2006. This smelter is now the largest in North America and **Aluminerie Alouette Inc.** reports that it is now capable of producing more than 560 000 t/y.

Alcoa and the Quebec government held talks on renewals of energy agreements for its three smelters. No announcements had been made on the results of these talks at the time of writing.

The Aluminium Association of Canada published an economic study outlining the contribution the industry makes

to the economy. Further information and links to web sites of Canadian primary aluminum producers can be found on the Association's web site at www.aac.aluminium.qc.ca.

WORLD OVERVIEW

In China, metal production growth rates have fallen from the exceptionally high growth rates in the early part of the decade to 19% in 2005 (7.8 Mt). Metal production is expected to have increased by at least a further 19% in 2006 (to 9.3 Mt). In addition, alumina production has strongly increased in 2006 based on imports of bauxite.

Tax and other policy changes within China, including a cancellation of value-added-tax (VAT) refunds, the imposition of an export tax on ingot (15%), and higher power rates, may continue to affect the longer-term plans for new smelters and manufacturing activity. However, increased profits resulting from a reduction in domestic alumina prices to US$305/t from prices above US$700/t in early 2006, and the current high price of metal, will counter that influence.

Within China, the consolidation of smaller primary aluminum companies and the rapid expansion of processing facilities is accelerating.

RUSAL, SUAL Group and **Glencore** have proposed to merge their aluminum assets, creating a company that would be the world's largest producer of aluminum and alumina.

After rising slightly in 2005, North American smelter production rates fell slightly in 2006 to 5.3 Mt/y from 5.4 Mt/y in 2005. The decline was due to the closure of smelters in the United States.

Alcan's activities outside of Canada, in addition to ongoing projects, include: a 25-year electricity supply agreement starting in 2010 for the proposed 720 000-t/y Coega aluminum smelter project at Port Elizabeth, South Africa; a Memorandum of Understanding with **Access Madagascar Sarl** on the joint study and development of a bauxite mine and alumina refinery in Manantenina District, Madagascar; approval for mining the Ely bauxite deposit in Queensland, Australia; a Memorandum of Understanding with the Republic of Ghana on studies for a potential bauxite mine and alumina refinery; and an agreement on the purchase of geothermal power for potential expansion in Iceland.

IAMGOLD has proposed the sale of **Omai Bauxite Mining Inc.** (formerly a property of **Cambior Inc.**, 70%, and the Government of Guyana, 30%) and **Omai Services Inc.** to **Bosai Minerals Group Company Ltd.** (www.iamgold.com).

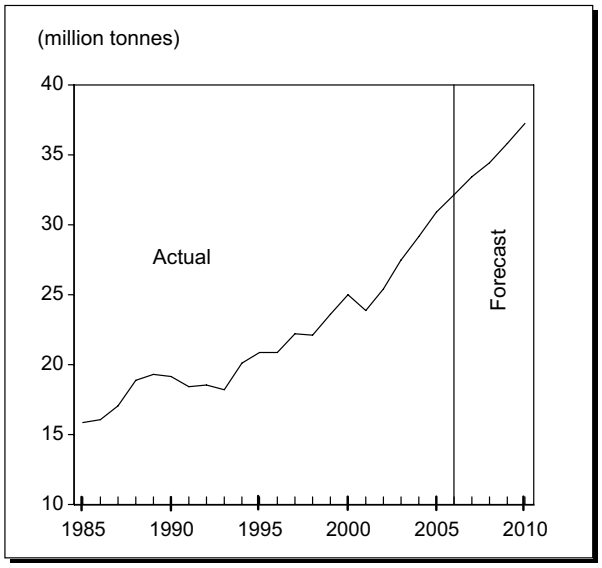
Toronto-based **Global Alumina Corporation** continued work to finance and construct a 2.8-Mt/y alumina refinery in the Boké region of Guinea (www.globalalumina.com).

Additional production of approximately 1.6 Mt (5%) from new and restarted production capacity located around the world (focused in China) is expected in 2007. For additional details, see the Aluminum chapter of the *Canadian Minerals Yearbook* (available on the Internet at www.nrcan.gc.ca/mms/cmy/com_e.html) and the company web sites listed in Table 1.

DEMAND OUTLOOK

The world's apparent use of aluminum in ingot form (apparent use of ingot plus imports of scrap) is estimated to be approximately 35.5 Mt in 2006, about 6% higher than the 33.5 Mt used in 2005. In 2007, world demand for aluminum, depending on the performance of the world economy, is expected to be somewhat lower, although still above its long-term trend of 3% annual growth (Figure 1). Canada's reported use of aluminum increased approximately 4% in 2005 to an estimated 1.1 Mt from a revised 1.06 Mt in 2004. Use is expected to have increased at approximately the same rate in 2006.

Figure 1
World Primary Aluminum Use, 1985-2010



Sources: Actual - International Consultative Group on Nonferrous Metal Statistics; Forecast - author.

CANADIAN AND WORLD PRODUCTION OUTLOOK

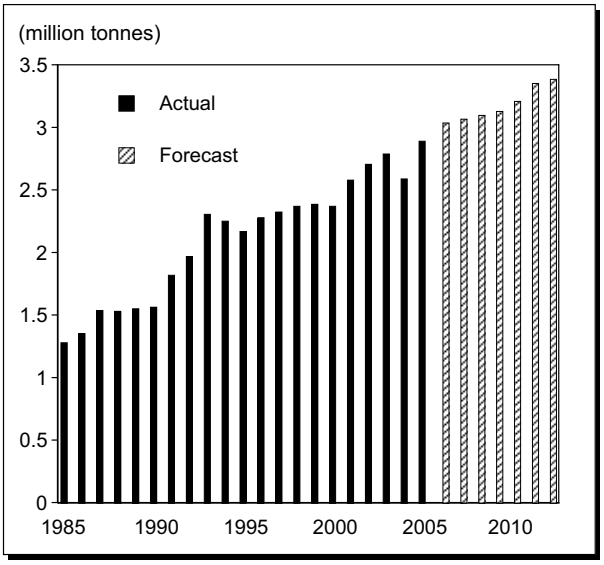
Canadian installed capacity for the production of primary aluminum is now 3.09 Mt/y. With production in 2006 of an estimated 3.04 Mt of primary aluminum, Canada is expected to maintain its rank as the third largest primary producer after China and Russia. Canada is expected to produce slightly higher amounts in 2007 and 2008 due to capacity creep in existing smelters. Canadian production growth has flattened and will remain relatively steady over the next few years, depending on production at Kitimat and closures of Söderberg capacity in the next decade (not included in Figure 2), which will lower Canadian installed capacity should modernizations not occur at these facilities. Smelter expansion projects in Quebec are dependent on the construction of new power projects and/or the negotiation of additional long-term power supply contracts at competitive rates. A number of new power projects have been recently announced by Quebec for the longer term; however, the Régie de l'énergie authorized Hydro-Québec to increase rates by 5.3% as of April 1, 2006, and this may affect longer-term plans.

World production of primary aluminum increased to 31.9 Mt in 2005, up 7% from 29.8 Mt in 2004. Production is expected to increase by over 5% in 2006 to about 33.5 Mt. For 2007, growth will be somewhat higher, possibly in the 8-10% range, due to projected re-openings of closed smelters in the United States and Europe. Accelerated growth in China will likely occur due to lower alumina costs allowing off-line and new plants to take full advantage of the current high metal price.

The International Aluminium Institute (IAI) indicates that members' world daily average primary aluminum production for the year to October was 65 800 t/d, up 500 t/d from a comparable period in 2005. It also reports that the rate for world consolidated production was 93 200 t/d, up from 87 300 t/d at the same time in 2005. Additional information can be obtained from the IAI's web site at www.world-aluminium.org.

The IAI reported that inventories of unwrought aluminum have fallen slightly over the last year and were at 1.5 Mt in November 2006, down from 1.8 Mt in December 2005. IAI total inventories have also declined from 3.2 Mt in December 2005 to 2.8 Mt in November 2006. On the other hand, the IAI reports primary aluminum inventories at London Metal Exchange (LME) warehouses have increased from 644 000 t in December 2005 to 692 000 t at the end of September 2006.

Figure 2
Canadian Primary Aluminum Production, 1985-2012



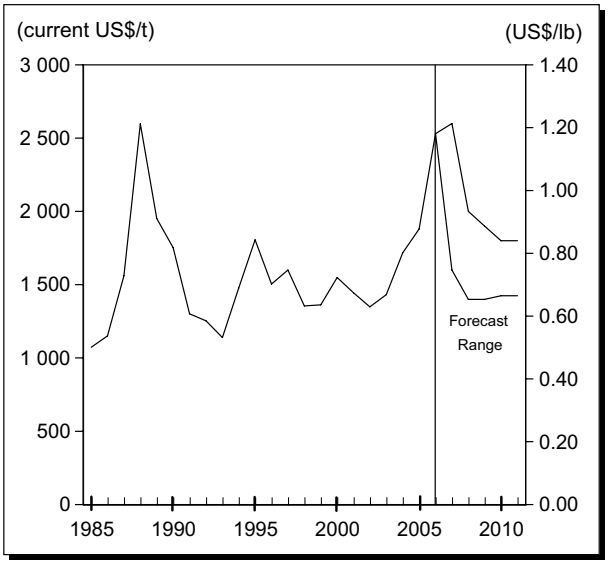
Source: Natural Resources Canada.

PRICE OUTLOOK

U.S. dollar-denominated prices were very strong and volatile in 2006. Cash prices for primary-grade aluminum on the LME started 2006 at approximately US$2270/t (103¢/lb) and sharply peaked at US$3275/t (149¢/lb) in mid-May 2006. Prices subsequently weakened to approximately US$2385/t (108¢/lb) in mid-September; however, prices have since increased to US$2800/t (131¢/lb) at the end of the year for an increase of about 27% for the year. The Canadian currency equivalents for the start of the year were $2625/t (121¢/lb) and in mid-December were $3200/t (145¢/lb), representing an increase of about 22% for the year.

Given the continued strength in alumina prices, and low inventories and current demand for the metal, this strength in prices and volatility is likely to continue in 2007. Depending on the world economy and currency fluctuations, high aluminum prices in the early part of the year would be expected to soften in mid-to-late 2007 with the price at the end of the year in the range of US$2000-$2300/t, for an average for the year of US$2400/t.

Figure 3
Average Aluminum Settlement Price, 1985-2011



Sources: Various journals and Internet sites.

Note: Most information in this article was current as of December 15, 2006.

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TABLE 1. COMPANY WEB SITES FOR FURTHER INFORMATION

Company	Abbreviation	Web Site Address
Alcan Inc.	Alcan	www.alcan.com
Alcoa Inc.	Alcoa	www.alcoa.com
Alcoa World Alumina and Chemicals	AWAC	www.alcoa.com
Alro Slatina	Alro Slatina	www.marcogroup.ch
Aluar Aluminio Argentinio SAIC	Aluar	www.aluar.com.ar
Alum SA Tulcea	Alum SA Tulcea	www.alumtulcea.com
Alumina do Norte do Brasil S.A.	Alunorte	www.cvrd.com.br
Alumina Limited	Alumina Limited	www.aluminalimited.com
Alumina Partners of Jamaica	Alpart	www.kaiseral.com
Aluminerie Alouette Inc.	Alouette	www.alouette.qc.ca
Aluminerie de Bécancour Inc.	A.B.I.	www.alcoa.com
Aluminij d.d. Mostar	Aluminij Mostar	www.aluminij.ba
Aluminium Association of Canada	the Association	www.aac.aluminium.qc.ca
Aluminium Bahrain B.S.C.	Alba	www.albasmelter.com
Aluminium Company of Egypt, The	Egyptalum	www.egyptalum.com.eg
Aluminium Delfzijl	Aluminium Delfzijl	www.aldel.nl
Aluminium Konin - Impexmetal S.A.	Konin	www.aluminium-konin.com.pl
Aluminum Association, Inc. (USA)	Aluminum Association	www.aluminum.org
Aluminum Corporation of China Ltd.	Chalco	www.chinalco.com.cn
Bharat Aluminium Company Limited	Balco	www.balcoindia.com
BHP Billiton	BHP	www.bhpbilliton.com
Brunei Economic Development Board	Brunei Economic Development Board	www.bedb.com.bn
Cambior Inc.	Cambior	www.cambior.com
Century Aluminum Company	Century Aluminum	www.centuryca.com
Coega Smelter	Coega	www.smelter.csir.co.za
Columbia Ventures Corporation	Columbia Ventures	www.nordural.is
Comalco Limited	Comalco	www.comalco.com, www.riotinto.com
Companhia Brasileira de Alumínio	CBA	www.aluminiocba.com.br, www.votorantim.com
Companhia Vale do Rio Doce S.A.	CVRD	www.cvrd.com.br
Corporaciòn Venezolana de Guayana	CVG	www.cvg.com
CVG Alcasa	Alcasa	www.aluminio.com.ve
CVG Bauxilum	Bauxilum	www.bauxilum.com
CVG Industria Venezolana de Aluminio C.A.	Venalum	www.venalum.com.ve
Dubai Aluminium Company Limited	Dubal	www.dubal.ae
East Hope Group	East Hope Group	www.easthope.com.cn
Elkem ASA	Elkem	www.elkem.com
Exploration Orbite V.S.P.A. inc.	Exploration Orbite	www.explorationorbite.com
Federation of Aluminium Consumers in Europe	FACE	www.facealuminium.com
Glencor International AG	Glencore	www.glencore.com
Global Alumina Corporation	Global Alumina	www.globalalumina.com
Grupo Votorantim	Votorantim	www.votorantim.com.br
Hindalco Industries Limited	Hindalco	www.adityabirla.com
Indian Aluminum Limited	Indal	www.indal.com
International Aluminium Institute, The	IAI	www.world-aluminium.org
Iranian Aluminum Company	Iranian Aluminum	www.iralco.net
Kombinat Aluminijuma Podgorica	Kombinat Aluminijuma Podgorica	www.kap.cg.yu
Magyar Aluminium Rt.	Magyar Aluminium	www.mal.hu
Marubeni Corporation	Marubeni	www.marubeni.com
Minmetals Nonferrous Metals Co., Ltd.	Minmetals	www.minmetals.com
National Aluminium Company Limited	Nalco	www.nalcoindia.com
Norsk Hydro ASA/Hydro Aluminium a.s.	Norsk Hydro or Hydro Aluminium	www.hydro.com
Nova Pb	NovaPb	www.novapb.com
Novelis Inc.	Novelis	www.novelis.com
Ormet Corporation	Ormet	www.ormet.com
PT Antam Tbk	Antam	www.antam.com/News/news.htm
Queensland Alumina Limited	QAL	www.qal.com.au
Russian Aluminium	Rusal	www.rusal.com
Saudi Arabian Mining Company	Ma'aden	www.maaden.com.sa
Sherwin Alumina Company	Sherwin Alumina	www.sherwinalumina.com
Siberian-Urals Aluminium Company	SUAL	www.sual.com
Sibirsky Aluminium	Sibirsky (Russian Aluminum)	www.sibirskyaluminum.com
Slovalco A.S.	Slovalco	www.slovalco.sk
Société générale de financement du Québec	SGF	www.sgfqc.com
Sterlite Industries (India) Ltd.	Sterlite	www.balcoindia.com/
SURAL	Sural	www.sural.com
Talum D.D. Kidricevo	Talum	www.talum.si
Titanium Resources Group	Titanium Resources	www.titaniumresources.com
Tomago Aluminium Company Pty Limited	Tomago	www.tomago.com.au
Vietnam National Mineral Corp.	Vimico	. .
Worsley Alumina Pty. Ltd.	Worsley Alumina	www.worsley.geo.net.au

. . URL not available.
Note: Feedback on missing or changed web addresses would be welcomed.

Copper

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Mined production value (2005): $2.5 billion
World rank (mine production): Eighth
Export value (concentrates and unwrought refined): $2.0 billion

Canada	2004	2005	2006 (e)
		(000 tonnes)	
Mine production (1)	563	595	592
Refined production	527	515	500
Refined use	294	279	297

(1) Metal in concentrates produced.
(e) Estimated.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

2003	2004	2005	2006	2007 (f)
		(US$/t)		
1 779	2 865	3 678	6 739	5 700

(f) Forecast.

METAL EXCHANGE STOCKS (1)

2004	2005	2006
	(000 tonnes)	
124	156	255

(1) LME, N.Y. COMEX, and Shanghai.

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.

CANADIAN OVERVIEW

Two of Canada's largest mining and exploration companies were acquired by foreign interests in 2006. Switzerland-based **Xstrata Plc** gained control of **Falconbridge Limited** in September and Brazilian-based **Companhia Vale do Rio Doce (CVRD)** gained control of **Inco Limited** shortly thereafter. Inco had attempted to purchase Falconbridge in October 2005 for cash and Inco shares, and the Canadian Competition Bureau cleared the proposed purchase in January 2006, but delays in receiving regulatory approval in Europe and the United States forced Inco to extend its offer until June 30, 2006, allowing time for other interested parties to put together competing bids. On May 8, **Teck Cominco Limited** announced a hostile cash and stock bid for Inco, followed by Xstrata's cash bid on May 17 for the 81.1% of Falconbridge it did not already own. Inco and Falconbridge responded by seeking out white knight **Phelps Dodge Corporation**, which announced a US$40 billion bid to acquire the assets of both Falconbridge and Inco on June 26. The Phelps Dodge bid failed to attract enough shareholder interest and Xstrata ultimately won control of Falconbridge. Meanwhile, CVRD announced a competing offer for control of Inco on August 11. Teck Cominco Limited raised its initial offer, but CVRD came back with an improved offer that shareholders accepted. The CVRD takeover transaction is expected to close in January 2007.

Full commercial production at **Aur Resources Inc.'s** Duck Pond copper-zinc mine in Newfoundland and Labrador is expected in early 2007. In its third-quarter 2006 report, Aur Resources stated that completion of the concentrator is behind schedule and, as a result, production for 2006 has been revised to half the originally planned output. Duck Pond is expected to produce about 18 600 t/y of copper contained in concentrates plus by-products of about 34 000 t/y of zinc, 16.7 t/y of silver and 0.1 t/y of gold over a seven-year period.

In May, **Agnico-Eagle Mines Limited** announced that it will proceed with the development of the LaRonde II project. LaRonde II is the extension of Zone 20 North beneath the current LaRonde mine. Annual production from LaRonde II is expected to average 10 t of gold, 21 t of silver, 4000 t of copper and 8600 t of zinc. The

development of LaRonde II is expected to extend the life of the LaRonde complex to at least 2020.

In August, Falconbridge Limited announced that it plans to invest US$130 million in the development of the Perseverance zinc mine. Start-up is expected in 2008 and the mine life is five years. Ore from the deposit will be processed at Falconbridge's former Lac Matagami mine facilities. The annual production of 228 000 t of zinc concentrate will be shipped and processed at the **CEZinc** refinery in Valleyfield, Quebec. The Perseverance orebody has measured and indicated resources of 5.1 Mt grading 15.8% zinc, 1.24% copper, 29 g/t silver and 0.38 g/t of gold.

Northgate Minerals Corporation is advancing the Kemess North project through the environmental permitting process and will make a decision on whether to develop the deposit only after permits are granted. The granting of permits will be based on the results of a joint environmental review of the project between the federal government, led by the Department of Fisheries and Oceans, and the Government of British Columbia, led by the British Columbia Environmental Assessment Office under the *Canadian Environmental Assessment Act* (CEAA). The review process began in March 2005. As of October 2006, the review was at the public hearings stage. Should the project proceed, the mine life of the Kemess operation, which currently mines ore from the Kemess South deposit, would be extended from 2012 to 2019. If Northgate does not proceed with the project, reserves at the Kemess South mine will be exhausted by 2009.

bcMetals Corporation is developing the Red Chris deposit, located near the village of Iskut in northwestern British Columbia. The project is the largest copper-gold open-pit development in North America. The development plan outlines an open-pit mining and milling operation operating at a capacity of 30 000 t/d of ore to produce 180 000 t/y of concentrate containing copper and gold. Under the conditions of its Environmental Assessment Certificate, bcMetals cannot commence construction until the B.C. government completes a project to extend the existing power-line infrastructure into the area of the deposit. The company expects to be able to commence construction in the spring of 2007 for completion in the fall of 2009.

Based on an updated feasibility study completed in mid-2006 that confirmed very positive economics, **Sherwood Copper Corporation** is proceeding with the development of the Minto project, located about 250 km northwest of Whitehorse, Yukon, on the west side of the Yukon River. Start-up is scheduled for the second quarter of 2007. Total measured and indicated resources as of February 2006 were 8.5 Mt of ore grading 1.81% copper, 0.57 g/t gold and 7.6 g/t silver. The mine plan calls for average annual production of 18 600 t of copper, 0.5 t of gold and 7.8 t of silver in the first six years of operation. The concentrates produced will be shipped out of the Port of Skagway, Alaska, to Asian smelters.

Yukon Zinc Corporation is advancing the development of the Wolverine deposit, located in the Finlayson District in southeast Yukon. First production is scheduled for the fourth quarter of 2007. Measured and indicated resources as of January 10, 2006, total 4.5 Mt grading 12.04% zinc, 351.48 g/t silver, 1.15% copper 1.68 g/t gold and 1.57% lead. The company plans to produce separate zinc concentrate, and lead and copper concentrate products. Annual production for the first three years of production is estimated at 33 342 t of zinc, 3577 t of copper and 3399 t of lead.

WORLD OVERVIEW

Cochilco issued a production report that forecasts Chile's copper output will increase from 2005 levels by 26% to 6.7 Mt by 2012 based on new production from **Codelco's** Gaby and Alejandro mines, **BHP Billition's** Spence mine, and **Antofagasta**'s Esperanze mine, as well as from the expansion of Aur Resource's Andacollo mine.

China Minmetals and Codelco have set up a joint venture called **CuPIC**, which will see Minmetals providing a total investment of US$2.0 billion in exchange for receiving from Codelco up to 800 000 t of refined copper over a 15-year period in monthly shipments of approximately 4650 t beginning in June. Minmetals will also have an option to buy 25-40% of the Gaby mine, which Codelco is developing for start-up in 2009.

The National Development and Reform Commission (NDRC) introduced a new policy entitled *Admittance Conditions for Copper Smelting Industry* aimed at controlling the growth of copper smelting and refining capacity in China. Conditions for new projects include a minimum capacity of 100 000 t/y, the owner must own 25% of the feed requirement or have secure supply deals for 40% of the feed over five years, and the company must provide a minimum 35% of the required financing. Low-energy/high-efficiency technologies must be used, and dust collection systems and sulphuric acid plants are mandatory.

In November, **China Nonferrous Metal Mining (CNMC)** signed a Memorandum of Understanding with the Zambian government for the construction of a 150 000-t/y copper smelter in Zambia at a cost of US$200 million to process concentrates from the Chambishi mine. Commercial operations for the first phase of 100 000 t of blister output are scheduled to start at the end of 2008. The blister will be delivered to **Yunnan Copper Co.**, which has a 40% interest in the project. CNMC owns 85% of the Chambishi mine and plans to raise production from 22 500 t/y of copper to 110 000 t/y by 2009.

Norddeutsche Affinerie is partnering with **Shangdong Fengxiang Corporation** to develop a copper smelting and refinery complex in the Shandong Province. Phase 1 will be completed by the end of 2006 and have a capacity of 200 000 t/y of copper cathode. Phase 2 of the project will increase capacity to 400 000 t/y.

The Indian government announced that, effective April 1, it would cut import duties on aluminum, copper and zinc metal to 7.5% from 10%. The import duty for ores and concentrates was reduced to 2% from 5%.

Rio Tinto PLC has agreed with **Ivanhoe Mines Ltd.** to partner in the development of the Oyo Tolgoi gold-copper project in Mongolia's South Gobi region. Rio Tinto will initially invest US$345 million for a 9.95% stake in Ivanhoe Mines and has an option to increase its interest to up to 40% over five years. The estimated cost to develop the deposit is US$5.6 billion. The mine plan calls for annual production of 725 000 t of copper and 28 t of gold.

In November, **Freeport McMoRan** acquired the assets of Phelps Dodge for US$26 billion. The new company will retain the name **Freeport McMoran Copper and Gold** and will be headquartered in Phoenix, Arizona. The combined production of the new company makes it the second largest copper-producing company in the world behind Codelco.

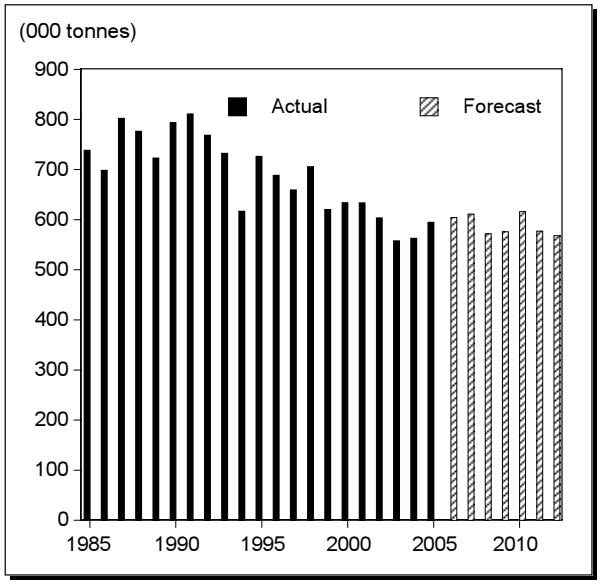
Russian Copper Company will increase its cathode production capacity by 60% to 290 000 t/y by the end of 2007 by increasing capacity at its Kyshtym and Novgorod plants in Russia.

CANADIAN PRODUCTION OUTLOOK

Mined copper output for 2006 is forecast to rise approximately 1.5% to 604 000 t from 2005 output of 595 000 t on the strength of full output from mines that re-opened in 2005 (Mount Polley and Gibraltar). Mined output in 2007 is forecast to rise a further 2.6% to 611 000 t, mainly on the expectation of increased output of copper concentrate from Voisey's Bay, the start-up of the Duck Pond mine, and the anticipated start-up of the Minto mine. A forecast of mine output to 2012 is plotted in Figure 1 and indicates that output may dip down below current levels by the end of 2008 when Kemess South reserves are expected to be depleted. Beyond 2008, it is possible that output could rise back above the 600 000-t/y level on the expectation that the positive price profile should support the start-up of Red Chris and Wolverine.

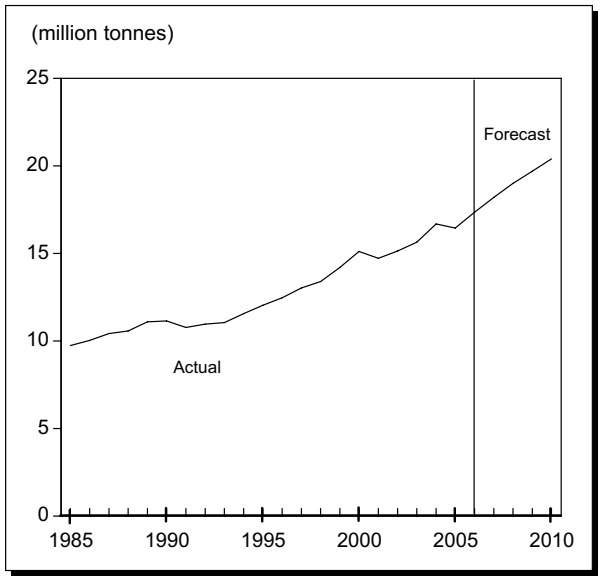
Based on January to October data reported to Natural Resources Canada via monthly surveys, forecast refined copper production for 2006 is 500 000 t, down slightly from 2005 output of 515 000 t. Canadian cathode production from 2006 onwards is coming from two refineries (the **CCR** refinery in Montréal and the Kidd Creek refinery in

Figure 1
Canadian Mine Production of Copper, 1985-2012



Source: Natural Resources Canada.

Figure 2
World Refined Copper Usage, 1985-2010



Source: Natural Resources Canada.

Timmins, Ontario, both owned by Xstrata Plc) following Inco Limited's decision in 2005 to close its Copper Cliff refinery by the end of 2006 and to ship copper anode from its Sudbury nickel operation to CCR for further processing. Going forward, annual output is likely to range between 500 000 and 520 000 t/y based on the current operating capacities of the two plants.

MARKET REVIEW AND OUTLOOK

Smelter Treatment and Refining Charges

Spot market and long-term concentrate treatment and refining charges (TC/RCs[1]) fell sharply from historical highs in 2005 in reaction to a deficit in the supply/demand balance for concentrates that emerged in the second half of 2006. Average spot TC/RCs c.i.f. Shanghai delivery basis were US$68.5/t and 6.9¢/lb for 2006, compared with US$150/t and 15¢/lb in 2005. Annual contract TC/RCs for 2006 deliveries under long-term contracts averaged US$95/t and 9.5¢/lb, up slightly from the 2005 average of US$85/t and 8.5¢/lb, but 2006 terms seem to be settling at the US$60/t and 6¢/lb level. Further evidence of the market tipping in favour of miners is a much-quoted settlement between BHP Billiton and the Chinese for Escondida concentrates, which was agreed at terms of US$60/t and 6¢/lb, and the elimination of price participation.[2] The concentrates market is expected to move into a small surplus balance for 2007 and 2008 (less than 50 000 t); therefore, TC/RCs will likely not recover strongly in the near term.

SUPPLY/DEMAND OUTLOOK

The International Copper Study Group's (ICSG) October forecast of production showed:

	2005	2006	2007	2006/05	2007/06
		(000 tonnes)			(% change)
Mine production	14 877	15 166	16 204	1.9	6.8
Refined production	16 512	17 398	18 059	5.4	3.8
Copper usage	16 614	17 160	17 884	3.3	4.2
Refined copper balance	-102	-122	176	n.a.	n.a.

n.a. Not applicable.

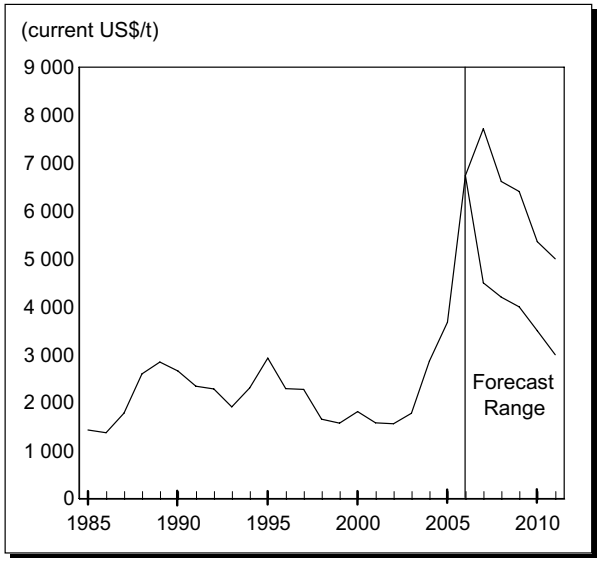
Mine production growth of 1.9% in 2006 was sluggish for the second year in a row as disruptions from accidents, strikes and production shortfalls affected some of the world's largest mines, including Chuquicamata and Escondida in Chile and Grasberg and Batu Hijau in Indonesia. A forecast issued by the ICSG in early October 2006 projected a 6.8% growth in mine supply in 2007, and this should help rebalance the concentrate market. Refined production growth in 2006 is estimated at 5.4%, which is higher than the 4.3% growth in 2005, but demand growth in 2006 increased substantially from 2005 to 3-4%, depending on how analysts interpreted the change in China's State Reserve Bureau (SRB) stocks.[3] The view for 2007 is mixed on whether refined production growth will outpace supply, but indications are that the supply/demand balance will swing from a deficit to a small surplus (less than 150 000 t).

PRICE OUTLOOK

Supplies of copper remained much tighter in the first half of 2006 than anyone predicted and the positive fundamentals plus strong interest from commodity fund investors sent the copper price to new historical highs, reaching a peak of US$8788/t ($3.99/lb) on May 12. The 2006 monthly average settlement price on the LME for Grade A copper of US$6739/t ($2.92/lb) was 83% above the 2005 average price of US$3678 ($1.69/lb).

With stocks still low and the supply/demand ranging from either a small deficit to a small surplus, the range of price forecasts is very wide for 2007 and 2008. A Reuters poll released in January 2007 indicates that 2007 forecasts range from a low of US$2.04/lb to a high of US$3.50/lb with an average of US$2.81/lb. With fundamentals remaining strong until at least 2009, prices will likely remain above US$2.50/lb over 2007/08 and trend downward thereafter. Prices should start to decline below the US$2.00/lb level beyond 2010 when supply from new projects will be sufficient to allow a rebuilding of global inventories. This scenario is plotted in Figure 3.

Figure 3
Copper Prices, 1985-2011
Annual Average LME Grade A Copper Settlement



Source: Natural Resources Canada.

More information about Canadian copper 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* at www.nrcan.gc.ca/mms/pubs/explor_e.htm.

REFERENCES

1 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.

2 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-upon threshold price.

3 Note that the ICSG does not take into account changes in SRB stocks.

Notes: (1) Forecasts and projections are subject to change by factors such as changing copper prices, exploration successes or failures, the ability to arrange financing, technological developments, and environmental permitting. (2) Information in this article was current as of January 15, 2007.

NOTE TO READER

Gold

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2005 mine production:	$2.0 billion
World rank:	Eighth (mine production)
Exports:	$4.21 billion

Canada	2005	2006 (e)	2007 (f)
		(tonnes)	
Production	119.7	104	106

(e) Estimated; (f) Forecast.

ANNUAL AVERAGE PRICES, LONDON BULLION MARKET ASSOCIATION

2003	2004	2005	2006	2007 (f)
		(London PM, US$/oz)		
363.32	409.17	444.45	603.77	650

(f) Forecast.

Gold is valued for its rarity, lustrous beauty, ductility, high resistance to corrosion, and conductivity. It has been treasured for its decorative and monetary value for at least 8000 years. Gold has a high density, its weight being equal to 19.3 times an equivalent volume of water. The main industrial uses for gold are in jewellery (83%) and electronics (8%). Gold bullion coins, such as the Maple Leaf coin, are also important products.

CANADIAN OVERVIEW

As companies positioned themselves in 2006 to increase their reserve base and overall market share, a number of Canadian companies were involved in large-scale mergers and acquisitions that saw the emergence of several new, Canadian-based, large-scale global gold producers.

Toronto-based **Barrick Gold Corporation** acquired all of the outstanding shares of Vancouver-based **Placer Dome Inc.** in 2006. Included in the deal to acquire Placer Dome, Toronto-based **Goldcorp Inc**. agreed to acquire Placer's Campbell, Porcupine and Musselwhite gold mines in Ontario and the La Coipa silver mine in Chile, as well as Placer Dome's Canadian exploration and reclamation properties.

In addition to picking up some of Placer Dome's assets, Goldcorp also pursued separate deals that led to the acquisition of **Virginia Gold Mines Inc**. and its Éléonore gold project in northern Quebec, as well as Nevada-based **Glamis Gold Ltd.**, along with its low-cost mines and development projects in Nevada, Mexico and Central America.

In February, **Wesdome Gold Mines Inc.** merged with **River Gold Mine Ltd.** to create **Wesdome Gold Mines Ltd.** In August, Wesdome began milling operations at its Kiena mine complex west of Val-d'Or, Quebec, and began to process stockpiled ore.

In September, Toronto-based **IAMGOLD Corporation** and Montréal-based **Cambior Inc.** agreed to a US$3 billion deal to create a newly merged company under the name "IAMGOLD Corporation," creating the 10th largest publicly traded gold producer in the world with operations in Canada, South America and West Africa.

In December, Toronto-based **Kinross Gold Corporation** and Vancouver-based **Bema Gold Corporation** signed an arrangement agreement for Kinross's acquisition of Bema Gold. The acquisition of Bema will expand Kinross's operations in Canada, the United States and South America to include operations in Russia and South Africa.

Richmont Mines Inc. brought the East Amphi mine project in northwestern Quebec into production in February and continued work on an advanced exploration project at the Island Gold property in northeastern Ontario. Richmont started milling operations at Island Gold in September and the first gold pour was announced in November. A decision on whether to proceed to commercial production is expected in 2007 once the current technical and metallurgical program is completed.

San Gold Corporation celebrated the grand opening of its Rice Lake gold mine near Bissett, Manitoba, in August.

Cusac Gold Mines Ltd. restarted gold production at the Table Mountain gold mine in northern British Columbia in December. The Table Mountain mine produced some 11 t of gold before it closed in 1997 due to weak gold prices.

Agnico-Eagle Mines Limited is completing construction of its Lapa gold mine project in northwestern Quebec. The first phase of construction at the mine, located 11 km east of Agnico-Eagle's LaRonde mine, began in July 2004. The Lapa mine is expected to produce an average of 4 t/y of gold when production starts in the fourth quarter of 2008.

Rocmec Mining Inc. poured its first doré bar in December from development ore at its Rocmec 1 (Russian Kid) project in northwestern Quebec. Rocmec completed three drifts on three separate levels of the mine and plans to mill 10 000 t of development ore before the end of the second quarter of 2007.

WORLD OVERVIEW

Gold Fields Limited acquired Barrick Gold's stake in the South Deep gold mine and Barrick's rights under the joint venture with Western Areas. Barrick Gold held a 50% stake in the South Deep mine as a result of its merger with Placer Dome earlier in the year. The South Deep mine has an indicated total resource of over 1835 t of gold.

Highland Gold Mining Ltd. missed its full-year gold production target due to a fire at its Darasun mine in Russia in September. Highland Gold said its full-year production would reach around 5.6 t for 2006, 124 kg under its original expectation. Barrick Gold holds a 34% interest in Highland Gold.

The **Dubai Gold and Commodities Exchange (DGCX)** will start trading options for gold and silver in the first quarter of 2007.

Toronto-based **Yamana Gold Inc.** expected to boost its gold output from its Brazilian mines fourfold in 2006 to 12.4 t, up from 3.1 t in 2005. The increase is due mainly to Yamana's purchase in April of **Desert Sun Mining Corp**., which operated the Jacobina gold mine in Brazil's Bahia Gold Belt. In addition, Yamana started two new mines in 2006: the Sao Francisco mine in Mato Grosso State and the Chapada mine in Goiás State, Brazil.

Centerra Gold Inc. lowered 2006 production forecasts for its Kumtor mine in Kyrgyzstan and is assessing forecasts for 2007 after a pit wall ground movement at the mine in July. Output at the Kumtor mine was expected to be 9.3 t in 2006, down from previous projections of about 13 t of gold.

Barrick sold its 51% interest in the Cerro Casale gold project in Chile that it had acquired as a result of the takeover of Placer Dome. Barrick also sold its stake in the property to Bema Gold (now owned by Kinross) and **Arizona Star Resource**, which own the rest of the property.

Barrick's Pascua Lama gold project received approval by Chilean environmental authorities in February 2006 and from the Argentinian authorities in December 2006. Construction at the Pascua Lama open-pit gold project, which straddles the border between Chile and Argentina, is expected to begin soon with production scheduled for 2010. Pascua Lama has reserves of 569 t of gold.

Toronto-based Agnico-Eagle started construction of the Kittila gold mine in northern Finland. The Kittlia project is expected to produce an average of 5 t/y gold. Production is expected to begin by mid-2008.

Sumitomo Metal Mining Co., Ltd., in a joint venture with **Teck Cominco Limited**, started producing gold at the Pogo mine in Alaska in February. The mine is expected to produce about 12 t/y of gold once it reaches full production. Vancouver-based Teck Cominco holds a 40% interest in the Pogo mine and acts as the project operator.

Gold Fields Limited acquired Toronto-based **Bolivar Gold Corp**. in February. Gold Fields will increase its output by 47 t by 2009 with the acquisition of Bolivar, which operated the Choco 10 open-pit gold mine in Venezuela. Gold Fields also increased its stake in Australia's **Sino Gold Mining Limited** to 14% from 8%. In June 2005, Sino Gold received approval from the Chinese government to build a mine at the Jinfeng deposit in southwestern Guizhou Province, one of China's largest undeveloped gold mines.

MARKET OUTLOOK

A wave of investment demand helped push the annual gold price to a level in U.S. dollar terms not seen since 1987. Fabricated demand for gold jewellery increased by about 3.8% in 2005. The third quarter of 2006 saw the value of gold jewellery demand reach another quarterly record at US$11.8 billion although, in volume terms, demand declined by 4% year-on-year in response to high price volatility early in the quarter. Industrial demand was the fastest-growing source of demand in 2006. The global hedge book declined by a further 62 t in the third quarter. While only accounting for 8% of the total fabricated demand for gold, the electronics industry is the second largest market for gold after jewellery. Gold's high electrical conductivity, its malleability, and its resistance to corrosion have made it an important component in the

manufacture of a wide range of electronic products and equipment, including computers, telephones, cellular telephones, and home appliances. Some 357 t will be used in 2006, with Japan expected to lead the way in the market, accounting for 135 t or 61% of the demand.

On the investment side, the rise in oil prices and the risk of inflation has provided added incentives for investors to put their money into gold. The introduction of gold exchange traded funds (ETFs) in recent years has made it easier for investors to invest in gold. By the end of 2006, the relatively new form of gold investment was worth US$12.8 billion worldwide.

CANADIAN PRODUCTION OUTLOOK

In 2006, Canadian gold production continued to decline, totaling an estimated 104 t, a decrease of 13% compared to the 2005 total of 119.7 t. The reduction in production resulted primarily from a number of mine closures in Ontario (the Holloway and Golden Giant mines) and Saskatchewan (the Konuto Lake mine), combined with lower outputs as a result of lower-grade ore. Several small-scale operations and mine re-openings are expected to help offset some of these closure in 2007.

About 90% of Canada's gold production comes from hard-rock underground and open-pit gold mines. The remainder is from base-metal mines and from placer mining operations (Figure 1).

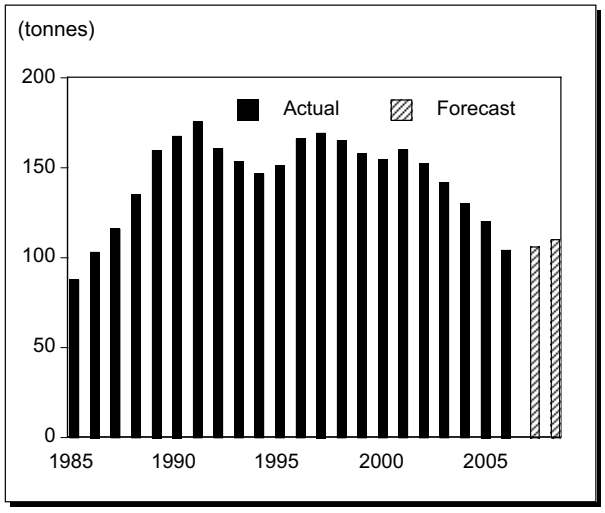
PRICE OUTLOOK

Gold prices continued to make an impressive recovery in U.S. dollar terms throughout 2006, rising above the US$700/oz barrier in May, before falling back somewhat to trade between $600 and $650/oz. On average, the price of gold was up 26% over the 2005 average to reach an annual average of US$603/oz.

While the price rise in U.S. dollar terms is welcome news for producers, the net effect of the stronger Canadian dollar against the U.S. dollar, coupled with higher energy costs and rises in other operating costs at some Canadian mines, muted the good news somewhat. The annual average gold price in Canadian dollar terms was $684/oz in 2006, up 21% from $538/oz in 2005. The rise in prices saw a number of projects, particularly previously closed operations, coming back on stream in Canada in 2006.

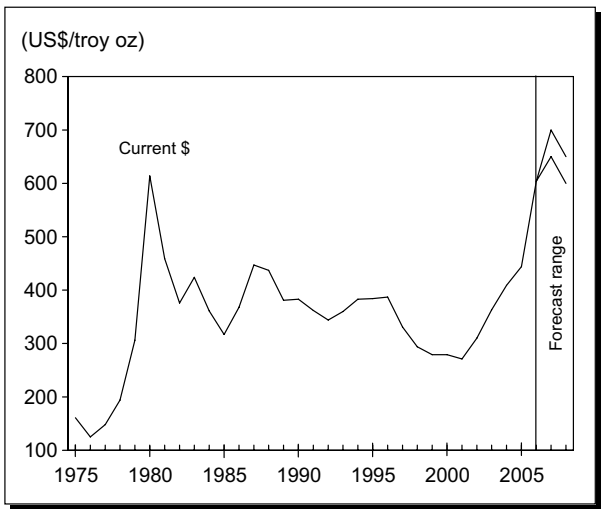
Low interest rates and the record current account deficit in the United States continued to put downward pressure on the U.S. dollar in 2006. This in turn put upward pressure on the gold prices. The agreement by central banks to limit sales, de-hedging by producers, the risk of inflation, higher energy prices, and lower mine output all combined with strong physical demand to support higher gold prices in 2006. The liberalization of gold markets in China and India is expected to increase investor demand in both of these important markets. Merger and acquisition activity will also likely continue in 2007 as large producers continue efforts to increase their market share.

Figure 1
Mine Production of Gold in Canada, 1985-2008



Source: Natural Resources Canada.

Figure 2
London Bullion Market Association Annual Average Gold Prices, 1975-2008



Source: Natural Resources Canada.

Strong support for prices in the US$620/oz range at the end of 2006, coupled with expectations by many forecasters for a further weakening of the U.S. dollar, is expected to keep prices strong in 2007. While such a scenario will result in a price rise in many key markets, the impact on demand will depend largely on whether such rises take place over a short or more gradual period. Prices are expected to trade in the US$625-$650/oz range over most of the first three quarters of 2007 and possibly rise to the US$700/oz range by the end of 2007 (Figure 2).

Note: Information in this article was current as of December 31, 2006.

Note to Readers

TABLE 1. COMPANY WEB SITES FOR FURTHER INFORMATION

Company	Web Site Address
Agnico-Eagle Mines Limited	www.agnico-eagle.com
Alexis Minerals Corporation	www.alexisminerals.com
Aurizon Mines Ltd.	www.aurizon.com
Aur Resources Inc.	www.aurresources.com
Barrick Gold Corporation	www.barrick.com
Bema Gold Corporation	www.bema.com
Breakwater Resources Ltd.	www.breakwater.ca
Callinan Mines Limited	www.callinan.com
Campbell Resources Inc.	www.ressourcescampbell.com
Centerra Gold Inc.	www.centerragold.com
Century Mining Corporation	www.centurymining.com
Claude Resources Inc.	www.clauderesources.com
Cusac Gold Mines Ltd.	www.cusac.com
Goldcorp Inc.	www.goldcorp.com
HudBay Minerals Inc.	www.hudbayminerals.com
IAMGOLD Corporation	www.iamgold.com
Imperial Metals Corporation	www.imperialmetals.com
Inco Limited	www.inco.com
Inmet Mining Corporation	www.inmetmining.com
Johnson Matthey Plc	www.matthey.com
Kinross Gold Corpoaration	www.kinross.com
Kirland Lake Gold Inc.	www.klgold.com
Miramar Mining Corporation	www.miramarmining.com
Newmont Mining Corporation	www.newmont.com
Northern Mining Explorations Ltd.	www.xnord.com
Northgate Minerals Corporation	www.northgateminerals.ca
Richmont Mines Inc.	www.richmont-mines.com
Rocmec Mining Inc.	www.rocmecmines.com
Royal Canadian Mint	www.mint.ca
San Gold Corporation	www.sangoldcorp.com
Teck Cominco Limited	www.teckcominco.com
Wesdome Gold Mines Ltd.	www.wesdome.com

TABLE 2. GOLD MARKETS

Company	Web Site Address
Dubai Gold and Commodities Exchange	www.dgcx.ae
London Bullion Market Association	www.lbma.org.uk
Multi Commodity Exchange of India	www.mcxindia.com
New York Mercantile Exchange (NYMEX)	www.nymex.com
Shanghai Gold Exchange	www.sge.sh
The London Gold Market Fixing Ltd.	www.goldfixing.com
Tokyo Commodities Exchange (TOCOM)	www.tocom.or.jp

Nickel

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(Abbreviations used in this article include: (e) = Estimated; (f) = Forecast; (p) =Preliminary; Ni = nickel; Cu = copper; Co=cobalt; FeNi = ferronickel; LME = London Metal Exchange; PGM = platinum group metals.)

2005 production: $3.3 billion
World rank: Second (mine)
2005 exports: $4.4 billion

Canada	2005	2006 (e)	2007 (f)
		(000 tonnes)	
Mine production	198	225	240
Refined production (1)	140	155	170
Use/consumption (2)	9	10	9

(e) Estimated; (f) Forecast.
(1) Refined includes nickel in salts, oxides, etc. (2) Use does not include nickel in scrap (series changed).

ANNUAL AVERAGE CASH SETTLEMENT PRICES, LONDON METAL EXCHANGE

	2003	2004	2005	2006	2007 (f)
US$/t	9 640	13 852	14 733	24 287	27 500
US¢/lb	4.37	6.28	6.68	11.02	12.50

(f) Forecast.

Nickel's resistance to corrosion, high strength over a wide temperature range, pleasing appearance, and suitability as an alloying agent make it useful in a wide variety of applications. Markets for primary nickel include stainless steel (over 60%), nickel-based alloys, electroplating, alloy steels, foundry products, batteries, and copper-based alloys. Nickel is intensively recycled; between 45% and 48% of nickel used to make stainless steels is in the form of stainless steel scrap.

CANADIAN OVERVIEW

The majority of the Canadian Ni industry was purchased by foreign interests in 2006. Briefly, **Inco** offered to purchase **Falconbridge** in October 2005 for cash and Inco shares, and the Canadian Competition Bureau cleared the proposed purchase in January 2006. The companies foresaw synergies in the Sudbury Basin. Concern about competition in the high-purity Ni market delayed regulatory approvals in Europe and the United States until July. In May, **Teck Cominco** offered cash and shares for Inco on the condition that Inco's acquisition of Falconbridge did not proceed. In June, Inco and **Phelps Dodge** proposed a US$56 billion transaction to merge Phelps Dodge, Inco and Falconbridge. Inco's offer of cash and shares was not as attractive to shareholders as **Xstrata**'s enhanced offer, and Inco's offer lapsed in July. Xstrata bought 68% of Falconbridge in mid-August, took management control on August 22, and completed the acquisition by November. **CVRD** made an offer for Inco on August 11, received Canadian regulatory clearance on October 19, and purchased control in October, buying 76% or 174 million shares at C$86/share. The purchase will be completed at a special Inco meeting in January 2007. (The Canadian dollar averaged US$0.8818 in 2006.)

Inco's Voisey's Bay operation was scheduled to produce 54 400 t of Ni in concentrate. It produced 29 000 t by June, but the mine was subsequently shut for two months by a strike. Inco chose Long Harbour for the commercial Ni plant site because Argentia posed potential environmental problems. Inco filed an application for a plant to

produce 50 000 t/y of refined Ni; two alternative technologies will be examined. In October, CVRD said it would consider accelerating the Voisey's Bay project by 12-18 months.

In Sudbury, Inco started up a fluid bed roaster to reduce SO_2 emissions. Inco Sudbury targeted 117 000 t of finished Ni in 2007, but some production was lost in the July-September quarter. Inco's Thompson operation in Manitoba was scheduled to produce 54 400 t, 58% from its mines and 17% from Voisey's Bay feed. A problem temporarily shut the Thompson smelter and converter in the July-September quarter. Inco's finished Ni production in Canada in the first six months of 2006 was: Sudbury, 57 100 t; and Thompson, 27 100 t. Both Sudbury and Manitoba recovered Ni from Voisey's Bay concentrate in the first half of 2006.

Falconbridge signed a new contract with workers at Raglan and committed US$50 million to infrastructure upgrades. In Sudbury, negotiations between Mine Mill Local 598 and Xstrata began in December for a new contract for Sudbury workers; the existing contract ends on February 1, 2007. Xstrata announced an expansion of Ni-Co recycling capacity at the Falconbridge smelter by mid-2007. Falconbridge's Ni mine production in the first six months of 2006 was: Sudbury, 8800 t; Montcalm, 5400 t; Raglan, 11 400 t; and the smelter produced 29 400 t of Ni in matte. Xstrata does not report quarterly.

In the first nine months of 2006, **FNX** sold 2800 t of payable Ni and 3300 t of payable Cu from the McCreedy West mine in Sudbury to Inco. FNX started production from the Levack shaft, intending to sell 3850 t of Ni in 2007 from Levack and to nearly double that in 2008. FNX's Podolsky shaft was sunk to depth and production was expected in 2008. FNX planned to sell about 11 000 t/y of Ni to Inco by 2010.

Sherritt International revised its expansion plans at the Fort Saskatchewan refinery: incremental expansions will be 4000 t/y in 2007, 9000 t/y in 2009, and over 3000 t/y in 2011. Sherritt and the Cuban government have equal shares in the refinery, which produced 21 794 t of refined Ni and 2396 t of refined Co in the first nine months of 2006.

North American Palladium's new underground mine entered commercial production in April. The company produced about 842 t of by-product Ni in concentrate in the first three quarters of 2006 from both mines. A review of the life-of-pit plan was under way at year-end.

First Nickel Inc. sent 1170 t of Ni in ore from its Lockerby mine near Sudbury to Xstrata's Strathcona mill in the first nine months of 2006.

Liberty Mines started its Redstone mine in mid-May. A 1500-t/d mill will be moved to the mine site and was to be operational by mid-2007 to take 360 t/d from Redstone and 1000 t/d of feed from the company's nearby McWatters deposit; until then, Redstone's ore was custom milled. Liberty shipped concentrate to **Jilin Jien Nickel** in China, who provided financing to Liberty. Liberty also had other Ni and Co properties in the area.

Canadian exports of Ni mattes, oxide sinters, unwrought forms, powders, and scrap were expected to exceed $4.5 billion in 2006. Exports of Ni chemicals, semi-fabricated items, supported catalysts, stainless scrap, chemicals, and accumulators were projected to exceed $400 million. Imports of all Ni feeds, chemicals, and semi-fabricated items were projected to be about $500 million, not including intermediate sulphides imported from Cuba.

WORLD OVERVIEW

Oceania

Capital costs at **BHP Billiton's** 60 000-t/y Ravensthorpe mine/leach plant and Yabulu refinery expansion in Australia rose to US$2.2 billion. The company sold 25 900 t of Ni in matte and 1200 t of Ni in conc. and produced 44 000 t of Ni metal in the first nine months of 2006 from its Ni West operations (former WMC Resources). **Allegiance** concluded a concentrate sales contract with **Jinchuan Group** and will start up its 7000-t/y Ni in conc. operation in 2007. Minara produced 31 500 t of Ni and nearly 2100 t of Co.

In Indonesia**, Antam's** FeNi III, 15 000-t/y Ni in FeNi smelter started up in July, but a leak shut the plant. A fire in May at **PT Inco** reduced production by about 4000 t; low rainfall forced a 130-t/d Ni cutback in late December. PT Inco's expansion to 90 000 t/y of Ni in matte was delayed until 2010. **Eramet** purchased **Weda Bay** in March for $270 million and is planning a 60 000-t/y Ni hydromet plant.

In New Caledonia, it was reported that the costs of Inco's 60 000-t/y Goro project would rise to US$3 billion; a French court ordered a halt to work at a future residue storage area. Xstrata and **SMSP** said US$100 million would be spent in a strategic renewal phase at the 60 000-t/y Ni in FeNi Koniambo project, targeted to start by 2010.

SMSP and **Posco** announced a 30 000-t/y Ni in FeNi joint-venture smelter in South Korea to start up in 2008. Labour actions reduced **SLN**'s output by about 4000 t of Ni in FeNi and matte.

China Metallurgical Construction will finance and build the US$800 million Ramu project in Papua New Guinea to produce 33 000 t/y of Ni and about 3300 t/y of Co in

sulphide intermediates; Jilin Jien will participate in the project.

Chinese pig iron producers imported about 2.5 Mt of laterite ore from the Philippines. Philippine laterite ore shipments were 2.7 Mt (dry) in the first nine months of 2006, up 157% from the same period in 2005. **Sumitomo** will spend US$285 million to double capacity of its Coral Bay operation to 20 000 t/y of Ni in sulphides by 2009.

Africa

In Botswana, **LionOre** will build an Activox refinery to produce 22 000 t/y of Ni metal by 2009; refinery and other costs will be US$620 million.

Dynatec's 60 000-t/y Ni, 5600-t/y Co Ambatovy project in Madagascar got environmental approval. Partners were Sumitomo, **Korea Resources** and **SNC-Lavalin**. Proven plus probable reserves were 125 Mt @ 1.04% Ni and 0.099% Co. Estimated capital costs were US$2500 million.

In South Africa, LionOre and **African Rainbow Minerals** approved an interim project at Nkomati to bridge the production gap until the Main Expansion project starts producing 20 000 t/y of Ni with an Activox refinery.

Eurasia

In China, Jinchuan production was estimated at 100 000 t of refined Ni (up 9000 t), of which 60 000 t of Ni in conc. came from its mines. Jinchuan signed offtake contracts for Ni in conc. with Allegiance (7000 t/y), **Albidon** (9000 t/y), and **Canadian Royalties** (10 000 t/y).

Jilin Jien began taking Ni conc. from Liberty Mines' Redstone mine and agreed to take an equity participation in Ramu. Jilin's output was Ni sulphate, although it built a 2000-t/y Ni in carbonyl plant.

Pig iron producers in China imported an estimated 30 000 t of Ni in laterite ore, representing an important new source of supply.

International Mineral Resources bought **NewCo Feronikeli L.L.C.** in Kosovo for €30.5 million in April, promising an investment of €20 million and employment for 1000; Feronikeli's three mines and a 12 000-t/y Ni in FeNi plant have been shut since the 1990s.

In Russia, **Norilsk Nickel** will produce 245 000 t of Ni in 2006, up 2000 t from 2005; will increase milling capacity in Siberia by 50% to 18 Mt/y; and will increase metal output to 260 000 t/y by 2011. Norilsk also agreed to buy Finland's **OMG's** Harjavalta refinery and Australian mine assets for US$400 million.

Ufaleynikel's plant produced 10 400 t of Ni and 1865 t of Co in the first nine months of 2006, and **Yuzhuralnikel** produced 14 400 t of Ni in FeNi in 2006.

European Nickel will build a 21 000-t/y Ni mine heap leach operation in Turkey, selling Ni hydroxide to BHP Billiton and ore to **Larco**; lack of a forestry permit was delaying the project at year-end.

Americas

In Brazil, CVRD completed the purchase of **Canico** and the 55 000-t/y Ni in FeNi project may start up in 2009. CVRD's 46 000-t/y Vermhelo hydrometallurgical project was delayed until 2010.

Votorantim Metais announced that it will build a 10 600-t/y Ni in FeNi smelter to start in 2009 and obtained replacement feed for its Fortaleza smelter. Votorantim planned to produce 27 000 t of Ni in all forms in 2007.

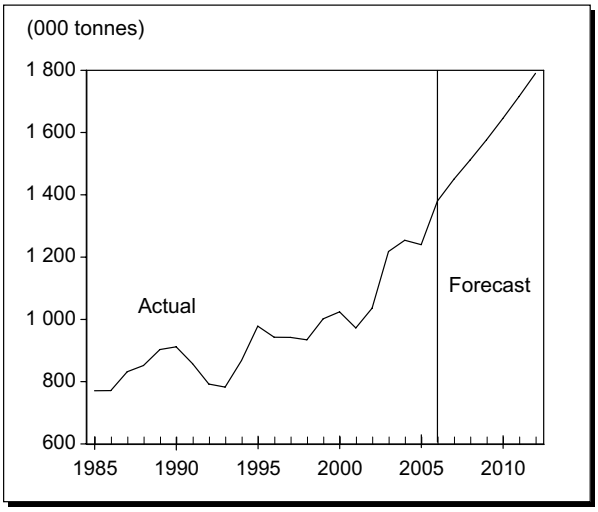
The US$1.2 billion Barro Alto project was approved by **Anglo American** in December. Barro Alto will add 33 000 t/y of Ni in FeNi and contribute 4000 t/y of recoverable Ni in ore to Anglo's Codemin operation.

Subject to financing, **Skye Resources** planned to build a 20 000-t/y Ni in FeNi plant in Guatemala, costing US$754 million, with start-up planned for 2009. A US$854 million hydromet operation producing 22 000 t/y of Ni and 1900 t/y of Co was also under consideration.

DEMAND OUTLOOK

The principal uses for primary nickel were stainless steel (62%) and other metallurgical uses (about 25%). Crude stainless steel production increased from 19.1 Mt in 2001 to an estimated 27.8 Mt in 2006, with most increases occurring in China. Comparing the third quarter of 2006 to the first quarter of 2001, world production was up 2.2 Mt (46%); Asian increases were up 1.7 Mt (83%). BHP Billiton forecast that demand for stainless steel would average 4.9%/y over the period of approximately mid-2005 to 2011 inclusive, with China providing most of the growth, as it had since 2000. **CRU** expected that nickel use would increase by 4.3% between 2006 and 2011. Nickel growth will likely be constrained by availability until 2008. In late 2006, Chinese stainless users were reportedly planning to purchase stainless steels with lower Ni contents to reduce prices. **MEPS** reported that world prices for Cold Roll Grade 304 stainless in October were US$4614/t, compared to about US$2714/t a year earlier. The International Nickel Study Group (INSG) forecast world primary Ni use as 1.37 Mt in 2006 and 1.45 Mt in 2007. A projected output to 2010 is shown in Figure 1.

Figure 1
World Primary Nickel Use, 1985-2012



Source: Natural Resources Canada.
Note: This is an average forecast; yearly actuals will differ from the trend.

CANADIAN PRODUCTION OUTLOOK

Sustained high nickel prices allowed many companies to advance projects. With Inco having reconfigured its Clarabelle mill to remove 30% of the copper from its Sudbury mine output, Inco's nickel smelting capacity in Sudbury has increased. By 2012, CVRD-Inco is to have additional refined nickel capacity at Long Harbour. Additional nickel production from properties in Manitoba could help secure the Thompson smelter's future, but a major challenge exists to reduce SO_2 emissions to 5.5% of the 2005 limits by 2015, given the distance of Thompson from markets for sulphuric acid. As noted above, Sherritt's expansion will bring on an additional 12 000 t/y of Ni by the end of 2009.

Inco planned to produce 88 000 t of Ni from its Sudbury mines and 32 000 t of Ni from its Thompson mines in 2006; production in 2007 is expected to increase. Xstrata started a Phase 1 study of the Fraser Morgan development that could ultimately bring on 7200 t/y of recoverable Ni production by early 2009. In August, Falconbridge had announced studies to develop new reserves at Raglan and examine a 30% mill expansion from 1 Mt/y to increase output from 26 000 t/y of Ni in conc. to 30 500 t/y in 2009 at a cost of US$500 million. FNX planned to triple Ni sales to CVRD-Inco by 2010.

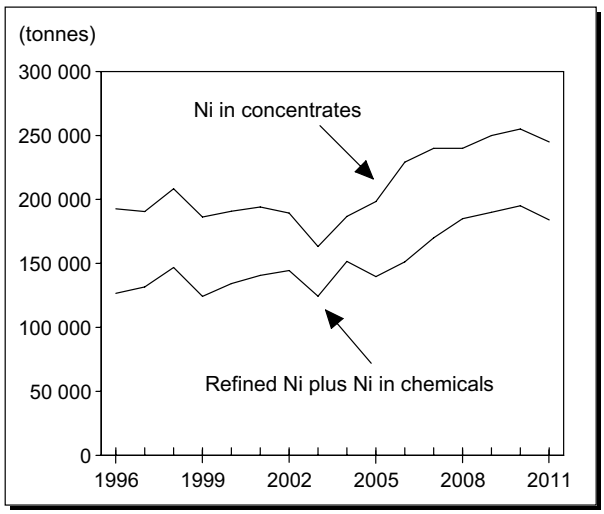
Canadian Arrow agreed to buy the Kenbridge property and planned more drilling, metallurgical testing, and resources evaluation in 2007. Canadian Royalties assessed its Raglan area deposits for the production of 9900 t/y of Ni in conc. plus copper and PGM; the company signed an offtake MOU with Jinchuan Group and a feasibility study will be delivered in 2007.

Crowflight Minerals bought a used concentrator, crusher and surface plant for its Bucko deposit, began rehabilitating the shaft, and applied for permits for a 1000-t/d underground mine to produce 5600 t/y of Ni starting in late 2007. Crowflight also had the TNB South and other projects in Manitoba, plus properties in Sudbury.

First Nickel planned to finish a prefeasibility/feasibility study of Premier Ridge by February 2007. A study of **Independent Nickel**'s Lynn Lake property looked at a $192 million investment to produce 6300 t/y of Ni and about 3400 t/y of Cu in conc. **Mustang Minerals**' scoping study of its Maskwa project was expected in early 2007; open-pit indicated resources were 5.2 Mt @ 0.68% Ni and 0.15% Cu. **URSA Major** applied for permits for an open-pit mine and a 4500-t/d mill that is expected to produce concentrates containing about 3700 t/y of Ni plus Cu, Co, PGM and Au at its Shakespeare operation. URSA will send concentrates to Xstrata for smelting and refining, and will send a 50 000-t bulk sample to Xstrata's Strathcona mill in 2007 for testing and to generate early cash flow.

Future nickel output in Canada ultimately depends upon the nickel price. The high prices of 2006 are not forecast to be the norm over the next half decade, with demand expected to fall due to increasing production and price-limited demand. Figure 2 shows projected nickel production in Canada to 2011.

Figure 2
Canadian Nickel Production, 1996-2011



Source: Natural Resources Canada.

PRICE OUTLOOK

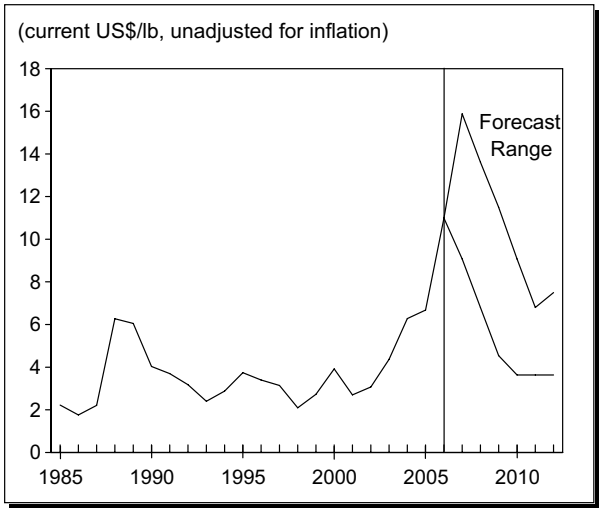
Prices stayed high during 2006, unlike in 2005 when the second half was weaker. End-of-year prices for delivery in 27 months were over US$24 000/t. Inco's market forecasts in 2006 proved more accurate than most who, including the author, greatly underestimated prices for 2006. A view of past nickel industry developments was given in October by P. Cranfield and was posted on the Internet at www.insg.org/docs/Mr_Cranfield_Oct06.pdf on the INSG site. Prices are expected be higher in the first half of 2007; the author's estimate is an average of US$25 000 to US$30 000/t for 2007 but, given the low levels of inventories, volatility and uncertainty will remain high.

ABARE forecast prices in December at US$24 800/t. With low stocks, high volatility in 2007 is expected; cash settlement Ni prices varied by US$21 950/t in 2006.

Analyses of the market and detailed production information by Inco and Falconbridge were last presented in the second quarter of 2006; their absence, like that of the former **WMC Resources**, decrease the transparency of the nickel industry.

Note: Information in this article was current as of January 20, 2007.

Figure 3
Nickel Prices, 1985-2012
Annual Average LME Cash Settlement



Source: Natural Resources Canada.

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Zinc

Metal Materials Division
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2005 mine production: $1.0 billion
World rank: Second (metal production)
2005 exports: $1.23 billion

Canada	2004	2005	2006 (e)
		(000 tonnes)	
Mine output	791	667	640
Refined metal production	805	724	822
Usage	152	150	150

(e) Estimated.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE FOR SPECIAL HIGH GRADE ZINC

2004	2005	2006	2007 (f)
	(US$/t)		
1 047.83	1 381.55	3 275	3 000

(f) Forecast.

Zinc is used in the automotive and construction industries for the galvanization of steel and manufacture of die-cast alloys, in the production of brass, in semi-manufactures such as rolled zinc, and in chemical applications. Promising new applications for zinc are in the manufacture of zinc-air batteries and in galvanized steel studs as an alternative to wood in residential construction. Recycled zinc has become an increasingly important source of the metal in recent years. Recycled zinc includes high-purity refined zinc, remelted zinc of a purity less than 98.5% zinc, and zinc scrap used in the production of zinc alloys. Canada currently produces only a minor amount of recycled zinc exclusively from recycled feeds in primary zinc smelters. However, refined zinc from the processing of electric arc furnace dusts or from the de-zincing of galvanized steel scrap may become important in the future.

CANADIAN OVERVIEW

Aur Resources Inc. expected full commercial production at the Duck Pond copper-zinc mine in Newfoundland and Labrador in early 2007. The mine was expected to produce concentrates containing about 18 600 t/y of copper plus 34 000 t/y of zinc, 16.7 t/y of silver and 128 kg/y of gold over a seven-year period.

Breakwater Resources Ltd. was re-opening and carrying out development work at the Langlois mine northwest of Val-d'Or in Quebec, targeting full commercial production in mid-2007 from a 2500-t/d concentrator located on the property. The re-opening was based upon processing 3.3 Mt @ 10.8% zinc, 0.8% copper, 52 g/t silver and 0.1 g/t gold from which concentrates containing 335 000 t of zinc, 22 900 t of copper, 80 kg of gold and 61 t of silver would be produced.

Xstrata Plc purchased majority control of **Falconbridge Limited** in August and took management control. Through compulsory acquisition, Xstrata obtained the remaining shares. In October, the acquisition of all outstanding shares of Louvicourt was completed.

In August, Falconbridge Limited (now Xstrata Plc) announced plans to invest US$130 million in the development of the Perseverance zinc mine in Quebec. Start-up was expected in 2008 with a mine life of five years. Ore from the deposit will be processed at Falconbridge's former Matagami mine facilities. The annual production of 228 000 t of zinc concentrate will be shipped and processed at the **CEZinc** refinery in Valleyfield, Quebec. The mine will also produce about 23 000 t of copper concentrate grading about 23%. The Kidd Mine D project was scheduled to be completed by the end of 2006.

In May, **Agnico-Eagle Mines Limited** announced that it will develop the LaRonde II project in Quebec. LaRonde II is the extension of Zone 20 North beneath the

current LaRonde mine. Annual zinc production will be 8600 t of zinc with 9.95 t of gold, 20.8 t of silver, and 4000 t of copper. LaRonde II is expected to extend the life of the mine to at least 2020.

Acadian Gold Corporation bought the Gays River lead-zinc deposit and the associated 1500- to 2000-t/d Scotia mill in Gays River, Nova Scotia, from **HudBay Minerals**. The company has acquired a number of other nearby properties and plans to start production at the Scotia mine in the second quarter of 2007. At a planned production rate of 700 000 t/y from the open pit, the Scotia mine was expected to produce 30 000 t/y of high-grade zinc concentrate and 10 000 t/y of high-grade lead concentrate containing about 18 000 t of zinc and 7500 t of lead.

Blue Note Mining Inc. acquired the Caribou and Restigouche lead-zinc mines located near Bathurst, New Brunswick, from Breakwater Resources, including a 3000-t/y concentrator and tailings facility at the Caribou site. The company planned improvements in the concentrator, and dewatering and rehabilitating of both mines to start production and commissioning of the mill in the second quarter of 2007. The Caribou mine was expected to produce about 260 000 t of zinc, 115 000 t of lead, 7500 t of copper, and 218 t of silver over its five-year mine life. The deposit reserves can be potentially increased.

Breakwater's Myra Falls mine produced 27 000 t of zinc in the first nine months of 2006, down from 37 000 t for the same period in 2005 due to lower head grades and decreased tonnage. Myra Falls also produced copper, silver and gold.

Yukon Zinc Corporation expected first production in the fourth quarter of 2007 from the Wolverine deposit, located in the Finlayson District in southeastern Yukon. Measured and indicated resources as of January 10, 2006, totaled 4.5 Mt grading 12.04% zinc, 351.48 g/t silver, 1.15% copper, 1.68 g/t gold, and 1.57% lead. The company planned to produce separate zinc concentrate, and lead and copper concentrates. Annual production for the first three years of production is estimated at 33 342 t of zinc, 3577 t of copper and 3399 t of lead.

In October, Vancouver-based **EuroZinc Mining Corporation** merged with Sweden's **Lundin Mining Corporation**. The merged company, Lundmin Mining Corporation, is listed on the Toronto Stock Exchange (TSX), the American Stock Exchange (AMEX), and the Stockholm Stock Exchange, and will be headquartered in Vancouver with an executive office in Stockholm, Sweden. The new Lundin operates four mines: Neves-Corvo in Portugal, Zinkgruvan and Storliden in Sweden, and Galmoy in Ireland. In 2007, a fifth mine (Aljustrel) is planned to start production in Portugal. Production for 2006, on a combined basis, was estimated to be approximately 180 000 t of contained zinc, 90 000 t of contained copper, 45 000 t of contained lead and 187 t of contained silver.

WORLD OVERVIEW

Five consecutive years of concentrate deficits have resulted in depleted producer stocks and sharply higher prices.

The Chinese government removed the 5% export rebate on refined lead and zinc in September, increasing the cost to producers of approximately 450 000 t of metal exported from China last year. Chinese exports of metal were 16% higher in the first 10 months of 2006 than in 2005.

Toronto-based HudBay Minerals Inc. successfully re-opened the Balmat zinc mine in New York State in May 2006. The mine had been on care and maintenance since 2001. Balmat has reserves of 1.86 Mt @ 11% zinc and resources of 1.39 Mt @ 12.9% zinc. Expected output of 60 000 t/y of zinc in concentrate will be processed at the **Noranda Income Fund** electrolytic refinery at Valleyfield, Quebec.

Australia's **Zinifex Limited** and Belgium's **n.v. Umicore s.a.** agreed to combine their zinc smelting operations in 2007; it will become the largest smelting concern in the world with a capacity of 1.2 Mt/y of zinc metal and operations in seven countries.

In Peru, **Compañía Minera Milpo S.A.A.** expected to open the 5000-t/d Cerro Lindo zinc mine in June 2007 to produce 70 000 t/y of zinc concentrates. The Antamina mine produced 115 000 t of zinc in concentrate in the first nine months of 2006, down from 169 000 t for the same period in 2005; Antamina is owned by **BHP Billiton Plc**, Xstrata Plc, **Teck Cominco Limited**, and **Mitsubishi Corporation**.

Hindustan Zinc Limited (HZL) was building a second 170 000-t/y electrolytic zinc smelter at Chanderiya, having completed the first one in 2005.

Apex Silver Mines Limited was putting its San Cristóbal silver-zinc-lead project in Bolivia into production. The deposit has reserves of 3.7 Mt of contained zinc and the mine will operate at 40 000 t/d starting in the third quarter of 2007, producing 259 000 t/y of zinc and 91 000 t/y of lead during the first five years.

ZincOx Resources plc was developing its Jabali project in Yemen, based on the mining of 800 000 ty of ore to produce 70 000 t/y of zinc oxide containing 80% zinc. It was expected to start up in the third quarter of 2008 and have a life of 12 years.

In Australia, Xstrata Plc received permission from Australian authorities to convert the McArthur River mine from an underground to an open-pit operation. This will give the operation a 25-year life and allow output to rise to 175 000 t/y. At Mt. Isa, Xstrata was increasing mill throughput from 5 Mt/y to 8 Mt/y by 2008; that will increase output to about 800 000 t/y of zinc in concentrates. **Oxiana Limited's** Golden Grove mine in Australia produced 133 000 t of zinc in concentrate in the first half of 2006, compared to 131 000 t in the 12 months of 2005. Lennard Shelf (Teck Cominco/Xstrata) was expected to start up in early 2007, producing about 75 000 t/y of zinc in concentrates.

Teck Cominco Limited's Red Dog operation in Alaska produced 424 000 t of zinc in concentrate in the first nine months of 2006, compared to 426 000 t during the same period in 2005.

LEADING WORLD ZINC PRODUCERS

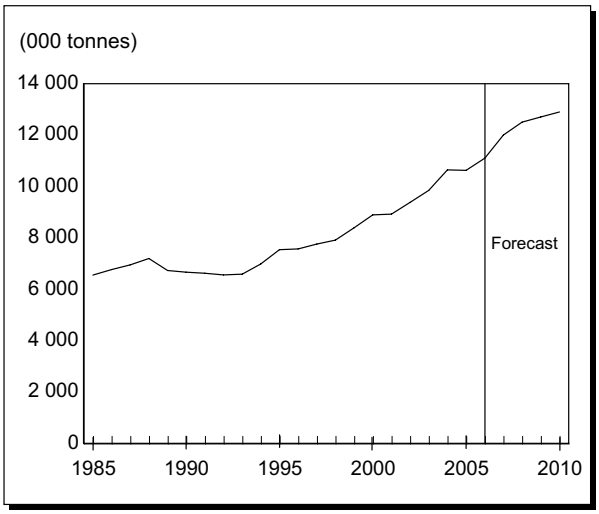
Producers Zinc in Concentrate	2005	Producers Zinc in Metal	2005
	(000 t)		(000 t)
China	2 525	China	2 772
Australia	1 329	Canada	723
Peru	1 202	Japan	638
Canada	667	South Korea	647
United States	720	Spain	500

Source: International Lead and Zinc Study Group.

DEMAND OUTLOOK

According to the International Lead and Zinc Study Group (ILZSG), global demand for refined zinc metal is expected to rise by 3.9% to 11.06 Mt in 2006 and by 2.6% in 2007. Chinese demand was slated to increase by over 4.5% in 2006 and by over 6.5% in 2007 in the run-up to the 2008 Olympic Games. Demand will ultimately be constrained by availability. Manufacturing demand for zinc was expected to continue to be stronger in Asia, notably in China and India, due to lower labour costs, local infrastructure demand, increased power availability, and ongoing infrastructure investments into 2007 and early 2008. Galvanizers, who account for about half of the zinc used, reportedly have cut zinc usage in response to higher prices. While some uses for galvanizing are protected by the high material costs of substitutes, some galvanizing use is threatened when maintenance and labour costs (e.g., painting) can be substituted for galvanizing. When zinc prices are high relative to substitutes, future demand will be affected.

Figure 1
World Zinc Use, 1985-2010



Source: Natural Resources Canada, ILZSG.

On the supply side, the ILZSG expects that global zinc mine supply will increase by 2.1% to 10.36 Mt in 2006, followed by a further rise of 7.3% to 11.12 Mt in 2007. The rises are largely due to recent expansions and mine openings in Australia, China and India. Global production of refined zinc metal was forecast to increase by 4.3% in 2006 and 4.9% in 2007.

Taking into account the forecasts by ILZSG member countries for supply, demand and trade, as well as releases from the U.S. National Defense Stockpile, it is anticipated that the Western World refined zinc market will remain in deficit both this year and next. The expected size of the shortfall this year is 354 000 t, falling to 154 000 t in 2007.

CANADIAN PRODUCTION OUTLOOK

The most significant change will occur when the Brunswick mine is closed due to the exhaustion of reserves. Brunswick produced 265 000 t of zinc in concentrate in 2005; reserves at the end of 2005 were estimated to be sufficient for four to five years. High prices have caused the re-evaluation of former producers and existing undeveloped deposits; in the short term, Canadian zinc mine output should rise. But the new sources are not expected to offset the future loss of Brunswick mine output. While mine output will likely decline, the outlook for refined production is more stable.

PRICE OUTLOOK

The market deficit for zinc was expected to continue into 2007 and to draw down stocks to low levels. Stocks declined from over 394 000 t at the start of 2006 to less than 89 000 t by year-end as prices reached record levels. Future high price volatility was expected to continue as stocks become a very low percentage of use. With smelter capacity seen to be the bottleneck to increased output, prices are expected to remain high in 2007, assuming no major economic dislocation, as Chinese demand continues its run-up in advance of the Olympic Games in 2008.

New production capacity is being lured by high prices and the prospect that these prices will continue. So long as demand remains robust, the high prices in historical terms can be supported. However, high prices not only encourage additional production capacity, but they also encourage substitution away from zinc either to cheaper materials, through the more efficient use of zinc, or by increased maintenance. Prices are expected to return to more historically normal levels before the end of the decade.

Note: Most information in this article was current as of December 31, 2006.

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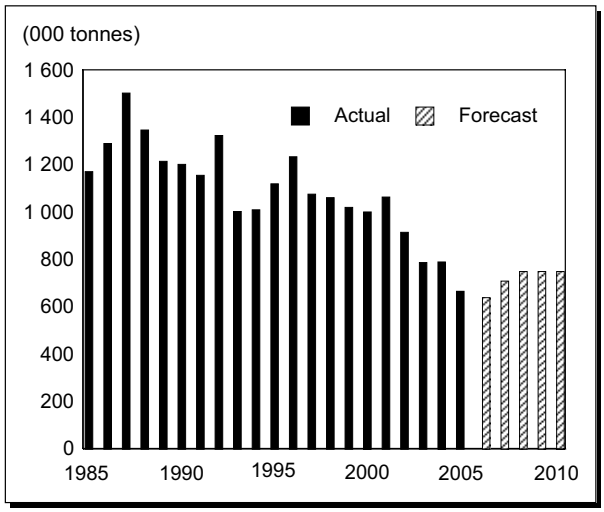
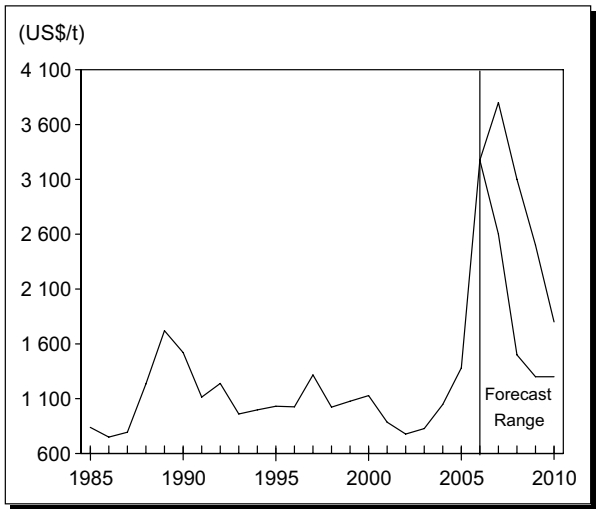
Figure 2
Canadian Mine Production of Zinc, 1985-2010



Source: Natural Resources Canada.

Figure 3
Zinc Prices, 1985-2010
Annual Average LME Cash Settlement



Source: Natural Resources Canada.

TABLE 1. WEB SITES FOR FURTHER INFORMATION

Company	Web Site Address
Acadian Gold Corporation	www.acadiangold.ca
Agnico Eagle Mines Limited	www.agnico-eagle.com
American Galvanizers Association	www.galvanizeit.org
Aur Resources Inc.	www.aurresources.com
Apex Silver Mines Limited	www.apexsilver.com
Breakwater Resources Ltd.	www.breakwater.ca
Blue Note Mining Inc.	www.bluenotemining.ca
Callinan Mines Limited	www.callinan.com
Campbell Resources Inc.	www.ressourcescampbell.com
Canadian Zinc Corporation	www.canadianzinc.com
EuroZinc Mining Corporation	www.eurozinc.com
HudBay Minerals Inc.	www.hudbayminerals.com
Imperial Metals Corporation	www.imperialmetals.com
Inmet Mining Corporation	www.inmet-mining.com
International Lead and Zinc Study Group	www.ilzsg.org
International Zinc Association	www.iza.com
London Metal Exchange	www.lme.co.uk
Lundin Mining Corporation	www.lundinmining.com
Noranda Income Fund	www.norandaincomefund.com
Northgate Minerals Corporation	www.northgateminerals.ca
Teck Cominco Limited	www.teckcominco.com
Yukon Zinc Corporation	www.yukonzinc.com
Xstrata Plc.	www.xstrata.com
Umicore s.a.	www.umicore.com
ZincOx Resources plc	www.zincox.com

Economic Situation and Outlook

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In the third quarter of 2006, the Canadian economy (real Gross Domestic Product) grew by an annualized 1.7%, following increases of 2.0% in the second quarter and 3.8% in the first quarter. Fourth-quarter growth was expected to be about the same as, or slightly lower than, growth in the third. The third-quarter increase brought Canada's real GDP (annual rate in chained 1997 dollars) to $1 192 200 million ($1 440 808 million nominal dollars), compared to an average of $1 157 705 million in 2005 ($1 371 425 million nominal). The slower growth over the last half of 2006 was primarily attributable to a slowdown in exports and inventory investment as firms adjusted to lower demand. Overall, real growth in 2006 should come in at about 2.7%. The Canadian economy should begin to accelerate through 2007, averaging about 2.5% in the first half and 2.75% in the second. Given the weakness seen in the second half of 2006, this translates into an annual average growth rate of about 2.3%. For 2008, the economy is likely to reach its potential output of about 2.8%.

Some factors that influenced the Canadian economy in 2006 include high commodity prices; rising oil prices for the first half of 2006 to above US$75 per barrel, then declining to US$50-$55 at year-end; declining natural gas prices over the last half of the year as a result of milder temperatures; stable interest rates; inflation well within the Bank of Canada's target range; a strong Canadian dollar, trading at about US$0.85 in early 2007; record employment levels; and a 30-year low in the unemployment rate.

Listed in the table opposite are some key economic indicators for 2006 with comparisons to 2005.

In spite of the relatively weak performance of the Canadian economy through the last half of 2006, the Bank of Canada is unlikely to lower its key target overnight interest rate any time soon. It estimates that the economy is operating at, or just above, its capacity limit. The 30-year low unemployment rate of 6.1% in December 2006 and all-time high employment rate (total employment as a share of the working population) attest to this. In addition, the "all-items" inflation rate, while increasing through the last four months of 2006, at 1.6%, was still relatively subdued. And the core rate finished the year at the Bank's target rate of 2%, reinforcing the Bank's neutral interest rate stance.

The Canadian dollar, which averaged almost US$0.90 in the third quarter of 2006, slipped somewhat to about US$0.85 at year-end in response to lower oil prices and moderating commodity prices. For 2007, the dollar should remain at about its current level.

Strong domestic demand is expected to continue. However, Canadian export growth is likely to remain weak in the near term in response to reduced demand from the United States. The anticipated stability of the Canadian dollar will, however, help bolster the export sector and, as the U.S. economy improves later in 2007, prospects for Canadian exports should also improve.

Consumer spending, supported by the high employment level and projected 3% rise in personal disposable income, will partially offset the weaker export sector. Business investment, especially in machinery and equipment, is expected to rise by about 8.5% in 2007 as industry continues to take advantage of the relatively high Canadian dollar (making imported goods less expensive).

The U.S. economy grew at a 2.0% annualized rate in the third quarter of 2006, much lower than the 5.6% recorded in the first quarter and 2.6% in the second. A depressed housing market and reduced motor vehicle production in the United States helped lead to the third-quarter

	2005	2006
Consumer Price Index (all items) 1992=100	2.2	2.0
Average employment level (000)	16 169.7	16 484.3
Change in employment 2005 to 2006 (000)	n.a.	314.6
Unemployment rate (%)	6.8	6.3
Bank of Canada interest rate (%)	2.90	4.27
Prime business rate (%)	4.40	5.77
Canada-U.S. exchange rate (US$ per C$)	0.8253	0.8818
Exports (11 months) ($ millions)	412 514	417 218
Imports (11 months) ($ millions)	354 397	367 346
Balance of trade (11 months) ($ millions)	58 117	49 872
Real Gross Domestic Product growth (%)	2.9	2.7

n.a. Not applicable.

slowdown. However, buoyed by real average hourly earnings, low unemployment and stable interest rates, consumer spending remained relatively brisk, leading to a fourth-quarter estimate of growth near 3%. For 2006 as a whole, real growth in the neighbourhood of 3.3% may be expected.

In 2007, after slow but still positive growth during the first half, growth is expected to rebound in the latter part of the year and to average about 2.5% or a little higher for the year. Speculation that the U.S. Federal Reserve may reduce interest rates in 2007 appears to have vanished as the slowdown in the United States seems to be less severe than originally thought. Even so, further weakness in residential construction and lower home prices will weigh on GDP growth, although not to the degree that the housing sector negatively influenced overall fourth-quarter 2006 GDP. Consumer spending, while still remaining relatively strong, may weaken somewhat as a result of lower housing wealth (due to lower housing prices).

U.S. exports continue to be a bright spot, expanding by an anticipated 8.6% in 2006 and a further increase of nearly 7% in 2007 as the relatively weak U.S. dollar provides exporters with a competitive edge.

Globally, real output in 2007 should rise by about 4.5%, compared to 5.1% in 2006. Output is expected to rebound in 2008 to near 2006 levels.

Backed mainly by business investment and foreign trade, the Japanese economy should grow by about 1.7% in 2007, lower than the 2.0% reached in 2006. A tight labour market may encourage an increase in wage settlements, therefore prompting an increase in consumer spending. The Japanese government, however, remains focused on spending restraint.

China's growth is expected to reach almost 10% in 2007 and be above 9% in 2008, compared to about 10.5% in 2006, again based mainly on capital expenditures, although the government is trying to encourage more consumer spending and rural development.

The Indian economy expanded by more than 8% in 2006 and this pace is likely to continue through 2008, although at a slightly slower pace. The Indian economy is becoming more well rounded as manufacturers turn their attention to foreign markets, in addition to their huge domestic market. India has also developed expertise in software development and business services.

Prospects in other parts of Asia remain favourable with recent lower energy prices providing support.

Overall, Latin America is likely to experience stable and sustainable growth over the next couple of years. Domestic demand's contribution to some of the economies should increase as a result of reduced demand from the United States, and improving monetary and inflationary conditions should boost consumer spending and credit activity, although inflation remains a concern in Argentina and Venezuela. Growth for the region as a whole was approximately 5% in 2006 and will likely be a little less in 2007.

Affected by a strong euro, rising interest rates and debt reduction policies, growth in the euro area will likely decline to about slightly above 2% in 2007, following an estimated 3% in 2006. Employment is generally increasing, but this is moderated by higher taxes and wage restraint. Business investment is expected to be concentrated on plant modernization as opposed to expansion. Currency appreciation relative to the U.S. dollar, moderate wage settlements, and government fiscal and monetary policy tightening should keep price increases contained. Recent declines in oil prices will also keep inflationary pressures under control.

Sources: Bank of Canada; Scotiabank Group; Statistics Canada; TD Economics; U.S. Bureau of Economic Analysis; U.S. Bureau of Labor Statistics.

Note: Information in this article was current as of January 2007.

Note to Readers

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.

December 2006

Import and Export Tables

TABLE 1. CANADA, VALUE OF MINERALS AND MINERAL PRODUCTS (STAGES 1 TO 4), IMPORTS BY COMMODITY, 2004-06

	2004	2005	2006 (a)
		($000)	
METALS			
Aluminum	4 223 311	4 579 200	4 926 925
Antimony	11 187	11 689	12 680
Barium	5 158	6 719	6 606
Beryllium	762	546	802
Bismuth	1 964	1 634	1 610
Cadmium	1 676	1 723	1 622
Calcium	49 262	51 432	47 033
Chromium	56 293	63 855	46 094
Cobalt	63 842	53 117	36 859
Copper	1 721 166	2 135 594	2 962 803
Gallium	80	69	100
Germanium	4 361	5 269	6 770
Gold	1 909 220	2 796 170	3 487 545
Hafnium	228	244	276
Indium	3 731	3 802	4 103
Iron and steel	9 355 812	10 934 586	11 006 159
Iron ore	403 948	660 627	620 568
Lead	98 263	95 583	82 672
Lithium	30 742	15 084	12 151
Magnesium and magnesium compounds	213 988	183 764	145 540
Manganese	196 683	165 040	126 480
Mercury	64	120	125
Molybdenum	136 389	279 399	207 360
Nickel	614 711	614 727	444 195
Niobium	20 310	18 332	22 355
Platinum group	296 163	307 224	336 664
Rare earth	11 168	3 836	3 682
Rhenium	49	32	38
Selenium	3 297	2 553	3 599
Silicon	120 278	79 292	63 944
Silver	294 566	200 045	311 763
Strontium	815	748	655
Tantalum	991	831	1 162
Tellurium	697	3 278	2 975
Thallium	1	–	–
Tin	46 379	42 747	44 060
Titanium	74 363	133 769	139 227
Tungsten	10 773	15 710	16 849
Uranium and thorium	294 617	409 927	410 156
Vanadium	27 918	61 958	36 759
Zinc	307 815	297 328	703 653
Zirconium	48 588	46 975	56 105
Other	633 543	459 459	449 006
Total metals	21 295 172	24 744 037	26 789 730
NONMETALS			
Abrasives	38 746	46 611	47 100
Arsenic	526	654	213
Barite and witherite	8 451	14 241	17 513
Boron	30 366	31 140	29 313
Bromine	2 935	3 943	3 475
Calcium (industrial minerals)	20	–	1
Cement	237 800	255 712	235 988
Chlorine and chlorine compounds	63 675	62 451	56 996
Chrysotile (asbestos)	36 274	44 955	50 227

TABLE 1 (cont'd)

	2004	2005	2006 (a)
		($000)	
NONMETALS (cont'd)			
Clay and clay products	338 437	321 647	285 809
Diamonds	399 516	462 032	557 474
Dolomite	7 736	8 209	7 731
Feldspar	257	5 168	328
Fluorspar	53 478	49 832	44 680
Glass and glassware products	359 607	318 549	297 935
Granite	77 869	87 975	96 767
Graphite	195 880	176 030	166 413
Gypsum	89 904	90 100	87 683
Iodine	13 111	15 659	17 190
Lime	9 104	11 406	11 080
Limestone flux and other limestone	22 893	26 286	24 613
Marble, travertine and other calcareous stones	35 871	30 654	31 961
Mica	11 911	11 551	8 806
Mineral pigments	172 310	177 362	156 065
Nepheline syenite	48	26	38
Nitrogen	215 473	245 563	206 921
Olivine	761	788	657
Pearls	11 511	13 776	13 033
Peat	1 502	2 618	2 878
Perlite	16 893	17 318	14 961
Phosphate and phosphate compounds	155 885	146 419	135 398
Potash and potassium compounds	35 160	46 823	45 401
Salt and sodium compounds	283 616	335 789	312 537
Sand and gravel	15 699	16 152	15 550
Sandstone	3 899	4 527	3 664
Silica and silica compounds	152 307	145 708	138 308
Slate	6 043	6 098	6 790
Sulphur and sulphur compounds	22 669	23 953	19 298
Talc, soapstone and pyrophyllite	19 026	17 936	16 051
Titanium oxides	264 984	267 813	234 637
Vermiculite	8 112	7 966	7 297
Other nonmetals	519 042	582 038	544 139
Other structurals	42 481	46 902	44 300
Total nonmetals	3 981 788	4 180 380	3 997 219
FUELS			
Coal	1 112 665	1 385 771	1 298 074
Coke	196 443	149 997	104 621
Natural gas	2 582 650	3 583 043	2 118 080
Natural gas by-products	131 649	119 889	159 829
Petroleum	21 084 891	29 561 173	29 658 143
Other	–	–	–
Total fuels	25 108 298	34 799 873	33 338 747
Total mining imports (including fuels)	50 385 258	63 724 290	64 125 696
Total non-fuel mining imports	25 276 960	28 924 417	30 786 949
Total mining imports (including coal and coke)	26 586 069	30 460 185	32 189 645
Total economy imports	356 055 522	380 759 930	364 519 528

Sources: Natural Resources Canada; Statistics Canada.
– Nil.
(a) First 11 months of 2006.
Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, VALUE OF MINERALS AND MINERAL PRODUCTS (STAGES 1 TO 4), TOTAL EXPORTS BY COMMODITY, 2004-06

	2004	2005	2006 (a)
		($000)	
METALS			
Aluminum	8 953 678	9 743 293	11 282 967
Antimony	1 073	1 671	1 815
Barium	53	238	189
Beryllium	5	85	4
Bismuth	3 316	1 910	918
Cadmium	5 101	7 139	8 050
Calcium	6 321	5 519	3 108
Chromium	24 136	20 635	16 605
Cobalt	460 048	316 982	249 933
Copper	3 006 207	3 929 642	5 689 684
Gallium	–	–	–
Germanium	1 482	951	3 289
Gold	3 550 455	4 343 850	5 115 443
Hafnium	–	–	–
Indium	–	–	–
Iron and steel	12 809 966	13 902 944	13 453 762
Iron ore	944 044	1 616 622	1 719 607
Lead	287 941	307 422	353 355
Lithium	4 505	2 250	2 943
Magnesium and magnesium compounds	190 785	187 296	135 920
Manganese	55 547	36 358	38 112
Mercury	35	235	148
Molybdenum	353 875	670 294	439 932
Nickel	4 377 251	4 125 653	5 156 666
Niobium	57 757	54 086	58 810
Platinum group	78 630	90 544	190 638
Rare earth	408	280	301
Rhenium	–	–	–
Selenium	9 263	21 044	14 708
Silicon	106 551	119 159	114 258
Silver	482 212	506 036	695 852
Strontium	–	–	–
Tantalum	399	705	442
Tellurium	3 241	4 231	4 110
Thallium	–	–	–
Tin	21 129	18 015	22 143
Titanium	30 892	50 847	67 076
Tungsten	12 367	20 109	58 620
Uranium and thorium	944 194	1 775 064	1 989 136
Vanadium	94 430	110 385	86 836
Zinc	1 225 959	1 252 356	2 034 078
Zirconium	15 742	16 890	23 306
Other	5 322 162	5 472 546	5 362 125
Total metals	43 441 160	48 733 286	54 394 889
NONMETALS			
Abrasives	256 757	257 193	260 167
Arsenic	–	–	–
Barite and witherite	5 723	4 077	1 840
Boron	1 581	2 118	1 845
Bromine	139	454	134
Calcium industrial minerals)	13	1	–
Cement	787 012	781 577	694 257
Chlorine and chlorine compounds	186 835	175 014	153 659
Chrysotile (asbestos)	170 177	127 465	107 036
Clay and clay products	110 110	108 118	102 550
Diamonds	2 089 064	1 853 805	1 433 812
Dolomite	36 293	34 043	37 431
Feldspar	–	364	2

TABLE 2 (cont'd)

	2004	2005	2006 (a)
		($000)	
NONMETALS (cont'd)			
Fluorspar	66 965	59 866	58 136
Glass and glassware products	1 137 525	1 117 660	1 070 273
Granite	93 132	77 631	65 305
Graphite	94 552	113 410	115 186
Gypsum	207 861	229 189	241 963
Iodine	7 039	9 457	11 375
Lime	22 140	26 912	25 768
Limestone flux and other limestone	26 208	21 441	16 124
Marble, travertine and other calcareous stones	22 259	26 872	31 226
Mica	11 557	11 921	10 859
Mineral pigments	144 902	157 546	159 319
Nepheline syenite	61 589	65 793	57 905
Nitrogen	1 175 039	1 457 130	1 260 766
Olivine	–	–	–
Pearls	4 879	3 876	3 131
Peat	255 052	285 621	275 449
Perlite	–	–	–
Phosphate and phosphate compounds	51 760	46 765	26 060
Potash and potassium compounds	2 180 258	2 768 665	2 176 015
Salt and sodium compounds	535 064	552 224	487 991
Sand and gravel	51 359	55 150	57 513
Sandstone	73	348	264
Silica and silica compounds	40 828	51 874	52 521
Slate	34 330	43 142	18 838
Sulphur and sulphur compounds	456 979	684 623	528 658
Talc, soapstone and pyrophyllite	26 153	22 371	21 448
Titanium oxides	175 700	215 557	195 033
Vermiculite	–	–	–
Other nonmetals	459 171	456 606	485 003
Other structurals	181 586	171 677	168 179
Total nonmetals	11 167 664	12 077 556	10 413 041
FUELS			
Coal	1 868 799	3 374 533	3 111 779
Coke	65 974	107 979	18 131
Natural gas	27 040 437	35 867 560	25 358 219
Natural gas by-products	2 148 944	2 377 834	2 026 404
Petroleum	37 694 912	45 396 043	50 485 055
Other fuels	461 143	454 792	447 572
Total fuels	69 280 209	87 578 741	81 447 160
Total mining exports (including fuels)	123 889 027	148 389 587	146 255 089
Total non-fuel mining exports	54 608 819	60 810 845	64 807 928
Total mining exports (including coal)	56 543 592	64 293 357	67 937 839
Total economy exports	411 839 578	436 194 790	403 356 681

Sources: Natural Resources Canada; Statistics Canada.
– Nil.
(a) First 11 months of 2006.
Note: Numbers may not add to totals due to rounding.