USGS
science for a changing world

2005 Minerals Yearbook

CANADA

U.S. Department of the Interior
U.S. Geological Survey

December 2007

The Mineral Industry of Canada

By Alfredo C. Gurmendi

Canada, a nation rich in mineral resources, was one of the leading mining countries in the world. In 2005, it continued to supply minerals to satisfy global demand. The values of coal, metal, and nonmetals production increased by 45.9%, 7.7%, and 3.6%, respectively, compared with those of 2004 (Birchfield, 2006, p. 1-2; Natural Resources Canada, 2006b). Canada remained among the leading world producers of such mineral commodities as potash followed by, in order of tonnage, Russia, Belarus, and Germany; diamond following, in order of output, Botswana, Russia, and Australia; nickel following, in order of output, Russia and Australia; selenium following Japan; columbium (niobium) following Brazil; and zinc following, in order of output, China, Australia, and Peru (Gabby, 2006b; George, 2006c; Kostick, 2006; Kuck, 2006; Magyar, 2006; Olson, 2006).

Canada had a population of more than 32.5 million in 2005, and had a gross domestic product (GDP) based on purchasing power parity of $1.13 trillion.[1] Canada's GDP growth was moderate at about 2.9%. In 2005, in spite of the appreciation of Canada's currency relative to the U.S. dollar, which was equivalent to 7.3%, the consumer price inflation remained subdued at 3.3% owing to higher world demand for Canadian mineral exports and higher mineral commodity prices, which contributed to the upturn in the country's economic growth. In 2005, in order of value, Canada's energy products, metals, and industrial minerals production was equivalent to 5% of the GDP. Unemployment decreased to 6.4% from 7.2% in 2004 (Department of Finance Canada, 2006§[2]; Government of Canada, 2006§; Statistics Canada, 2006d§; U.S. Central Intelligence Agency, 2006§).

In 2005, Canadian coal, metals, and industrial minerals production[3] was valued at almost $23 billion (CAN $26.4 billion), which was 8.6% higher than that of $18.6 billion (CAN $24.3 billion) in 2004. The Canadian nonfuel mineral production was valued at $20.9 billion (CAN $24 billion), which was 5.8% higher than that of $17.3 billion (CAN $22.7 billion) in 2004 (Birchfield, 2006, p. 1-2; Natural Resources Canada, 2006b).

The output and value of mineral production in 2005 increased significantly for a number of mineral commodities. Among those commodities, uranium output increased by 9.1% and its value increased by 65.4%; potash (K_2O content) output increased by 1.6% and its value increased by 31.3%; and copper ore output increased by 4.8% and its value increased by 20.9%. Although iron ore output decreased by 0.9%, its value increased by 13.5%. In terms of value, the leading mineral commodities produced were nickel, the value of which increased to $2.9 billion in 2005 from $2.5 billion in 2004; potash, to $2.4 billion from $1.5 billion; copper, to $2.2 billion from $1.5 billion; coal, to $2.0 billion from $1.2 billion; gold, to $1.7 billion from $1.6 billion; iron ore, to $1.3 billion from $1.1 billion; sand and gravel, to $1 billion from $850 million; stone, to $960 million from $770 million; and zinc, to $960 million from $770 million (Natural Resources Canada, 2006b).

In 2005, according to the Prospectors & Developers Association of Canada's (PDAC) president, the "Super" Flow-Through Shares—Mineral Exploration Tax Credit (METC) program was a boon to Canada's exploration sector. Since its introduction in 1999, this federal tax credit program has kept investment in Canada and has provided an incentive for Canadian investors to continue to invest in exploration for mineral resources despite fierce global competition for exploration investment. The METC has allowed Canada to capture exploration investment and maintain its position as the leading country in the world for mineral exploration spending (Dillon, 2006).

Exploration and deposit appraisal spending amounted to $1.18 billion in 2004, a remarkable increase of 71.8% compared with the $686.7 million spent in 2003. Final figures for 2005 indicated an increase of 12.7% to $1.33 billion compared with spending in 2004, and revised spending intentions were expected to reach $1.72 billion in 2006. To that effect, the Voisey's Bay nickel-copper-cobalt deposit (in Newfoundland and Labrador) and the diamond deposits at Ekati, Diavik, and Snap Lake (in the Northwest Territories), and Jericho (in Nunavut) are successes, which make an impressive case for more exploration in Canada, no matter how attractive and lucrative the opportunities may be in Asia, Australia, and/or Latin America. Because of the Voisey's Bay's development and the Diavik and the Ekati diamond mines' production, which amounted to about 15% of the world's supply of rough diamond by value, exploration activity is being driven by the continuing exploration interest for diamond and encouraged by the significant recent diamond findings, such as at the Jericho Project in Nunavut and the Victor Project in Ontario. Across Canada, diamond exploration will continue in, in order of economic importance, the Northwest Territories, Nunavut, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and Newfoundland and Labrador (Birchfield, 2006).

In 2005, the number of Canadian mining companies, both senior (large) and junior (small), that were active in exploration and deposit appraisal increased by an additional 16% following a dramatic 72% increase in 2004. This increase was owing, in part, to higher mineral and metal commodity price increases during 2004 and 2005, which rose in response to increased

[1]Where necessary, values have been converted from Canadian dollars (CAN$) to U.S. dollars (US$) at an average rate of CAN$1.1468=US$1.00 for 2005. All values in this report, unless otherwise specified, are expressed in U.S. dollars.

[2]References that include a section mark (§) are found in the Internet References Cited section.

[3]For more detailed information on the mineral production in Canada, see the Canadian Minerals Yearbooks for 1998 and 1999, prepared by the Mining Sector, Natural Resources Canada, Ottawa, Canada, which were used extensively as source material for this report. The U.S. Department of the Interior has arranged to have these Canadian publications placed in selected depository libraries of the 50 States and Puerto Rico.

global demand that was driven by the rapidly growing economies of China and India. Copper, coal, iron ore, and uranium were sold at record high prices, and gold traded at its highest level since the early 1980s.

Spending by the active mining companies increased to $1.1 billion (CAN $1.4 billion) from $960 million (CAN $1.2 billion) in 2004 and $550 million (CAN $1.2 billion) in 2003. Mineral exploration accounted for 81% of these expenditures, and deposit appraisal, 19%. Spending by junior firms, which overtook spending by senior companies during the 2004-05 timeframe, accounted for 58% of the 2005 total. Junior firms spent $632 million in 2005 compared with $375 million in 2004. Senior companies spent $468 million in 2005 compared with $377 million in 2004 (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 2-3, 5; Natural Resources Canada, 2006a).

In 2005, Ontario continued to lead in exploration and deposit appraisal spending (24.7%) followed by British Columbia (16.3%), Quebec (16.1%), Nunavut (13.1%), Saskatchewan (10.0%), and the Northwest Territories (7.2%), which together accounted for 87.4% of exploration and deposit appraisal expenditures in Canada. Expenditures were equally apparent in Yukon (3.8%), Newfoundland and Labrador (3.5%), and Manitoba (3.3%) (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 2, 6; Bouchard, 2006, p. 7-10; Natural Resources Canada, 2006a).

In 2005, other factors that contributed to revitalize mineral exploration ventures in Canada—besides metal prices at record high levels, gold trading at its highest level since the early 1980s, and strong demand for most mineral commodities driven by increased consumption by the industrial sectors of the United States, China, and India—were Canada's timely tax incentives, positive exploration results, and better access to the capital markets (Bouchard, 2006, p. 7-10).

In 2005, Canada's larger mining companies remained internationally active by continuing to spend almost 75% of their exploration budgets for precious and base metals or diamond in, by domicile of company in order of spending, Australia, Africa-Middle East, Europe-Commonwealth of Independent States (CIS), the United States, Latin America and the Caribbean, and the Asia and the Pacific region (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 159-161). The increase in spending reflected the rapid response by the Canadian companies to a better metal price outlook during the 2003-04 timeframe accompained by generous Government tax and nontax incentives and a steady stream of positive exploration news. Such discoveries as the Voisey's Bay copper-nickel project, the Kelex Nickel Zone, and the Sudbury Basin's platinum-group metals (PGM)-rich deposits, and the Diavik, the Jericho, and the Snap Lake diamond projects confirmed that Canada is still rich in mineral resources (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 2-5, 17-18).

According to the Canadian Intergovernmental Working Group of the Mineral Industry's projections for exploration and deposit appraisal, expenditures in Canada, by type of company and mineral commodity, will continue to dominate the Canadian mining sector because of still-favorable base metals, precious metals, uranium, and diamond market conditions. Uranium also appears to be headed for a stronger exploration program beyond 2005. The globalization of diamond demand has introduced unprecedented levels of volatility into the diamond supply and the pricing of rough and polished diamond (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 160; Natural Resources Canada, 2006a).

Exploration is a vital component of Inco Limited's Voisey's Bay project in the Province of Newfoundland and Labrador. Inco spent $5 million to continue its exploration program on the project in 2005, and the company expected to spend an additional $80 million to further investigate the underground resource to establish minable reserves (Voisey's Bay Nickel Company Limited, 2006a§). At the end of 2005, the Voisey's Bay Ovoid deposit contained estimated open pit proven and probable reserves of 32 million metric tons (Mt) at grades of 2.75% nickel, 1.59% copper, and 0.14% cobalt. In addition, the deposit contained an underground estimate of 40 Mt of indicated mineral resource grading 1.89% nickel, 0.90% copper, and 0.12% cobalt and 6 Mt of inferred mineral resource grading 2.3% nickel, 1.0% copper, and 0.2% cobalt (Inco Limited, 2006b§; Voisey's Bay Nickel Company Limited, 2006b§).

According to the Voisey's Bay Nickel Company Limited (VBNC), construction of a 6,000-metric-ton-per-day (t/d) integrated mine and concentrator at the Voisey's Bay site in the Province of Newfoundland and Labrador was completed in November 2005. The estimated investment in these facilities was $828 million (CAN $950 million). These facilities will support the mining and processing of ore from the Voisey's Bay deposits and will produce two types of concentrate: a copper concentrate and a nickel-cobalt-copper concentrate (Voisey's Bay Nickel Company Limited, 2006c§).

Environmental concerns continued to influence mineral exploration and development activities throughout Canada, and mineral exploration criteria seemed to have become increasingly subject to legal and community influences in much of Canada. Land use, which had never been given much attention in the past, had become an issue. First Nation rights, for instance, were receiving much consideration. The Minister of Natural Resources stated that Federal and Provincial Governments were working on legislative reforms that were expected to afford a better regulatory climate.

The Investment Tax Credit for Exploration (ITCE) that was introduced in October 2000 was extended during the 2003-04 period in the Federal budgets and was due to be phased out at the end of 2005; issuing companies, however, will be able to continue to incur eligible expenses to the end of 2006. The Canadian Intergovernmental Working Group on the Mineral Industry (IGWG) subworking group on taxation concluded that the ITCE had been successful in maintaining access to exploration financing and, with the aid of a stronger metal prices and interesting diamond discoveries, that Canada had achieved higher exploration levels. The ITCE and related tax incentives acted as catalysts for mineral exploration investment in Canada, and the PDAC was asking the Federal Government to extend the program for an additional 3 years (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 30-31; Prospectors & Developers Association of Canada, 2006§).

In 2004 (the latest year for which data were available), according to Natural Resources Canada, almost $8.7 billion (CAN $11.4 billion) in equity financing was available for international exploration and development projects. About 50% of that total was raised for companies listed on the Canadian stock exchanges of, in order of stocks volume, Toronto, Ontario, British Columbia, and Vancouver. In 2004, worldwide exploration budgets for, in order of importance, precious metals, base metals, and diamond increased by almost 40% to $3.8 billion (CAN $5.0 billion) from $1.5 billion in 2003. The number of companies that reported exploration programs (defined here as those with budgets of at least $100,000) increased to 1,138 in 2004, or by 24%, from 917 companies in 2003. Of those 1,138 firms, 680, or 60%, were based in Canada and the remaining were based around the world. In 2004, more mining companies were based in Canada than anywhere else and 105 of the world's 213 leading firms (or 49%, up from 45 firms in 2003) were located in the country followed by the Asia and the Pacific region, with 23%; Europe and the CIS, 10%; the United States, 8%; Africa and the Middle East, 6%; and Latin America and the Caribbean, 4%. Canadian companies are likely to continue, for at least the near future, to dominate minerals exploration worldwide (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 159-161).

Government Policies and Programs

The Canadian Provinces exercise the primary jurisdiction over mineral resources. Through their mining acts, the Provincial governments regulate most aspects of exploration and mining in Canada. The exceptions are the Northwest Territories, Nunavut, and the Yukon Territory, which are still under the resource-management control of the Canadian Federal Government, although they were slowly accumulating more independent powers. For instance, the Federal, the Territorial, and the First Nation negotiators, via the Devolution Transfer Agreement, transferred the Federal Government's current responsibilities for managing most of Yukon's natural (mineral and energy) resources to the Government of Yukon, effective April 1, 2003.

The ITCE program was given super flow-through-shares (FTS) status. This Federal and Provincial tax credit boosted the FTS' financing process and continued to encourage new investment and stimulate Canada's exploration program. The credit is in addition to the existing 100% deduction of eligible exploration expenditures from the Federal portion of investors' income tax and is equivalent to a 136.7% exploration expense deduction. The two types of FTS investments are the super flow-through, which includes additional Federal tax credits for grassroots exploration, and the regular flow-through plus Provincial and Territorial harmonization initiatives.

According to the IGWG's 2005 report, the Provinces and Territories continued to offer tax incentives for grassroots exploration and deposit appraisals. The Province of Newfoundland and Labrador's mineral incentive program was in its second year of a 3-year plan. The Province's combined assistance for 2005 was about $1.7 million, most of which was matched by the recipients (junior exploration companies and prospectors) (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 44-45).

New Brunswick's exploration incentives make up a threefold program to stimulate exploration activities: 1) A junior mining assistance program to attract exploration investment into the Province, which provided $270,000 in grants to 10 junior firms in 2005; 2) A comprehensive prospector development program to encourage grassroots exploration, which provided $225,200 in grants to 23 prospectors in 2005; and 3) An advanced exploration program to identify potential mineralization at greater depth than was previously possible via advanced exploration technology (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 53-54).

Quebec's refundable FTS tax credit for mineral resources will continue to allow a tax credit of up to 60% of exploration expenditures, for both senior and junior companies, until 2007. An additional deduction of 50% of qualifying exploration expenses, such as surface exploration and underground drilling on land that is not under a mining lease or mining concession and/or has had no production in the previous 5 fiscal years, may also be granted under the Mining Duties Act up to a limit of 50% of annual profit (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 59-60).

The Mineral Exploration Assistance Program (MEAP) provides financial assistance of up to 25% of eligible exploration expenditures to a maximum of $300,000 per year and recipient to companies or individuals undertaking mineral exploration in Manitoba. Companies and/or individuals may qualify for up to 35% of eligible exploration expenditures to maximum of $400,000 per year and recipient in remote areas of the Province, such as in Bissett, Far North, and Lynn Lake/Leaf Rapids. In April 2005, Manitoba renewed the MEAP program and will provide an additional $7.4 million funding during a 3-year period (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 81).

The Saskatchewan Mineral Exploration Tax Credit (SMETC) was introduced in December 2001. Saskatchewan also had in place a temporary 10% tax credit for eligible FTS investors in mineral exploration firms active in the Province where the targeted commodities were diamond and uranium. The SMETC program parallels the Federal 15% ITCE. In September 2002, the Province announced a 6-year $12.6 million package of mineral exploration incentives, such as 1) the corporation exploration incentive program, which offers reimbursement of up to 25% of approved eligible expenditures to a maximum of $100,000 per year and recipient, and 2) the prospectors incentive program, which offers reimbursement of up to 50% of approved eligible expenditures to a maximum of $7,500 per year and recipient (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 98-99).

During 2005, British Columbia provided a 10-year extension of the METC, which is a 20% refundable tax credit to companies undertaking eligible grassroots exploration in the Province. The METC program, in combination with the Federal Government's 15% mining tax credit, was considered to be one of the best exploration tax credit programs in Canada (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 107).

The Yukon Territory offered the Yukon Mining Incentives Program (YMIP), which offers reimbursement of up to 25% of approved eligible expenditures for individuals and companies. In 2005, funding was offered to 63 of 75 applicants for a total of more than $1.0 million; 12 of the successful applicants were in the grassroots prospecting stage, 21 were in the focused regional stage, and 33 were in the target evaluation stage. Of the successful YMIP applicants, 70% were exploring for gold, which included 20% for alluvial gold; of the remaining, 27% were exploring mainly for copper, and 3%, for gemstones and other commodities. In 2005, mineral exploration expenditures increased to $50 million from $22 million in 2004. About 70% of the expenditures was in the exploration of base metals, 20% was for precious metals, and 10% was for gemstones and coal (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 117, 121).

The Northwest Territories Geoscience Office (NTGO) is a partnership of, in order of economic importance, the Indian and Northern Affairs Canada (INAC), the Northwest Territories' Geology Division of the Department of Resources, the Wildlife and Economic Development Program, and the Geological Survey of Canada (GSC). The purpose of the NTGO is to contribute to a prosperous and sustainable resource-based economy, make a significant contribution to Canada's energy supply, and increase the informed use of geosciences for land claims, land use, and resource management policy (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 136).

The Canada-Nunavut Geoscience Office (C-NGO) is a partnership between the Government of Nunavut, the INAC, and the GSC (Department of Economic Development and Transportation). The mandate of the C-NGO is to provide accessible geosciences information in support of sustainable development of mineral and energy resources. In 2005, a total of 1,136 prospecting permits encompassing 48 million hectares were granted by the Mining Recorder's office (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 141).

Federal, Provincial, and Territorial policies, although not entirely consistent among Provinces, are generally stable and have traditionally supported the research and information services that relate to the mining industry. The Federal Government has negotiated multiyear Mineral Development Agreements with Provincial Governments to fund initiatives intended to strengthen the mining industry in Canada. The Canadian Securities Administrators' National Instrument 43-101, which pertains to the "Standards of Disclosure for Mineral Projects," was enacted into law in early 2001. This instrument continued to be applied to all technical public disclosure on mineral projects and to require that all technical disclosure be based on the work of a qualified person. The qualified person continued to be responsible for scientific and technical matters, which included not only exploration, development, definitions of resources and reserves, and mining matters, but also quality-control standards for analytical laboratories, the form of technical reports, professional supervision, corporate governance practices, regulatory oversight of the mining industry, and enforcement of securities laws (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 1-2, 180, 183-187).

Environmental Issues

Canada is a federation of 10 provinces and 3 territories and the authority to make laws is divided between the Parliament of Canada and the Provincial legislatures. The municipal governments are created under Provincial law and can make bylaws addressing a variety of local matters, such as zoning regulations and the issuance of construction permits. Certain arrangements have been developed for Aboriginal governments to exercise a range of governmental powers over reserve lands and other territories covered by specific arrangements negotiated with the Federal and Provincial governments (Natural Resources Canada, 2006a§).

The Canadian Environmental Assessment Act (CEAA) is a Federal environmental assessment process that provides the means of integrating environmental factors into planning and decisionmaking processes. The Government of Canada, through CEAA, seeks to achieve sustainable development and to promote economic development that conserves and enhances environmental quality. The Government of Canada is committed to ensuring that the administration of the CEAA results in a timely and predictable environmental assessment process that produces high quality environmental assessments so Federal decisions about projects safeguard the environment and promote sustainability. In Canada, based on the CEAA results, the Provincial and Territorial governments support and promote exploration and deposit appraisal activities in their respective jurisdictions via various initiatives, such as fiscal incentives, resolution of land access issues, and the provision of state-of-the-art geoscientific data (Canadian Environmental Assessment Agency, 2006§; Department of Justice Canada, 2006§).

The PDAC's total landscape management (TLM) is a multiple-use concept to achieve conservation, environmental protection, and resource development objectives. It has thus far produced unsatisfactory results, because the complex and changing needs of the TLM requires a more comprehensive and integrated approach for mining activities with environmental protection in a sustainable way. The TLM acknowledges, however, that access to land and certainty of title are crucial to resource development and that biological diversity, wilderness protection, and the preservation of unique and exceptional areas are fundamental to conservation objectives. The TLM also recommends management of entire ecological landscapes by employing the principal of conservation diversity; a system of "floating reserves" designed to accomplish protection in a constantly changing, dynamic landscape; adaptive management that allows the flexibility to accommodate new information, evolving ecosystems, and natural disturbances; and comanagement that ensures the provision of local community input (Canadian Intergovernmental Working Group on the Mineral Industry, 2005, p. 185-187).

Production

Mineral production took place in every Province and Territory in Canada. In 2005, the mineral and metal commodity prices continued to increase in response to the buoyant global demand. Canadian metals production was valued at $10.1 billion (CAN $13.3 billion) compared with $9.4 billion (CAN $12.4 billion) in 2004; industrial minerals production was valued at $8.2 billion (CAN $10.7 billion) compared with $7.9 billion (CAN $10.3 billion) in 2004; and coal production was valued at $1.8 billion (CAN $2.3 billion) compared with $1.2 billion (CAN $1.6 billion) in 2004. Production increased for, in order of value, nickel, potash, copper, coal, gold, cement, and diamond. Ontario's mineral output amounted to 27.4% of the total value followed by British Columbia, 18.4%; Saskatchewan, 15.5%; Quebec, 13.7%; the Northwest Territories, 6.5%; Alberta and Manitoba, 4.8% each; Newfoundland and Labrador, 4.3%; New Brunswick, 3.3%; Nova Scotia, 1.1%; and the Yukon Territory, 0.1%. Although the production of fuels tended to be concentrated in the Western Plains provinces, the output of nonfuel mineral commodities was characterized by a much wider distribution throughout Canada (Natural Resources Canada, 2006b; 2006b§).

Trade

As the world's leading exporter of minerals and metals, Canada enjoyed economic benefits from its mineral industry that included a significant contribution to its trade balance. In 2005, Canada's total exports, imports, and trade balance amounted to $395.1 billion, $338.5 billion, and $56.5 billion, respectively, compared with those of 2004, which were $330.7 billion, $279.0 billion, and $51.7 billion, respectively (Statistics Canada, 2006b§).

In 2005, Canada exported energy products ($75.8 billion), which included crude petroleum ($26.5 billion), natural gas ($31.4 billion), and coal and others ($17.9 billion); industrial goods and materials ($73.8 billion), which included crude minerals and ores ($7.8 billion), chemicals and fertilizers ($26.4 billion), metals and alloys ($23.6 billion), and industrial minerals ($16.0 billion) (Statistics Canada, 2006a§). Canada imported energy products ($29.4 billion), which included crude petroleum ($18.8 billion) and others ($10.6 billion), and industrial goods and materials ($68.5 billion), which included crude minerals and ores ($20.9 billion), chemicals ($25.0 billion), and industrial minerals ($22.6 billion) (Statistics Canada, 2006c§).

Prominent among the crude minerals exported in 2005 were iron ore, potash, and sulfur to the United States; copper concentrates to Japan; and iron ore and zinc concentrates to the EU. Exports of smelted and refined metals included aluminum, copper, gold, iron and steel, nickel, silver, and zinc to the United States; aluminum and gold to Japan; and copper and nickel to the EU. Coal exports went mostly to Japan. Total trade between Canada and the United States exceeded that of any other two countries in the world. In 2005, almost 81% of Canadian exports ($321.4 billion) and 67% of Canadian imports ($226.5 billion) were with the United States followed by, in order of value, Japan, the United Kingdom, the EU, Mexico, and other countries (Statistics Canada, 2006b§).

Structure of the Mineral Industry

The Canadian mineral industry comprised about 3,000 domestic and about 200 foreign companies; more than 9% of these companies were actively engaged in actual mining. Senior and junior companies were engaged in exploration, some of which were in advanced stages of mine development and expansions. Companies whose corporate voting rights were at least 50% non-Canadian were considered to be foreign, although other distinctions could apply for some large companies. More than 2,500 mine sites, which included coal, were active (Giancola, 2005, p. 13-19). Another 3,000 mines and quarries produced sand and gravel and other construction materials. About 40 smelters and refineries and other processing plants were operating in the cement, sodium chlorate, and sulfuric acid industries. Foreign companies were subject to the same taxes as domestic companies, and repatriation of earnings was allowed.

The Canadian mineral industry was privately owned with shares trading publicly on various exchanges in Canada and, in many cases, the United States. Overall, the mineral industry in Canada consisted of underground and open pit mines, leaching operations, concentrators, smelters, and refineries, as well as drilling and production operations characteristic of the petroleum industry. Table 2 lists the main commodities, leading companies, and major equity owners of the Canadian mineral industry.

In 2005, employment in the Canadian mineral industry declined to 388,000 from 390,000 in 2004, which was equivalent to almost 2.4% of the national employment level of 16.2 million. In the other sectors, employment in metal mining decreased by 4.8% to 21,519, nonmetal increased by 1.1% to 18,537, and coal increased by 11.3% to about 4,833 in 2005. About 1,500 people were also employed in diamond drilling (Birchfield, 2006, p. 2; Natural Resources Canada, 2006c§).

Commodity Review

Metals

Aluminum.—Canada produced more than 2.9 Mt of primary aluminum, which was an increase of almost 12% compared with the 2.6 Mt produced in 2004 and ranked Canada third after China and Russia and first, with Russia second and Venezuela third, in amount exported to the United States. The increase was owing to the Alouette smelter expansion and the restarting of the Aluminerie Bécancour smelter idle capacity in Quebec. In 2005, the value of Canadian production increased to $5.8 billion in 2005 from $5.1 billion in 2004, or by almost 14%; this increase was a result of increases in production and metal prices, which countered the increase of the Canadian dollar with respect to the U.S. dollar (Plunkert, 2006; Wagner, 2006, p. 11-12; Natural Resources Canada, 2006b§).

Alcan Inc. owned 51.9% of the total Canadian primary aluminum smelter capacity of about 2.7 million metric tons per year (Mt/yr), or almost 1.4 Mt/yr, followed by Alcoa Inc.

(25.2%), and others (23.7%) (Alcan Inc., 2006§; Alcoa Inc., 2006§). Alcan's 277,000 metric-ton-per-year (t/yr) smelter in Kitimat, British Columbia, operated at full capacity in 2005. Alcan announced the construction of an 80,000-t/yr facility in the Saguenay-Lac-Saint region of Quebec in 2006; this plant would use the first commercial application of Alcan's new low-caustic leaching and liming process. Alcan had completed the sale of Novelis Inc., which was the world's leading aluminum rolled-products firm, and opened packaging and automotive structures plants in Quebec (Wagner, 2006, p. 11; Alcan Inc., 2006§).

Alcoa was planning to expand its Lauralco-Deschambault smelter near Quebec City to 570,000 t/yr from 250,000 t/yr. Construction would start in 2006, initial production would begin in 2008, and full capacity would be reached in 2013. Alcoa was negotiating with Nova Pb Ltd. and St. Lawrence Cement Inc. for a long-term agreement to recycle Nova's spent potliner at its secondary lead smelter facility near Montreal and to recycle spent aluminum potliner produced by Alcoa's Quebec smelters to produce a new product called "CALSiFrit" to be used in cement production by St. Lawrence's Joliette plant (Wagner, 2006, p. 12; Alcoa Inc., 2006§). Alcoa and the Province of Quebec continued negotiating on the capacity upgrade of the Baie-Comeau smelter, which would increase the smelter's capacity to 547,000 t/yr from 437,000 t/yr by 2010 at an investment of about $1 billion (Alcoa Inc., 2006§).

Aluminerie Alouette Inc. [which is jointly owned by Alcan (40%), Aluminium Austria Metall Quebec (20%), Hydro Aluminum (20%), Société Générale de Finacement du Quebec (13.33%), and Marubeni Quebec Inc. (6.67%)] completed the more than $1.2 billion expansion of its smelter capacity near Sept-Îles, Quebec, from 245,000 t/yr to 550,000 t/yr. Preliminary work started in early 2003, and the metal output was expected in January 2006. Aluminerie de Bécancour Inc. restarted production at the 409,000-t/yr Bécancour smelter, which was owned by Alcoa (75%) and Alcan (25%) after its takeover of Pechiney SA of France (Wagner, 2006, p. 11; Alcan Inc., 2006§; Alcoa Inc., 2006§).

Bauxite and Alumina.—Production of alumina (Al_2O_3) totaled more than 1.2 Mt, which was an increase of 3.8% compared with that of 2004, and alumina (hydrate) was about 1.4 Mt, which was an increase of 5.4% compared with that of 2004 (table 1). In 2005, Alcan owned 100% of the total Canadian alumina refinery capacity of almost 1.2 Mt/yr. This capacity included Alcan's smelter-grade alumina refinery in Vaudreuil, Quebec, and two specialty alumina refineries in Brockville, Ontario (18,000 t/yr) and in Vaudreuil (160,000 t/yr). Canada imported about 2.2 Mt of bauxite from Brazil in 2005. Bauxite ore can be refined into two grades of alumina—smelter grade and specialty chemical grade; the former is used in the production of primary aluminum, and the latter is used in various products, such as absorbents, ceramics, fire retardants, and refractory bricks (Departamento Nacional de Produção Mineral, 2006; Alcan Inc., 2006§).

Copper.—Mine output of copper content increased to 594,812 t in 2005 from 562,795 t in 2004. Canada ranked seventh as world producer of copper following, in order of tonnage output, Chile, the United States, Indonesia, Peru, Australia, and Russia (Edelstein, 2006). Refined metal production decreased to 515,223 t from 526,955 t in 2004; the value of metal production, however, increased to $2.1 billion from $2.0 billion, or by about 5.0%, owing to the world copper price increase. Canada exported $2.5 billion worth of copper during 2004 (the latest year for which data were available) (Coulas, 2006, p. 15-16; Natural Resources Canada, 2006b).

In Canada, four Provinces accounted for the majority (96.4%) of copper production. In 2005, British Columbia was the leading copper producing Province. Its share amounted to about 44.5%; Ontario's, 32.5%; Quebec's, 12.1%; and Manitoba's, 7.3%. Teck Cominco Limited announced that the life of the Highland Valley Copper Mine will be extended by about 5 years to September 2013 at a cost of $40 million. The mine, which is located near Kamloops in British Columbia, was owned by Teck Cominco, 63.9%; BHP Billiton Ltd., 33.6%; and others, 2.5%. The Mount Polley copper gold mine restarted operations in March 2005 owing to the discovered Northeast Zone and improved metal prices. The proven and probable reserves in the Bell, the Springer, and the Wight open pits totaled 44 Mt containing 0.45% copper and 0.30 gram per metric ton (g/t) gold, which is equivalent to about 198,000 t of copper and 13.5 t of gold. The mine's life as of February 2005 was about 7 years. Inco and Falconbridge Limited signed a 10-year agreement under which Inco would send copper anodes produced at its Sudbury copper smelter to Falconbridge's Canadian Copper Refinery (CCR) in Montreal to refine copper and precious metals; the refined copper and precious metals would be purchased by Falconbridge, less treatment and related charges, and Inco would receive back the nickel and PGM recovered from the anodes. Inco was expected to ship between 104,000 t/yr and 122,000 t/yr of copper anode to CCR.

Inco announced in early 2005 that it would be closing its copper refinery in Sudbury, Ontario, citing as the major factors the facility's size and high operating costs. Ontario owed much of its past importance to the Sudbury and the Timmins regions where copper was recovered in conjunction with nickel.

Large-scale copper mining in Quebec was centered mostly on, in order of tonnage output, Falconbridge's Raglan, BHP Billiton's Selbale, Noranda's Bell Allard, and TeckCominco's Louvicourt copper mines. Campbell Resources Inc. brought the Copper Rand Mine back into production in March 2005 at a cost of almost $60 million. The copper gold mine is located in the Chibougamau area of Quebec. Noranda announced that it would increase output at the Horne smelter in Quebec to 170,000 t/yr from 140,000 t/yr of anode by the end of 2005.

Manitoba's importance revolved around Inco's Thompson and Hudson Bay's Chisel and Trout Lake mines and smelter in Flin Flon. Aur Resources Inc. announced that its Duck Pond copper zinc deposit in Quebec would come into production in late 2006. The Aur Mine would produce about 18,600 t/yr of copper, 16 t/yr of silver, and 128 kg/yr of gold. Inco's Voisey's Bay Mine and concentrator became operational in November 2005. Planned production in the first phase of the project would be about 50,000 t/yr of nickel and 38,550 t/yr of copper (Coulas, 2006, p. 15-16; Voisey's Bay Nickel Company Limited, 2006b§).

Gold.—Gold output decreased to 119 t in 2005 from 131 t in 2004, or by 9.2%. As a result, the value of gold production decreased by 22.7% ($1.7 billion) in 2005 compared with that of 2004 ($2.2 billion). The annual average gold prices have increased from $363 per ounce in 2003 and $409 per ounce in 2004 to $430 per ounce in 2005. World gold demand decreased by 7% owing mostly to the change from implied investment to disinvestment, and world gold production decreased to 2,340 t from 2,460 t, or by almost 5%. Additional production from several new mines was not enough to balance with the mine closures in, in order of production importance, Quebec and Nunavut. The sharp increase in gold value at the end of 2005 and into 2006, however, sparked renewed exploration and development operations across the country (Chevalier, 2006, p. 21-23; Natural Resources Canada, 2006c§).

Ontario produced about 60% of Canada's total gold production in 2005 followed by Quebec, 20%; British Columbia, 14%; and other Provinces and Territories, 6%. Operating gold mines accounted for 92.5% of Canada's output, 19 base-metal mines (gold as byproduct) accounted for 6%, and numerous gold placers contributed 1.5%. Canada was the eighth ranked gold producer worldwide following South Africa, Australia, the United States, China, Peru, Russia, and Indonesia. Canada exported $3.8 billion worth of gold in various forms during 2005 compared with $3.1 billion in 2004 (Chevalier, 2006, p. 21; George, 2006a; Natural Resources Canada, 2006b).

Iron Ore.—Output of iron ore decreased to 28.3 Mt from 28.6 Mt in 2004, or by almost 1%, and the value of production increased to $1.3 billion from $1.2 billion in 2004, or by 8.3% (Natural Resources Canada, 2006b). The output of iron content was composed of concentrates, pellets, and sinter from hematite and siderite ores. Canada's production came from its major iron ore producing companies, which included Iron Ore Company of Canada, Quebec Cartier Mining Co., and Wabush Mines Ltd. The remaining production was from the byproduct recovery of magnetite from two base-metal smelters in British Columbia. Labrador and Newfoundland produced 62%; Quebec, 37%; and British Columbia, 1% of a total output of iron ore in 2005. Canada shipped 28.1 Mt of iron ore to stockpiles, which was a decrease of 15.4% compared with the previous year. Canada exported 22.5 Mt of iron ore from stockpiles; of that amount, 4.5 Mt went to the United States in 2005 (Jorgenson, 2006; Natural Resources Canada, 2006b; 2006b§).

Lead and Zinc.—Canada was the world's fourth ranked mine producer of zinc in concentrate at 666,700 t and the world's sixth ranked producer of lead in concentrate at 79,300 t. Zinc mine output showed a decrease of almost 16% in 2005 compared with that of 2004; lead production, however, increased by 3.3% compared with that of 2004. Increased prices for zinc continued because of the shortfall in supply in the markets worldwide. Canada is an important producer and exporter of zinc and zinc products. Hudson Bay Mining and Smelting Co., Limited was acquired by HudBay Minerals Inc. from Anglo American plc. on December 21, 2004 (HudBay Minerals Inc., 2005§). Canada had a zinc smelting capacity of about 800,000 t/yr in four smelters—Falconbridge's Kidd Creek in Ontario, Hudson Bay's Flin Flon in Manitoba, Noranda's Valleyfield in Quebec, and Teck Cominco's Trail in British Columbia—and produced about 10% of the world's total supply of zinc (Gabby, 2006a, b; Natural Resources Canada, 2006b; 2006b§).

In 2005, Noranda's mine and mill operation at the Brunswick Mine near Bathurst, New Brunswick, was the leading lead producer with a capacity of 74,000 t/yr. Teck Cominco's Trail operation in southern British Columbia was the world's leading fully integrated smelter and refinery complex and had a zinc production capacity of 290,000 t/yr. HudBay Minerals was expanding its Chisel North underground zinc mine at Chisel Lake, Manitoba, which is located near Snow Lake. HudBay was planning to invest $260 million in the 777 zinc deposit, which contains approximately 14.5 Mt of estimated proven and probable zinc reserves. HudBay planned to spend an additional $21 million for the refurbishment of the Snow Lake mill. Snow Lakes' concentrates would be trucked 200 kilometers (km) southwest to the Flin Flon smelter. The 777 deposit was expected to enter into full production by 2006. The construction of a $65 million electrolytic tankhouse and work on a new zinc tankhouse at the Flin Flon smelter increased capacity by 35% to 115,000 t/yr from 85,000 t/yr. The Kidd Creek complex's zinc production capacity was 145,000 t/yr. The Valleyfield facility's production capacity near Montreal had increased steadily to 260,000 t/yr from its original 64,000 t/yr in 1962 (Natural Resources Canada, 2006b§).

In 2005, Canadian exports and imports of lead were 211,781 t valued at $247.1 million and 151,838 t valued at $161.2 million, respectively. Exports and imports of zinc were 965,277 t valued at $965 million and 318,647 t valued at $311 million, respectively (Natural Resources Canada, 2006b§).

Nickel.—Canadian nickel mine production increased to 198,369 t of nickel content in 2005 compared with 186,694 t in 2004, or by about 6.3%. Higher prices caused the value of nickel to increase by 15.2%, or $2.9 billion, compared with that of 2004. Nickel was the most valuable mineral commodity produced in Canada during the year followed by, in order of value, potash, copper, coal, gold, cement, diamond, and iron ore. Traditionally, the Sudbury Basin in Ontario and the Thompson nickel belt in Manitoba were the most significant nickel production areas in Canada (McCutcheon, 2006, p. 27; Natural Resources Canada, 2006b; Inco Limited, 2006a§).

In 2005, Falconbridge's Raglan Mine in the northern Ungave Peninsula, Quebec, processed 0.9 Mt of ore and produced concentrates containing 22,200 t of nickel, 5,800 t of copper, and 350 t of cobalt. Falconbridge operated three mines in Sudbury and produced concentrates containing 19,700 t of nickel, 23,400 t of copper, and 354 t of cobalt after processing 2.2 Mt of ore. Falconbridge's smelter produced a record 63,100 t of nickel in matte. The matte, which contained about 54% nickel from the smelter, was shipped to Falconbridge's Nikkelverk refinery in Norway where cobalt, copper, nickel, and precious metals were recovered. The Raglan operation produced concentrates of 26,552 t of nickel and 6,867 t of copper. Raglan concentrates were shipped from Deception Bay, which is located 100 km north of the mine, to Quebec City to continue by rail to Falconbridge's Sudbury smelter in Ontario. Falconbridge's exploration at the Nickel Rim South near Sudbury resulted in an increased resource of 13.4 Mt at grades of 1.8% nickel, 3.3% copper, 0.04% cobalt, 1.8 g/t platinum, 2.0 g/t palladium, and

0.8 g/t gold by late 2004; production was expected to start in 2009 (McCutcheon, 2006, p. 28; Falconbridge Limited, 2006§).

In 2005, Inco's seven underground mines produced 8.75 Mt of ore containing 1.28% nickel and 1.38% copper, and its Sudbury's refinery produced 60,000 t of metal. About 37,500 t of nickel from the Sudbury smelter was sent to Inco's U.K. refinery for final processing. Smelting of Voisey's Bay concentrates at Inco's Sudbury smelter was expected to produce about 19,500 t on nickel in 2006 (McCutcheon, 2006, p. 28; Inco Limited, 2006a§).

Sherritt International Corp. and the Cuban Government each owned 50% equity of Metals Enterprise Inc. (MEI), which operated a refinery in Fort Saskatchewan, Alberta, and a laterite mine and leach plant in Cuba. MEI produced 31,900 t of refined nickel and 3,390 t of refined cobalt in 2005 compared with 31,800 t of refined nickel and 3,320 t of refined cobalt in 2004. MEI announced a 50% expansion of its nickel-cobalt production capacity at an estimated cost of $500 million by 2008 (McCutcheon, 2006, p. 29).

Platinum-Group Metals.—Mine production of PGM increased by about 12.5% compared with that of 2004 as a result of the 22% and the 15% increase in the prices of platinum and palladium, respectively, in 2005. PGM use increased by almost 7% owing to higher demand in the autocatalyst and the electronic industries in 2005. Platinum alloys tended to be used in jewelry; platinum, palladium, and copper-gold-silver alloys were used in dentistry. North American Palladium Limited produced PGM as its main product from the Lac des Iles open pit, which is located west of Thunder Bay in Ontario. Most production of PGM has been as byproducts from Inco's and Falconbridge's nickel-cobalt operations in Sudbury, Ontario. Falconbridge also recovered PGMs from its Raglan Mine in Quebec. Inco's Sudbury operation accounted for the majority of primary PGM output, although a small amount came from its Birchtree and Thompson operations in Manitoba as well (Chevalier, 2005a, p. 41.1-3, 41.11; Inco Limited, 2006a§).

The nickel sulfide ores yield creditable byproducts, such as, in order of value, copper, cobalt, gold, silver, PGM, selenium, tellurium, sulfuric acid, and liquid sulfur dioxide. Falconbridge shipped its PGM, which were contained in copper-nickel matte, to the firm's Nikkelverk refinery in Norway. Inco's PGM refinery in Acton, United Kingdom, processed primary and secondary materials from its Ontario ores. Canada ranked third behind South Africa and Russia in world platinum production and fourth after Russia, South Africa, and the United States in world palladium production (Chevalier, 2005a, p. 41.2; George, 2006b).

Silver.—Canada ranked sixth in world silver production after Peru, China, Mexico, Australia, and Chile (Brooks, 2006). Canadian silver production has been largely a byproduct of base-metal and gold mining and, therefore, subject to whatever mining incentive applied to the principal product, whether copper, gold, and/or lead and zinc. Accordingly, silver output suffers when mines close or suspend operations for reasons that involve supply, demand, and pricing for the major product. In 2005, silver-in-concentrate production from base-metal mines accounted for 51% of the total output and gold mines contributed the remaining 49%.

According to the Natural Resources Canada and the Silver Institute, the annual average price for silver increased to $7.31 per ounce from $6.66 per ounce in 2004, or by 9.8%. Furthermore, prices were driven by strong investment demand, higher industrial demand, and lower net Government silver stockpile sales. An increase in industrial demand in developing countries, such as China, and the rest of the world as economic conditions continue to improve coupled with an expected decline in the value of the U.S. dollar and higher oil prices could lead to better prices in 2006 (Chevalier, 2005b, p. 48.1-3).

Titanium.—Mine production of ilmenite increased by about 10% compared with that of 2004 and ranked third following Australia and South Africa (Gambogi, 2006). QIT-Fer et Titane, Inc. (QIT) (a wholly owned subsidiary of the British-Australian Rio Tinto Group) operated an ilmenite mine at Lac Tio, which is located near Havre-Saint-Pierre, Quebec (QIT-Fer et Titane, Inc., 2006§). In 2005, QIT produced 3 Mt of ilmenite ore, which it crushed onsite (Lac Tio) and transported to the QIT metallurgical complex in Sorel-Tracy, Quebec. At this facility, which was the only one of its kind in the world, the crushed ore was mixed with high-quality coal and smelted in electric arc furnaces to produce SORELMETAL iron ingots, which is a premium-quality iron, and titanium-dioxide rich titanium slag known as SORELSLAG. The quality iron went to the steelworks to produce SORELSTEEL and ATOMET as iron and steel powders. The primary product was a titanium dioxide feedstock to make, in order of value added, pigments for paints, surface coatings, plastics and paper, and iron and zircon byproducts. QIT's proprietary process technology had the production capacity to supply sulfate (1.1 Mt/yr of SORELSLAG titanium slag) and chloride (250,000 t/yr of UGS titanium slag) pigments. SORELSLAG had a titanium dioxide content of about 80% and was sold to pigment producers that used the sulfate process. UGS titanium slag, which was QIT's newest product, contained 94.5% of titanium dioxide and was supplied to the growing market of pigment producers that used the chloride process. To meet future potential demand, the UGS titanium slag plant could be expanded to 600,000 t/yr from its current (2005) capacity of 250,000 t/yr (QIT-Fer et Titane, Inc., 2006§).

Industrial Minerals

Asbestos.—Canadian asbestos production increased by less than 10% compared with that of 2004. The asbestos industry continued to be affected by competition for market share with, in order of tonnage supplied, Russia, China, and Brazil, and by liability issues because of the adoption of governmental regulations by a number of countries owing to human health concerns (Gaëtan, 2005, p. 18.4). Chrysotile is the only form of asbestos in the serpentine group. The amphibole group consists of actinolite, amosite, anthophyllite, crocidolite, and tremolite forms. Of these minerals, chrysotile is the least hazardous to human health and is the only form of asbestos produced in Canada. After Russia, China, and Kazakhstan, Canada was the fourth ranked producer of asbestos and supplied about 93% of the U.S. demand. Total exports for 2004 were estimated to be 240,000 t at a value of $145 million, which represented a

23.7% decrease compared with that of 2003 (Gaëtan, 2005, p. 18.12; Virta, 2006). China produced almost exclusively short-fiber asbestos for asbestos cement and replaced Canada as the second ranked producer; China could eventually threaten Russia's leading position. As a result of the ban on movement in Europe and regulatory changes in other developed countries, asbestos use was expected to remain low in the foreseeable future. In some developing countries, the benefits and safety of chrysotile-cement products continued to be recognized despite increasing competition from substitute fibers, PVC, and galvanized steel. The chrysotile-cement pipes are essential for water transportation and irrigation in the developing countries because the abruptness of terrain and economic conditions, but are not yet conducive to substitute products, such as PVC types (Gaëtan, 2005, p. 18.3).

The introduction of new chrysotile-containing products to address current health concerns and the gradual recognition by regulatory bodies of the potential toxicity of the substitute fibers may increase use of chrysotile asbestos products in the medium term. Marginal gains were expected in Latin American consumption of Canadian chrysotile; Asia, which was already a significant market (taking more than 50% of exports), was seen as expanding the demand for longer Canadian fibers (Gaëtan, 2005, p. 18.3).

The Canadian chrysotile industry is concentrated in Quebec. Production comes from the Bell underground mines and the Lac d' Amiante du Quebec, Ltée open pit, which was owned and operated by LAB Chrysotile, Inc. and is located near Thetford Mines, and the Jeffrey Mine, which was operated by Jeffrey Mine Inc. and is located near the town of Asbestos (table 2; Gaëtan, 2005, p. 18.1).

Cement.—Production of cement increased to 14.3 Mt in 2005 from 14.0 Mt in 2004 with a corresponding increase in value of about 5.1% to $1.44 billion in 2005 from $1.37 billion in 2004. Cement producers in Canada, on the basis of preliminary data, shipped an estimated 14.3 Mt of portland cement valued at $1.7 billion in 2005 compared with 14.0 Mt valued at $1.6 billion in 2004 (Panagapko, 2005, p. 15.1; Natural Resources Canada, 2006b; 2006b§). The continued demand for raw materials in China has caused a dramatic increase in shipping rates that has been affecting the imports of cement to the Americas from Asia. U.S. imports of cement and clinker totaled 31.8 Mt in 2005 (van Oss, 2006). Canadian and U.S. trade of cement and clinker varies from year to year depending on construction activity. In 2005, cement exports to the United States amounted to 4.3 Mt, which was a decrease of 7.8% from the previous year and represented almost 45% of total Canadian production (Panagapko, 2005, p. 15.4). This implies that for the immediate and perhaps the foreseeable future, the success of Canadian cement producers could be based significantly on exports to the United States and, hence, on U.S. economic growth. Canadian growth and construction, particularly in Ontario, which was the leading domestic cement market, will play the key role in determining the balance between domestic and U.S. consumption (Panagapko, 2005, 15.3-15.4).

According to the Canadian Construction Association and the Minerals and Metals Sector of Natural Resources Canada, cement production was expected to be marginally higher as a result of an increase of about 10% in the expenditures on infrastructure to about $90 billion. Also, the "Infrastructure Canada Program (ICP)," which involves Federal, Provincial, Territorial, and municipal governments, will contribute about $4 billion to ICP across Canada in the coming decade. An increase in mortgage interest rates, however, could affect residential construction and cause increases in the cost of new homes, and ease the demand for cement for other components, such as nonresidential and engineering construction programs (Panagapko, 2005, p. 15.7).

The fact that Canada has been the major exporter to the United States has kept Canadian cement kilns operating at high rates throughout the past decade and has allowed for gains in pricing. During 2001-04, the United States' main import sources for hydraulic cement and clinker were Canada (22%), Thailand (14%), China (9%), Venezuela (7%), and others (48%) (Panagapko, 2005, p. 15.4; van Oss, 2006).

Diamond.—Production of diamond decreased by about 2.4% to 12.3 million carats from that of 2004 (12.6 million carats) with a corresponding value decrease of 19% to $1.7 billion in 2005 compared with that of 2004 ($2.1 billion). The decreases in output and value resulted from the processing of low-grade ores at the Diavik and the Ekati diamond mines as part of their mine plans. In 2005, Canada's diamond mining sector completed its seventh full year of production, and was the country's fifth ranked nonfuel mineral commodity after nickel, potash, copper, and coal.

Canada's first open pit and underground diamond mine and commercial producer of diamond was the Ekati Mine. It was a joint venture between BHP Billiton Diamonds Inc. (80%), which was owned by BHP Billiton Group of Australia, and Charles Fipke and Stewart Blussom (10% each). The Ekati Mine is located near Lac de Gras about 300 km northeast of Yellowknife in the Northwest Territories. The Panda underground project part of Ekati started production in April 2005 and was expected to produce about 4.7 million carats per year during the next 6 years.

The second Canadian diamond mine, the Diavik Mine, which is located about 35 km southeast of Ekati and 300 km northeast of Yellowknife in the Northwest Territories, began production in January 2003. The Diavik Mine was an unincorporated joint venture between Diavik Diamond Mines Inc. (DDMI) (60%) (a wholly owned subsidiary of Rio Tinto plc of the United Kingdom) and Aber Diamond Mines Ltd. (40%) (a wholly owned subsidiary of Aber Diamond Corporation of Toronto, Ontario, Canada); DDMI was the operator of the mine. By yearend 2004, Diavik's reserves included 29.8 Mt of ore at 3.2 carats per metric ton, and its diamond production in 2005 amounted to 8.3 million carats, which was an 8.4% increase compared with that of 2004. In 2005, Canada's diamond output contributed almost 13.5% of the world's production of natural rough diamond, which was estimated to total 162.3 million carats valued at about $162.3 billion, and made Canada the third ranked producer by value following Botswana and Russia. With the planned opening of the Jericho Mine in 2006, the Snap Lake Mine in 2007, the Victor Mine in 2008, and the Gahcho

Kue Mine in 2011, however, Canada's share of world diamond production was expected to increase to more than 20% from 13.5% in 2005 (Natural Resources Canada, 2006b; Perron, 2006, p. 17).

BHP Billiton Diamonds reported that the quality of diamond recovered to date from the five kimberlite pipes at their Lac de Gras property compared favorably with the best pipes in other parts of the world. The five pipes were located under, in order of value, the Panda, the Koala, the Misery, the Fox, and the Leslie lakes and would be mined during a 30-year period. The centralized processing plant, which was located southwest of the Koala pit, was to receive 9,000 t/d of ore during the first 9 years of operation and 18,000 t/d thereafter. The cutoff grade would be 0.01 carat per metric ton. Processing was expected to involve mainly crushing, scrubbing, and dense-media separation, as well as high-intensity magnetic separation, X-ray concentration, and sorting. Future output was projected to be 4.5 million carats per year, or about 5% of world diamond production. Capital investment was expected to be at least $4 billion in association with the five pipes (BHP Billiton Diamonds Inc., 2006§).

The Snap Lake underground mine, which was 100% owned by De Beers Canada Inc. (part of the De Beers Group, which is headquartered in South Africa), is located 220 km northeast of Yellowknife in the Northwest Territories. On June 1, 2004, De Beers Canada was granted its final permit to proceed with the development and full construction of the Snap Lake Mine at a cost of about $560 million. This project would be De Beers' first mine outside of Africa and the first time that a kimberlite dike (tabular-shaped structure) would be mined on a large scale. The Snap Lake project contains more than 18.3 Mt at an average grade of 1.46 carats per metric ton of diamond as defined (minable) reserves. The Snap Lake project was expected to produce about 1.5 million carats per year by early 2007 and to have a mine life of more than 20 years with an investment of $1 billion. The average value per carat was estimated to be $76. In October 2005, De Beers received final environmental approval for the development and full construction of its Victor project in northern Ontario at a cost of about $860 million. At the end of 2008, when operating at full capacity, Victor was expected to produce about 600,000 carats per year during a 12-year open pit mine life (Perron, 2006, p. 18; Antwerp Facets Online, 2006§; De Beers Canada, 2006§).

The Jericho diamond project, which is located in Nunavut about 420 km northeast of Yellowknife, was wholly owned by Tahera Diamond Corporation, which was based in Toronto, Ontario. Tahera planned to develop the project as Nunavut's first diamond mine. In June 2004, Tahera received Federal approval for its Jericho diamond project, followed by the water license and land lease in early 2005. Open pit development was completed by the end of 2005, and full production was to begin in April 2006 at a rate of 500,000 carats per year. Tahera's base plan indicated that more than 4.7 million carats would be produced during a 9-year mine life. The Jericho project contains defined (minable) reserves of more than 2.6 Mt at an average grade of 1.2 carats per metric ton and total diamond resources of 5.5 Mt at an average grade of 0.84 carat per metric ton. Tahera had in place a diamond purchasing and marketing agreement with a wholly owned subsidiary of Tiffany & Co. of the United States. Under the agreement, a portion of the production would be used in jewelry and the balance would be sold on behalf of Tahera on the international market for a fee (Perron, 2006, p. 18; Tahera Diamond Corporation, 2006§).

On January 1, 2003, the Kimberley Process Certification Scheme (KPCS) was implemented internationally. Under the KPCS, all Government participants agreed that all imports and exports of rough diamond would be accompanied by a certificate, and trade would take place only between participants, each of which must have adequate legislation to enforce the terms and conditions of the KPCS. Canada and 45 other countries were current (2005) members of the KPCS. On October 12, 2002 (Bill C-14), Canada's Parliament passed the Export and Import of Rough Diamond Act and regulations, which provided the Government with the authority to control trade of rough diamond, which must be reported to the Minister of Natural Resources Canada, who is Canada's export and import authority for rough diamond. Bill C-14 was to be modified by Bill S-36, which was introduced on November 25, 2005. The provisions of the New Act were to be published in the Canada Gazette in 2006 (Natural Resources Canada, 2006b; Perron, 2006, p. 20-23).

Potash.—The dominant potash product is potassium chlorite (KCl), which is reported as potassium oxide/oxide of potash (K_2O) equivalent. Potash production totaled about 10.6 Mt; this was an increase of almost 3% compared with that of 2004 (10.3 Mt). The value of production increased to about $2.5 billion in 2005 from $1.5 billion in 2004. Most of the output came from mines in Saskatchewan, but about 5% came from New Brunswick. Canada has probably the world's largest identified potash resource, which was estimated to be about 60 billion metric tons, and a reserve base of almost 10 billion metric tons (Natural Resources Canada, 2006b; Stone, 2006b, p. 31).

Canada was the world's leading producer and exporter of potash. Canadian potash exports amounted to 15.8 Mt in 2005 compared with 16.5 Mt in 2004. The United States remained Canada's leading market, with a volume of 9.2 Mt, or a 58.2% share of the total exports, and was followed by China, with 2.4 Mt, or 15.2%; Brazil, with 1.2 Mt, or 7.6%; and others, with the remaining 3.3 Mt, or 19%. In 2005, exports to the United States increased by 3.2% compared with 8.9 Mt in 2004. Exports to Asia, which climbed owing to an increase in shipments to China, increased by 28% compared with 1.9 Mt in 2004. Exports to Brazil declined to 1.2 Mt in 2005 compared with 1.6 Mt in 2004. The outlook for potash demand in 2006 was positive (Stone, 2006b, p. 31-32).

Potash Corporation of Saskatchewan Inc. (PotashCorp), which was based in Saskatoon, Saskatchewan, was one of the world's leading publicly owned potash producers. It had the following divisions, in order of production: Allan, Cory, Lanigan, New Brunswick, Rocanville, and Patience Lake (a solution mine). PotashCorp owned 25% of the reserves at Esterhazy, Saskatchewan, which were mined by IMC Esterhazy Canada Limited Partnership under a long-term agreement. PotashCorp's production capacity was 12.1 Mt/yr of KCl equivalent, which was equal to about 56.5% of Canada's total potash annual capacity of 21.4 Mt (Stone, 2006b, p. 32).

Mineral Fuels and Related Materials

Coal.—At the end of 2005, Canada's coal reserves amounted to almost 6.6 billion metric tons (table 3). Canada produced 67.3 Mt of coal in 2005 compared with 66.5 Mt in 2004. Coal production was still declining from the record high of about 78.9 Mt in 1997. The total value of production was $2 billion, which was an increase of almost 43% compared with that of 2004 ($1.4 billion). In 2005, owing to higher prices and stronger demand, the coal sector in western Canada continued to prosper. For example, in northeastern British Columbia, Western Canadian Coal Corp.'s Wolverine/Perry Creek Mine received the necessary regulatory approvals to start mine development in April 2005, to start coal production at a rate of 2.4 Mt/yr in July 2006, and to reach a full capacity of 3 Mt/yr by 2007. Northern Energy and Mining Inc. completed construction of its Trend Small Mine at the end of 2005 and production was to start in January 2006 at a capacity of 1 Mt/yr of coking coal. Twenty-four coal mines were operating in Canada by the end of 2005; most large-scale coal mines were located in western Canada. In 2005, Canada accounted for only about 2% of the world's coal production; it exported less than one-half of that production, thus making it the world's fifth ranked exporter after Australia, the United States, China, and South Africa (Natural Resources Canada, 2006b; 2006b§; Stone, 2006a, p. 13-14).

Canada exported 28.2 Mt of coal, which included 26.7 Mt of coking coal and 1.5 Mt of thermal coal. Canada's export volume increased by 8% in 2005 compared with that of 2004. Canada's exports to Asia, which was the leading market for Canadian coal, increased to 15 Mt in 2005 from 12 Mt in 2004; exports to Japan increased to 7.5 Mt from 5.4 Mt, and exports to South Korea increased to 4.9 Mt from 3.6 Mt; exports to Europe increased to 8.8 Mt from 8.3 Mt; and exports to Latin America increased to 2.3 Mt from 2.0 Mt. Exports to the members of the North America Free Trade Agreement (NAFTA), however, declined by 40% in 2005 owing to domestic supplies, mostly, in Mexico and the United States. Canada imported 21 Mt of coal in 2005 compared with 19 Mt in 2004, or almost an 11% increase. Of the total imports, 17 Mt was thermal coal, mainly for coal-fired electricity generation in the Provinces of, in order of amount consumed, Ontario, Nova Scotia, and New Brunswick. In 2005, the United States supplied 17.7 Mt of coal, which was 1.1 Mt more than in 2004, and Colombia supplied 2.6 Mt compared with 1.5 Mt in 2004. Domestic coal consumption remained high at about 60 Mt, and much of the eastern Canadian demand was supplied by imports. Electricity generation consumed about 56 Mt of thermal coal, of which 39 Mt was supplied domestically and 17 Mt was imported. Canada's cement, steel, and other sectors consumed 4 Mt (Stone, 2006a, p. 13-14; Statistics Canada, 2006a§, c§).

In 2005, Elk Valley Coal Partnership operated the Coal Mountain, the Elkview, the Fording River, the Greenhills, and the Line Creek mines in British Columbia and the Cardinal River Mine in Alberta. The Elk Valley, which was the second ranked metallurgical coal operating unit in the world, was established by the joint venture of Consol Energy Inc., Fording Inc., and Luscar Energy Partnership (59%) and Teck Cominco (41%). Luscar Coal Ltd., which was owned by the Luscar Energy Partnership (Canada's leading coal producer) operated the following surface mines (listed here in order of tonnage produced): the Coal Valley, the Obed Mountain, the Highvale, the Paintearth, the Sheerness, the Whitewood, and the Genesee in Alberta and the Poplar River, the Boundary Dam, and the Bienfait in Saskatchewan. These coal mines have a combined production capacity of 40 Mt/yr of bituminous, subbituminous, and lignite thermal coal used mainly for domestic electric power generation. In eastern Canada, the Nova Scotia government selected Xtrata plc in December 2005 to develop coal resources at the Donkin Mine on Cape Breton Island (Stone, 2006a, p. 14; Elk Valley Coal Partnership, 2006§; Teck Cominco Limited, 2006§).

After Canada ratified the Kyoto Protocol (2002) to limit greenhouse gas emissions and the production of particulate associated with the burning of coal, the Government and the private sector invested in the development of clean coal technologies. These technologies are designed to enhance both the efficiency and the environmental acceptability of coal development, production, and consumption (Stone, 2006a, p. 13).

Crude Oil.—Production of crude oil (petroleum) totaled 928.5 million barrels (Mbbl) in 2005, which was a decrease from a record high of 940.1 million barrels (Mbbl) in 2004 and an increase of about 2.2% compared with the 908.2 Mbbl produced in 2003. The value of the production was $51 billion in 2005 compared with $36 billion in 2004; the oil prices in 2005 were the highest of the past 30 years (average $54.52 per barrel). Canada, which in 2005 had a projected 22% share of world production, maintained its position as America's third ranked producer of crude oil after, in order of volume, the United States and Mexico and followed by Venezuela and Brazil. The country remained a leading exporter with a more than 16% share of U.S. crude oil imports (BP p.l.c., 2006§; Statistics Canada, 2006a§).

In 2005, petroleum exports and imports increased by 2.5% and 2.4%, respectively, compared with those of 2004. Exports amounted to almost 65% (600 Mbbl) of the total petroleum production, which was a result of the strong demand from the United States. Canadian imports amounted to 341 Mbbl; a significant volume (more than 98%) was supplied by the United States and Europe (BP p.l.c., 2006§; Statistics Canada, 2006a§, c§).

Natural Gas.—Production of natural gas totaled about 196,000 million cubic meters; this was an increase of almost 1% compared with that of 2004 (195,815 million cubic meters). The value of production increased to $15.2 billion in 2005 from $14.6 billion in 2004. Natural gas byproducts were valued at $2.3 billion, which was an increase of 9.5% compared with that of 2004. Both products, however, responded to supply-and-demand imbalances and increased prices. Canada ranked third in the world after Russia and the United States in the output of natural gas. Increasingly, the production of natural gas has played a major role in the mineral economy of Canada and has had a palpable effect on the GDP. Natural gas consumption in the United States, which was the world's leading consumer, decreased to about 633.5 billion cubic meters from 645.0 billion cubic meters in 2004, or by almost 2% because of higher prices and industrial restructuring; this had some effect on the

Canadian marketed gas (Natural Resources Canada, 2006b; BP p.l.c., 2006§).

Canada remained the leading foreign supplier of natural gas to the United States. About 104.2 billion cubic meters of natural gas, which was more than 16% of the U.S. consumption, was exported to the United States in 2005. These exports were expected to increase to about 105 billion cubic meters by 2006 in anticipation of the increasing inability of U.S. domestic production to meet its demand. In 2005, Canada's natural gas proven reserves were estimated to be about 1.6 trillion cubic meters, which remained about the same level as that of the preceding year (table 3; BP p.l.c., 2006§; Statistics Canada, 2006a§, c§; U.S. Energy Information Administration, 2006§).

Exploration for new discoveries of natural gas continued in Alberta and Saskatchewan. Exploration activities in both provinces began at least two decades ago. Chevron Canada Resources Ltd. (a subsidiary of ChevronTexaco Corp. of the United States) had one of the largest natural gas strikes in recent history near Fort Laird, Northwest Territories, where projections by the company showed "between 11 billion and 17 billion cubic meters (400 billion and 600 billion cubic feet) of gas in place in more than 400 meters (1,200 feet) of pay zone" (Natural Resources Canada, 2006c§). Accessing Canada's abundance of fuels, particularly oil in northern Alberta and natural gas in the Northwest Territories, has become economically feasible because of new technology and rising fuel prices (BP p.l.c., 2006§; Natural Resources Canada, 2006c§).

Opposition to natural gas exploration, production, and transmission, however, has grown in recent years. Environmental groups opposed to the construction of proposed pipelines to feed demand in the United States, and the Rocky Mountain Ecosystem Coalition attempted to slow the expansion of natural gas exploration and production activities in northern Alberta. A National Energy Board report, which assessed supplies and demand to 2025, put known natural gas reserves in Canada's northern frontier at 680 billion cubic meters (24 trillion cubic feet) and estimated reserves at 4.8 trillion cubic meters (170 trillion cubic feet) (BP p.l.c., 2006§).

Uranium.—Production of uranium (U content) in 2005 amounted to 12,597 t U and increased by more than 9.1% compared with that of 2004 (11,548 t U), mainly because the uranium spot market prices continued to increase in 2005 and into 2006. In 2005, the value of uranium production increased by almost 65.4% compared with that of 2004. Canada's two largest high-grade uranium (U content) deposits to date are McArthur River, which contains 160,000 t U at an average grade of 22% U, and Cigar Lake, which contains 90,000 t U at an average grade of 16% U. The McArthur River Mine began production in late 1999. Development of the Cigar Lake deposit was proceeding, and production was expected to start at full production capacity of 7,000 t/yr in late 2007. The Rabbit Lake Mine produced 2,317 t U in 2005 compared with 2,310 t U in 2004. The McClean Lake Mine production decreased to 2,112 t U in 2005 from 2,310 t U in 2004 owing to lower-grade mill feed (table 2; Natural Resources Canada, 2006b; Vance, 2006, p. 37-38).

Concerns about cleaner air and climate change have stimulated public debate on energy policy and created a more-favorable attitude towards nuclear power. In general, Canadian uranium producers in northern Saskatchewan remained well-positioned to capitalize on current market conditions and prospects for further nuclear power development in, for example, France, Japan, and the United States. As the world's leading supplier of uranium, Canada was well-placed in terms of resources, reserves, mining labor experience, and technology to maintain this position considering expected improvement on longer term world demand. The Athabasca Basin of Saskatchewan remained the focus for uranium exploration. Uranium exploration has also been reported in, in order of tonnage of resources, the Northwest Territories, Yukon, Nunavut, Quebec, Newfoundland and Labrador, Ontario, Manitoba, and Alberta. As many as 90 junior exploration firms have been involved. As of January 1, 2006, Canada's identified recoverable uranium resources totaled 431,000 t U, which was almost a 3% decrease compared with that of January 1, 2005 (444, 000 t U). In Canada, the transition to new production was being centered on tapping high-grade and low-cost uranium ore deposits, such as the Cigar Lake Mine, which would ensure that Canada remains the world's leading U supplier. The Cigar Lake Mine was expected to begin production in 2007 once the necessary licenses are obtained and provided the market conditions are favorable (Vance, 2006, p. 38).

Reserves

According to Natural Resources Canada, reserves of selected minerals were estimated based on responses by mining companies to the annual Federal, Provincial, and Territorial survey of operating mines and Corporate Canada's annual reports. Table 3 lists the levels of Canadian reserves of copper, gold, lead, molybdenum, nickel, silver, zinc, and other selected mineral commodities as of June 2006. Data are shown in terms of metal contained in ores for the base and precious metals or recoverable quantities of other mineral commodities, which included industrial minerals and mineral fuels. These mineral reserves represent "proven" and "probable" categories and exclude quantities reported as "possible." Reserves were defined as being well-delineated and economically minable ore from mines committed to production (Reed, 2005).

Yearly changes in the assessment of reserves are, in simplest terms, the arithmetic result of additions to reserves, deletions from reserves, and production. A complication is that, in Canada, a large number of mines produce more than one metal, thus necessitating close attention to market price and processing costs for two or possibly several mineral commodities simultaneously to enable production as coproducts to share costs and/or byproducts as credits.

Four Provinces dominated the reserves position in terms of proven and probable (minable) reserves of major metals—Ontario had 56% of the nickel reserves, about 57% of the gold, 55% of the copper, 29% of the zinc, and 26% of the silver; British Columbia had 100% of the molybdenum reserves, about 28% of the copper, 26% of the silver, 15% of the gold, 8% of the zinc, and 6% of the lead; New Brunswick had 88% of the lead reserves, 28% of the zinc, and 20% of the silver; and Quebec had 29% of the zinc reserves, 28% of the silver, 24% of the gold, 11%

of the nickel, and 6% of the copper. Manitoba had the smallest shares of reserves, such as 16% of the nickel, 6% of the zinc, 2% of the copper, and 1% each of gold and silver (Reed, 2005).

Infrastructure

Canada's total area of about 9.985 million square kilometers includes land area of 9.094 million square kilometers and freshwater area of 891,163 square kilometers. This total area is slightly larger than the United States. Canada has networks of highly developed infrastructure and vast areas of trackless wilderness. The country has 1.409 million kilometers of roads that comprise 497,300 km of paved highway, which included 16,900 km of expressways and 911,500 km of unpaved gravel or other loose-surface roads. Bulldozed temporary roads have been established for mining exploration in many remote places, but these deteriorate readily where not maintained (Natural Resources Canada, 2006b§; U.S Central Intelligence Agency, 2006§).

A total of 48,910 km of standard-gauge railroads included two main systems—the Canadian National and the Canadian Pacific. The country also had about 3,000 km of inland waterways plus the 3,770-km Saint Lawrence Seaway (one of the busiest in the world), which includes the 3,060-km Saint Lawrence River that leads into the Great Lakes and is shared with the United States. Principal ports and harbors were Becancour (Quebec), Churchill (Manitoba), Halifax (Nova Scotia), Montreal (Quebec), Prince Rupert (British Columbia), Quebec (Quebec), Saint John (New Brunswick), Saint John's (Newfoundland), Sept Isles (Quebec), Sydney (Nova Scotia), Trois-Rivieres (Quebec), Thunder Bay (Ontario), Toronto (Ontario), Vancouver (British Columbia), and Windsor (Ontario). Canada's merchant marine comprised about 169 ships of 1,000 or more gross registered tons (Natural Resources Canada, 2006c§; U.S Central Intelligence Agency, 2006§).

The country had 1,337 airports. Among these, 509 had permanent-surface runways;18 had runways that were between 2,438 and 3,047 meters (m) in length; 15 had runways that were between 1,524 and 2,437 m in length; 150 had runways that were between 914 and 1,523 m in length; and 245 had runways that were less than 914 m in length. Canada had about 828 major transport aircraft; Air Canada was the major carrier (Natural Resources Canada, 2006c§; U.S. Central Intelligence Agency, 2006§).

Canada generated electrical power from coal, natural gas, nuclear fuel, and massive hydroelectric facilities. Total capacity was roughly 114 gigawatts. About 566.3 net terawatt hours, which was significantly less than capacity, was produced in 2004 (the latest year for which complete data were available). Hydroelectric plants generated 57% of Canada's electricity; coal and fossil fuel, 28%; nuclear reactors, about 13%; and other renewables, 2%. Quebec and Ontario produced the most electricity (154 and 141 terawatt hours, respectively). Nearly 97% of Quebec's electricity came from hydroelectric plants, and the remaining 3% was produced mainly by nuclear facilities. In contrast, about 61% of Ontario's electric power was derived from nuclear plants, and the remainder, from hydroelectric and coal-fired plants. Most of Canada's electricity exports originated in New Brunswick, Ontario, and Quebec and were sold to consumers in New England and New York. British Columbia and Manitoba also exported large amounts of electricity, mainly to California, Minnesota, Oregon, and Washington. Except for Alberta, all Canadian Provinces that border the United States had transmission links to the neighboring systems. Canada was a net exporter of, in order of value, crude oil, natural gas, coal, uranium, and hydropower, and was the main source of U.S. energy imports (Statistics Canada, 2006a§; U.S. Central Intelligence Agency, 2006§; U.S. Energy Information Administration, 2006§).

An extensive system of pipelines connected oil- and gas-producing and consuming areas in Canada and the United States. The system was dominated by the Interprovincial Pipe Line, which delivered oil from Edmonton east to Montreal, Quebec, and the U.S. Great Lakes region, and the TransMountain Pipe Line, which delivered oil mainly from Alberta west to refineries and terminals in the Vancouver area and to the Puget Sound area of Washington. Canadian natural gas was transported largely by TransCanada Pipe Lines Ltd. of Calgary, which owned 13,600 km of mainline gas pipelines in Canada and 56 compressor stations that linked western Canadian gas producers with consumers in eastern Canada and the United States. The Canadian pipeline network included about 24,000 km for crude oil and refined products and 75,000 km for transmission of natural gas. Alberta's network represented the greatest length for any Province (18,900 km, or almost 20% of the total pipeline network) (U.S. Central Intelligence Agency, 2006§; U.S. Energy Information Administration, 2006§).

Outlook

Canada continued to be a very important trading partner of the United States; this partnership enhanced investment and trade among the members of NAFTA. The United States absorbed more than 68% of Canadian total minerals and mineral product exports, which were valued at $43.8 billion in 2005. Canada's economic growth in 2006 is likely to remain at about the same level as or to decline slightly relative to the 2005 rate of 2.9%. The combination of favorable factors, such as continued consumer price inflation subdued, high demand for Canadian mineral exports, high mineral commodity prices driven by strong global economy, and importers' continued economic growth could maintain the Canadian mining industry sustained in 2006 and into 2007. The duration of the current cycle in mineral commodity prices and continued access to financing will remain essential factors in the success of the Canadian minerals exploration and development operations in 2006 and beyond. Exploration is key to assuring a long-term supply of Canadian minerals (Birchfield, 2006; Dillon, 2006).

Canada's mineral industry is encouraged by the Federal Government to work towards the improvement of the permitting process. The goal is to enable exploration and mining companies to comply with the regulatory requirements in a timely and efficient way and, at the same time, to operate within high environmental and social standards. The Government and industry are enthusiastic about the concept of a Northern Mines Ministers Conference to be held each year to report on progress, to identify challenges, and to network with all stakeholders to

reestablish an attractive investment climate and to reverse any economic difficulties, such as the costs of socioeconomic and impact benefit agreements with local aboriginal groups being deductible from royalties and eligible as exploration investment (Andrews, 2005; Dillon, 2006).

In 2005, major mergers and acquisitions were underway and they continued into 2006 and beyond. The merger and acquisition activity and continuous diamond development highlighted operations in the Canadian minerals sector. The high energy consumption regionally and globally and the high energy prices will continue to encourage new developments, such as the White Rose oilfields in the Jeanne d'Arc Basin and expansions of the Hibernia and the Terra Nova oilfields in the near future. Comparisons between the Canadian offshore oil resources and the development of the now legendary North Sea fields continue to be made. Canadian uranium companies are effectively positioning themselves at the forefront of uranium producers worldwide as they seek to discover additional uranium resources to meet the growing domestic and global demand for nuclear energy.

The concerted effort to reconcile conflicting interests in the formulation of policy concerning ownership, aboriginal issues, mining development, environmental constraints and remediation, social responsibilities, and economic necessity in furthering the concept of sustainable development will continue to be difficult to assess or predict. Active engagement of these issues among the private sector, Government, and communities (stockholders and stakeholders) will probably provide outcomes that support a sustained future of the Canadian mining industry.

Canada is expected to continue to be well-positioned in terms of its metals and mineral fuel resources base and its access to, in order of economic importance, the NAFTA, China, Europe, Japan, and other global markets. Canada's mineral industry is primarily export oriented; as much as 93% of the production of some mineral commodities goes to world markets. The United States will continue to be a major market for Canada's minerals. In this regard, the industry's export capability is enhanced significantly by a lower exchange rate for the Canadian dollar.

Canada's continuous challenge is expected to be facing the realities of globalization and internationalization, especially with respect to developing countries that have more-competitive mineral resources and that are more avidly open to attract foreign investment. Canada's greatest long-term asset may be the achievement of a popular consensus in support of sustainable development that respects the interests of mining companies, First Nation peoples' rights, and the preservation of the environment.

References Cited

Andrews, Tony, 2005, A special report from Metals Economics Group for the PDAC 2005 International Convention—World exploration trends: Prospectors and Developers Association of Canada—PDAC 2005, 73d, Toronto, Ontario, Canada, March 8-11, 2005, PDAC Technical Session abstracts, 8 p.

Birchfield, Greig, 2006, Mining industry value of production and employment, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.

Bouchard, Ginette, 2006, Canadian exploration scene, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, February 2006, 39 p.

Brooks, W.E., 2006, Silver: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 152-153.

Canadian Intergovernmental Working Group on the Mineral Industry, 2005, Overview of trends in Canadian mineral exploration: Ottawa, Ontario, Canada, Canadian Intergovernmental Working Group on the Mineral Industry, 187 p.

Chevalier, Patrick, 2005a, Platinum group metals, *in* Canadian minerals yearbook—2004 review and outlook: Ottawa, Ontario, Canada, Natural Resources Canada, December, p. 41.1-41.16.

Chevalier, Patrick, 2005b, Silver, *in* Canadian minerals yearbook—2004 review and outlook: Ottawa, Ontario, Canada, Natural Resources Canada, December, p. 48.1-48.12.

Chevalier, Patrick, 2006, Gold, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.

Coulas, Maureen, 2006, Copper, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.

Departamento Nacional de Produção Mineral, 2006, Sumário mineral: Produção Mineral Brasileira, v. 26, December, 122 p.

Dillon, Patricia, 2006, Prospectors & Developers Association of Canada hails return of "super" flow-through during the Prospectors & Developers Association of Canada—PDAC 2006 International Convention—World exploration trends: Prospectors & Developers Association of Canada—PDAC 2006, 74th, Toronto, Ontario, Canada, March 5-8, 2006, PDAC Activities and Canadian Exploration News, 8 p.

Edelstein, D.L., 2006, Copper: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 56-57.

Gabby, P.N., 2006a, Lead: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 96-97.

Gabby, P.N., 2006b, Zinc: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 190-191.

Gaëtan, Raymond, 2005, Chrysotile, *in* Canadian minerals yearbook—2004 review and outlook: Ottawa, Ontario, Canada, Natural Resources Canada, December, p. 18.1-18.17.

Gambogi, Joseph, 2006, Titanium mineral concentrates: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 178-179.

George, M.W., 2006a, Gold: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 74-75.

George, M.W., 2006b, Platinum-group metals: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 126-127.

George, M.W., 2006c, Selenium: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 148-149.

Giancola, Diane, 2005, Canadian & American mines handbook, 2004-05: Toronto, Ontario, Canada, Business Information Group, 600 p.

Jorgenson, J.D., 2006, Iron ore: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 86-87.

Kostick, D.S., 2006, Potash: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 128-129.

Kuck, P.H., 2006, Nickel: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 116-117.

Magyar, M.J., 2006, Columbium (niobium): U.S. Geological Survey Mineral Commodity Summaries 2006, p. 54-55.

McCutcheon, Bill, 2006, Nickel, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.

Natural Resources Canada, 2006a, Mineral exploration—2005 Canadian mineral exploration and deposit appraisal: Ottawa, Ontario, Canada, Natural Resources Canada Information Bulletin, March, 2 p.

Natural Resources Canada, 2006b, Mineral production—2005 mineral production continues to supply global demand: Ottawa, Ontario, Canada, Natural Resources Canada Information Bulletin, March, 2 p.

Olson, D.W., 2006, Gemstones: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 70-71.

Panagapko, Doug, 2005, Cement, *in* Canadian minerals yearbook—2004 review and outlook: Ottawa, Ontario, Canada, Natural Resources Canada, December, p. 15.1-15.15.

Perron, Louis, 2006, Diamonds, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.

Plunkert, P.A., 2006, Aluminum: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 22-23.

Reed, Alan, 2005, Canadian reserves of selected major metals, and recent production decisions, *in* Canadian minerals yearbook—2004 review and outlook: Ottawa, Ontario, Canada, Natural Resources Canada, December, p. 2.1-2.11.

Stone, Kevin, 2006a, Coal, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.
Stone, Kevin, 2006b, Potash, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.
Vance, R.E., 2006, Uranium, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.
van Oss, H.G., 2006, Cement: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 44-45.
Virta, R.L., 2006, Asbestos: U.S. Geological Survey Mineral Commodity Summaries 2006, p. 28-29.
Wagner, Wayne, 2006, Aluminum, *in* Canadian overview 2005: Ottawa, Ontario, Canada, Natural Resources Canada, May 2006, 39 p.

Internet References Cited

Alcan Inc., 2006, 2005 annual report, accessed August 18, 2006, at URL http://www.alcan.com/web/publishing.nsf/Contents/Investors+-+2005+Annual+Report.
Alcoa Inc., 2006, 2005 annual report, accessed August 18, 2006, via URL http://www.alcoa.com/global/en/about_alcoa/map/globalmap.asp?1c=16&country=Canada.
Antwerp Facets Online, 2006, Tahera starts work on Nunavut's first diamond mine, accessed August 18, 2006, at URL http://www.antwerpfacets.com/newsagency/index.aspx?ID=84.
BHP Billiton Diamonds Inc., 2006, Panda underground project in production, accessed June 6, 2006, at URL http://ekaty.bhpbilliton.com/Default.asp?print=true.
BP p.l.c., 2006, Quantifying energy, 2005 in Review, accessed August 14, 2006, via URL http://www.bp.com.
Canadian Environmental Assessment Agency, 2006, Canadian Environmental Assessment Agency, accessed April 18, 2007, via URL http://www.ceaa-acee.gc.ca/index_e.htm.
De Beers Canada, 2006, Snap Lake—Project development, accessed July 8, 2006, at URL http://www.debeerscanada.com/files_2/snap_lake/snap_project-development.html.
Department of Finance Canada, 2006 (March), The economy in brief, accessed August 21, 2006, at URL http://www.fin.gc.ca/ECONBR/pdf/ecbr06-03e.pdf.
Department of Justice Canada, 2006, Canadian Environmental Assessment Act, accessed April 18, 2007, at URL http://laws.justice.gc.ca/en/c-15.2/text.html.
Elk Valley Coal Partnership, 2006, World's second largest exported of metallurgical coal, Coal, accessed August 18, 2006, at URL http://www.elkvalleycoal.ca/cache/page_1258.html.
Falconbridge Limited, 2006, Sudbury highlights, Nickel, accessed August 18, 2006, at URL http://www.falconbridge.com/our_business/nickel_sudbury.html.
Government of Canada, 2006, The Canadian economy online, accessed August 21, 2006, at URL http://canadianeconomy.gc.ca/english/economy/index.cfm.
HudBay Minerals Inc., 2005, HudBay acquired Hudson Bay Mining and Smelting Co., Limited on December 21, 2004, accessed August 23, 2005, at URL http://www.hudbayminerals.com.
Inco Limited 2006a, Inco's mining and processing operations in Manitoba and Ontario, accessed September 25, 2006, at URL http://www.inco.com/about/operations/default.aspx.
Inco Limited 2006b, Mineral reserves and mineral resources estimates, Inco Annual Report 2005, accessed September 25, 2006, at URL http://www.inco.com/investorinfo/annualreports/2005/en/_pdf/Inco2005AR_complete.pdf.
Natural Resources Canada, 2006a, Canada's mining taxation—Division of constitutional powers, accessed April 17, 2007, at URL http//www.nrcan.gc.ca/miningtax/inv_1.htm.
Natural Resources Canada, 2006b, Production of Canada's leading minerals monthly publication, accessed October 23, 2006, via URL http://mmsd1.mms.nrcan.gc.ca/mmsd/data/default_e.asp.
Natural Resources Canada, 2006c, Significant Canadian facts publication, accessed October 23, 2006, at http://atlas.nrcan.gc.ca/site/english/learningresources/facts/supergeneral.html.
Prospectors & Developers Association of Canada, 2006 (May), Prospectors & Developers Association of Canada's position on Canada's "super" flow-through program, accessed October 3, 2006, at URL http://www.pdac.ca/pdac/advocacy/financial/flow-through.html.
QIT–Fer et Titane, Inc., 2006, Sorel Tracy Complex, Canada, accessed September 25, 2006, at URL http://www.qit.com/eng/profil/sorel_tracy.html.
Statistics Canada, 2006a, Exports of goods on a balance-of-payments basis—By product, Canadian Statistics, accessed October 18, 2006, at URL http://www40.statcan.ca/l01/cst01/gblec04.htm.
Statistics Canada, 2006b, Imports, exports, and trade balance of goods on a balance-of-payments basis—By country or country grouping, Canadian Statistics, accessed October 18, 2006, at URL http://www40.statcan.ca/l01/cst01/gblec02a.htm.
Statistics Canada, 2006c, Imports of goods on a balance-of-payments basis—By product, Canadian Statistics, accessed October 18, 2006, at URL http://www40.statcan.ca/l01/cst01/gblec05.htm.
Statistics Canada, 2006d, Population characteristics—By year—By provinces and territories, Canadian Statistics, accessed October 18, 2006, at URL http://www40.statcan.ca/l01/cst01/ demo02.htm.
Tahera Diamond Corporation, 2006, The Jericho diamond project, accessed August 18, 2006, at URL http://www.tahera.com/jericho_diamond.html.
Teck Cominco Limited, 2006, Coal Mines in SE British Columbia, accessed August 18, 2006, at URL http://www.teckcominco.com/operations/coalpartnership/partnership.htm.
U.S. Central Intelligence Agency, 2006 (August 8), Canada, World Factbook 2006, accessed August 21, 2006, at URL http://www.cia.gov/cia/publications/factbook/geos/ca.html.
U.S. Energy Information Administration, 2006 (April), Canada, Country Analysis Brief, accessed August 21, 2006, at URL http://www.eia.doe.gov/emeu/cabs/Canada/Full.html.
Voisey's Bay Nickel Company Limited., 2006a, Exploration, accessed September 25, 2006, at URL http://www.vbnc.com/Exploration.asp.
Voisey's Bay Nickel Company Limited., 2006b, Mineral reserves and resources, accessed September 25, 2006, at URL http://www.vbnc.com/ReservesAndResources.asp.
Voisey's Bay Nickel Company Limited., 2006c, Mine and concentrator—Development timelines, accessed September 25, 2006, at URL http://www.vbnc.com/MineMill.asp.

Major Sources of Information

Natural Resources Canada
580 Booth St.
Ottawa, Ontario K1A 0E8
Canada
Minerals and Metals Sector
Earth Sciences Sector
Canada Centre for Mineral and Energy Technology (CANMET)
Geological Survey of Canada
601 Booth St.
Ottawa, Ontario K1A 0E4
Canada

Statistics Canada
Tunney's Pasture
Ottawa, Ontario K1A 0T6
Canada

Indian and Northern Affairs Canada
Terrasses de la Chaudiere
10 Wellington St., North Tower
Ottawa, Ontario K1A 0H4
Canada

Environment Canada
Terrasses de la Chaudiere
27th Floor
10 Wellington St.
Ottawa, Ontario K1A 0H3
Canada

The Mining Association of Canada
1105-350 Sparks St.
Ottawa, Ontario K1R 7S8
Canada

Provincial Sources

Ministry of Energy, Mines, and Petroleum Resources
Parliament Buildings
Victoria, British Columbia V8V 1X4
Canada
Department of Energy
Petroleum Plaza, North Tower, 9945 108 St.
Edmonton, Alberta T5K 2G6
Canada
Department of Energy and Mines
Room 306, Legislative Building
Regina, Saskatchewan S4S 0B3
Canada
Administration of Mining Lands
Toronto-Dominion Bank Building
1914 Hamilton St.
Regina, Saskatchewan S4P 4V4
Canada
Department of Energy and Mines
Room 301, Legislative Building
Winnipeg, Manitoba R3C 0V8
Canada
Ministry of Northern Development and Mines
10 Wellesley St. East
Toronto, Ontario M4Y 1G2
Canada
Ministry of Natural Resources
Mines and Minerals Division:
Mineral Development and Lands Branch
Ontario Geological Survey
Southern Ontario Region
Northeastern Region
Northwestern Region
Ministere des Ressources Naturelles
5700, 4e Avenue Ouest, 3e Etage
Charlesbourg (Quebec) G1H 6R1
Canada
Department of Natural Resources and Energy
Minerals and Energy Division
Hugh John Flemming Forestry Centre
Fredericton, New Brunswick E3B 5H1
Canada
Mines and Minerals Division:
Geological Surveys Branch
Mineral Development Branch
Planning and Administration Branch
Energy Branch
Department of Mines and Energy
1701 Hollis St.
P.O. Box 1087
Halifax, Nova Scotia B3J 2X1
Canada
Department of Energy and Forestry
P.O. Box 2000
Charlottetown, Prince Edward Island C1A 7N8
Canada
Newfoundland Department of Mines and Energy
P.O. Box 8700
St. John's, Newfoundland A1B 4J6
Canada
Northwest Territories Chamber of Mines
P.O. Box 2818
Yellowknife, Northwest Territories X1A 2R1
Canada
Yukon Chamber of Mines
P.O. Box 4427
Whitehorse, Yukon Territory Y1A 2B7
Canada
British Columbia and Yukon Chamber of Mines
840 West Hastings St.
Vancouver, British Columbia V6C 1C8
Canada
Chamber of Mines of Eastern British Columbia
215 Hall St.
Nelson, British Columbia V1L 5X4
Canada
Mining Association of British Columbia
P.O. Box 12540, 860,
1066 West Hastings St.
Vancouver, British Columbia V6E 3X1
Canada
Alberta Chamber of Resources
1410 Oxford Tower, 10235 101 St.
Edmonton, Alberta T5J 3G1
Canada
Saskatchewan Mining Association Inc.
1740 Avord Tower
Regina, Saskatchewan S4P 0R7
Canada
The Mining Association of Manitoba
700-305 Broadway
Winnipeg, Manitoba R3C 3J7
Canada
Ontario Mining Association
1114-111 Richmond Street West
Toronto, Ontario M5H 2G4
Canada
Quebec Asbestos Mining Association
410-1140 Sherbrooke St. West,
Montreal, Quebec H3A 2M8
Canada
Quebec Mining Association Inc.
942-2635 Boulevard
Hochelaga, Ste. Foy
Quebec G1V 4W2
Canada
The New Brunswick Mining Association
Suite 312-236 St. George St.
Moncton, New Brunswick E1C 1W1
Canada

Chamber of Mineral Resources of Nova Scotia
202-5525 Artillery Place
Halifax, Nova Scotia B3J 1J2
Canada

Major Publications

Business Information Group [Toronto], Canadian & American Mines Handbook, annual:
Hollinger Canadian Newspapers, L.P.
Canadian Geoscience Council, annual report.
Canadian Mineral Analysts, monthly.
Canadian Mining Journal [Toronto], monthly: Business Information Group.
Natural Resources Canada:
The Atlas of Canada, annual.
Canada's Minerals and Metals Industry—An Economic Overview, monthly.
Canadian Minerals Yearbook, annual.
Canadian Mineral Production Statistics, annual.
Canadian Mineral Industry Reports, monthly.
Information Bulletin—Mineral Production, annual.
Information Bulletin—Exploration, annual.
Information Bulletin—Mining and Aboriginal Communities, annual.
Government of Canada—Investment Tax Credit for Exploration in Canada, annual.
Minerals and Metals Sector—The Social Dimension of Sustainable Development and the Mining Industry, A Background Paper, November, 2003.
Minerals and Metals Sector—Focus 2006: A Strategic Vision for 2001-2006.
Minerals and Metals Sector: Canadian Intergovernmental Working Group on the Mineral Industry—Overview of Trends in Canadian Mineral Exploration, annual.
Mineral Policy Sector, Canadian Minerals, annual.
Mining and Mineral Processing Operations in Canada, Annual Mineral Bulletin.
Production of Canada's Leading Minerals, monthly.
Geological Association of Canada, Geoscience Canada, quarterly.
Indian and Northern Affairs Canada, Mines and Mineral Activities, annual.
Industrial Minerals magazine [London], monthly: Metal Bulletin PLC.
International Mining of London, Canadian Mining, monthly.
The Journal of Commerce (U.S.) Weekly Magazine.
L'Industrie Miniere du Quebec, annual.
Metal Industry, Trends and Outlook, monthly.
Mining Journal Ltd., London, Mineral Markets and Mining Finance, monthly.
Mining Journal Ltd., London, Mining Journal, weekly.
Northern Miner Press Inc.:
Canadian Mines Handbook, annual.
Canadian Oil & Gas Handbook, annual.
The Northern Miner, weekly.
PennWell Publishing Co.:
Natural Gas Industry Directory, annual.
Oil & Gas Journal, Weekly Magazine.
Production et Investissements de l'Industrie Miniere du Quebec: Statistiques, annual.
Prospectors and Developers Association of Canada, quarterly "In Brief;" also annual "Exploration and Development Highlights."
Quebec Prospectors Association, monthly.
Repertoire des Etablissements Menant des Operations Minieres Au Quebec, annual.
Rock Products Register, annual: Intertec Publishing, Chicago, Illinois.
Statistics Canada:
Coal and Coke Statistics, monthly.
Crude Petroleum and Natural Gas Production, monthly.
International Trade Division, Imports by Commodity, annual; Exports: Trade Merchandise, annual.
United Nations, Energy Statistics Yearbook, annual.
U.S. Embassy, Ottawa: Periodic Economic and Industrial Outlook reporting.
Corporate Annual Reports of individual mining companies.
Information Respecting Securities Law.

TABLE 1
CANADA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2001	2002	2003	2004	2005[p]
METALS						
Aluminum:						
Alumina:						
Al_2O_3		1,036,000	1,125,400	1,108,500	1,169,836	1,214,405
Hydrate		1,196,470	1,283,000	1,269,600	1,328,842	1,400,340
Metal:						
Primary		2,582,746	2,708,910	2,791,915	2,592,160	2,894,204
Secondary		180,000	180,000	51,964	49,701	50,000
Total		2,762,746	2,888,910	2,843,879	2,641,861	2,944,204
Antimony[2]		278	173	153	105 r	96
Bismuth:						
Mine output, Bi content[2]		258	189	145	185	185
Metal, refined[e]		250	250	250	250	250
Cadmium:						
Mine output, Cd content[2]		1,098	1,027	814	848 r	671
Metal, refined		1,493	1,706	1,759	1,880 r	1,703
Calcium[e]	kilograms	133,200 [3]	135,000	135,000	135,000	135,000
Cobalt:						
Mine output, Co content[2]		5,326	5,148	4,327	5,060 r	5,533
Metal:						
Shipments[4]		2,112	2,065	1,842	2,085 r	2,105
Refined, including oxide		4,378	4,625	4,233	5,144	5,079
Columbium (niobium) and tantalum:						
Pyrochlore concentrate:						
Gross weight		7,070	7,410	7,270	7,670	7,700
Nb content		3,180	3,333	3,270	3,450	3,500
Tantalite concentrate:						
Gross weight		308	232	220	276	300
Ta content		77	58	55	69	70
Nb content		15	12	11	10	10
Copper:						
Mine output, Cu content[2]		633,531	603,498	557,082	562,795 r	594,812
Metal:						
Smelter:						
Primary, blister		601,359	513,934	430,116	446,209 r	450,000
Secondary and scrap		41,640	24,761	26,789	29,982	30,525
Total		642,999	538,695	456,905	476,191 r	480,525
Refined:						
Primary		524,920 r	469,761 r	428,077 r	495,835 r	484,123
Secondary		42,800	24,761 r	26,789 r	31,100 r	31,100
Total		567,720 r	494,522 r	454,866 r	526,955 r	515,223
Gold:						
Mine shipments, all forms	kilograms	158,875	151,904	140,861	129,478 r	118,528
Mine output, Au content	do.	160,200 r	152,059 r	141,589 r	130,727 r	119,225
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand metric tons	27,119	30,902	33,322	28,596 r	28,343
Fe content	do.	17,186	19,684	20,993	17,801	17,900
Metal:						
Pig iron	do.	8,780	8,800	8,800 e	8,800 e	8,800
Direct-reduced iron[e]	do.	920	920	920	920	920
Ferroalloys, electric arc furnace:[e]						
Ferrosilicon	do.	56	56	56	56	56
Silicon metal	do.	30	30	30	30	30
Ferrovanadium	do.	1	1	1	1	1
Total	do.	87	87	87	87	87
Crude steel	do.	16,300	16,300 e	17,000	17,000 e	17,000

See footnotes at end of table.

TABLE 1—Continued
CANADA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2001	2002	2003	2004	2005[p]
METALS—Continued						
Lead:						
Mine output, Pb content		153,932	97,178	81,264	76,730 [r]	79,252
Metal, refined:						
Primary		127,007	136,896	118,506	131,717 [r]	109,795
Secondary		103,921	114,664	104,927	109,453 [r]	119,613
Total		230,928	251,560	223,433	241,170 [r]	229,408
Lithium, spodumene[e]		22,500	22,500	22,500	22,500	22,500
Magnesium, metal, primary		83,400 [r]	80,000 [r]	78,000 [r]	54,000 [r]	50,000
Molybdenum, mine out, Mo content		8,233	8,043	9,092	9,519 [r]	7,910
Nickel:						
Mine output, Ni content[2]		194,058	189,297	163,244	186,694 [r]	198,369
Refined[5]		140,591	144,476	124,418	151,518	139,683
Platinum-group metals, mine output:						
Palladium	kilograms	8,972 [r]	12,210 [r]	12,808 [r]	12,000 [r]	13,500
Platinum	do.	7,733 [r]	9,202 [r]	6,990 [r]	7,000 [r]	9,000
Others (irridium/rhodium/ruthenium)	do.	3,989	2,960	1,730	7,364	5,000
Total	do.	20,694 [r]	24,372 [r]	21,528 [r]	26,364 [r]	27,500
Selenium, refined[6]	do.	238,000	175,000	253,000	277,000	300,000
Silver:						
Mine output, Ag content	do.	1,320,030	1,407,558	1,310,153	1,337,465 [r]	1,121,500
Refined	do.	1,623,140	1,855,979	1,558,105	1,837,724	1,547,326
Tellurium, refined[5]	do.	51,000	39,000	40,000	69,000	75,000
Titanium, Sorel slag[7]		1,014,000	890,000 [e]	873,000	863,000	860,000
Tungsten, mine output, W content		--	2,295	3,636	--	450 [p]
Zinc:						
Mine output, Zn content		1,064,744	916,220	788,063	791,373 [r]	666,654
Metal, refined, primary		661,172	793,410	761,199	805,438 [r]	722,951
INDUSTRIAL MINERALS						
Asbestos		276,790 [r]	242,241	240,500	200,500 [r]	243,000
Barite		23,000	17,000	23,000	21,000	21,000
Cement, hydraulic[8]	thousand metric tons	12,793 [r]	13,079 [r]	13,425 [r]	14,017 [r]	14,267
Clay and clay products[9]	value, thousands	$194,580	$233,244	$234,000	$229,971	$230,000
Diamond	carats	3,716,000	4,936,616	10,755,654	12,618,080	12,299,733
Diatomite[e]		10,000	10,000	10,000	10,000	10,000
Gemstones, amethyst and jade		148	246	114	105	105
Graphite[e]		35,000 [3]	25,000	25,000	28,000	28,000
Gypsum and anhydrite	thousand metric tons	7,821	8,809	8,378	9,339 [r]	9,400
Lime[8]	do.	2,213	2,248	2,221	2,410	2,410
Magnesite, dolomite, brucite[e]		180,000	180,000	180,000	180,000	180,000
Mica, scrap and flake[e]		17,500	17,500	17,500	17,500	17,500
Nepheline syenite		710,000	717,000	697,000	702,000	702,000
Nitrogen, N content of ammonia		3,438,700	3,699,900 [r]	3,661,800 [r]	4,106,600 [r]	4,100,000
Potash, K_2O equivalent	thousand metric tons	8,181 [r]	8,515 [r]	9,104 [r]	10,100 [r]	10,596 [3]
Pyrite and pyrrhotite, gross weight[e]		5,000	5,000	5,000	5,000	5,000
Salt	thousand metric tons	13,725	12,736	13,718 [r]	14,125	14,500
Sand and gravel	do.	236,486	238,120	235,574	248,159	248,159
Silica, quartz[10]	do.	1,613	1,540	1,581	1,690	1,600
Sodium compounds, n.e.s.:[e]						
Sodium carbonate, soda ash	do.	100	--	--	--	--
Sodium sulfate, natural[11]	do.	305	305	305	305	305
Stone[12]	do.	124,758	124,746	119,356	127,559	127,559
Sulfur, byproduct:						
Metallurgy	do.	762	703	614	621	620
Petroleum	do.	8,154	7,671	7,891	8,271	8,300
Total	do.	8,916	8,374	8,505	8,892	8,920
Talc, pyrophyllite, soapstone[e]	thousand metric tons	90	90	90	90	90

See footnotes at end of table.

TABLE 1—Continued
CANADA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2001	2002	2003	2004	2005[p]
MINERAL FUELS AND RELATED MATERIALS						
Carbon black[e]		165,000	165,000	165,000	165,000	165,000
Coal, run-of-mine:						
Bituminous and subbituminous	thousand metric tons	59,042	55,408	50,929	55,393	56,141
Lignite	do.	11,319	11,200	11,200	11,200 [e]	11,200
Total	do.	70,361	66,608	62,129	66,593	67,341
Coke, high-temperature[e]	do.	3,300 [3]	3,300	3,300	3,300	3,300
Natural gas:						
Gross	million cubic meters	200,709	200,890	194,487	195,815	196,000
Marketed	do.	171,388	171,348	166,072	167,360 [r]	170,335
Natural gas liquids:[e]						
Pentanes plus	thousand 42-gallon barrels	66,000 [3]	66,000	66,000	66,000	66,000
Condensate	do.	2,800 [3]	2,800	2,800	2,800	2,800
Total	do.	68,800 [3]	68,800	68,800	68,800	68,800
Peat	thousand metric tons	1,319	1,385	1,341	1,180	1,350
Petroleum:						
Crude[13]	thousand 42-gallon barrels	816,505	861,730	908,213	940,100 [r]	928,500
Refinery products:						
Propane, butane, and naphtha	do.	16,375 [r]	17,231 [r]	16,358 [r]	15,422 [r]	14,954
Gasoline:						
Aviation	do.	766 [r]	774 [r]	722 [r]	663 [r]	672
Motor	do.	284,163 [r]	296,845 [r]	297,704 [r]	290,796 [r]	281,361
Petrochemical feedstocks	do.	30,623 [r]	32,778 [r]	32,079 [r]	36,613 [r]	28,018
Jet fuel	do.	31,781 [r]	29,515 [r]	31,134 [r]	34,496 [r]	31,593
Kerosene	do.	3,655 [r]	2,862 [r]	3,381 [r]	3,324 [r]	3,560
Diesel and light fuel oil	do.	218,445 [r]	218,513 [r]	233,913 [r]	236,530 [r]	236,651
Lubricants including grease	do.	8,204 [r]	8,261 [r]	8,271 [r]	8,885 [r]	8,102
Heavy fuel oil	do.	52,086 [r]	53,223 [r]	56,046 [r]	62,560 [r]	60,934
Asphalt	do.	26,658 [r]	27,600 [r]	26,990 [r]	29,803 [r]	28,021
Petroleum coke	do.	12,042 [r]	10,639 [r]	11,983 [r]	10,206 [r]	10,449
Other petroleum products	do.	15,200 [r]	14,702 [r]	22,183 [r]	25,803 [r]	30,765
Refinery fuel and losses[14]	do.	26,055 [r]	33,690 [r]	35,698 [r]	39,185 [r]	36,117
Total	do.	726,053 [r]	746,633 [r]	776,462 [r]	794,286 [r]	771,197
Uranium oxide, U content		12,487	11,607	10,456	11,548 [r]	12,597

[e]Estimated data are rounded to no more than three significant digits; may not add to totals shown. [p]Preliminary. [r]Revised. -- Zero.

[1]Table includes data available through November 2006.

[2]Metal content of concentrates produced.

[3]Reported figure.

[4]Cobalt content of all products derived from Canadian ores, which include cobalt oxide shipped to the United Kingdom for futher processing and nickel-cobalt matte shipped to Norway for refining.

[5]Nickel contained in products of smelters and refineries in forms that are ready for use by consumers. Natural Resources Canada has revised all refined nickel figures to conform with International Nickel Study Group (INSG) guidelines.

[6]From all sources, which includes imports and secondary sources. Excludes intermediate products exported for refining.

[7]Refined Sorel slag has been upgraded to 95% titanium oxide.

[8]Producers' shipments and quantities used by producers.

[9]Includes bentonite products from common clay, fire clay, stoneware clay, and other clays. Values are in current Canadian dollars.

[10]Producers' shipment of quartz.

[11]Excludes byproduct production from chemical plants.

[12]Crushed, building, ornamental, paving, and similar stone.

[13]Includes synthetic crude, from oil shale and/or tar sands.

[14]Refinery fuel represents total production of still gas, which includes a small amount sold.

TABLE 2
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[2]
Alumina	Alcan Inc.	Refinery in Vaudreuit, Quebec	1,169 (smelter-grade).
Aluminum	Alcan Inc.	Smelter in Laterriere, Quebec	219.
Do.	do.	Smelter in Beauharnois, Quebec	50.
Do.	do.	Smelter in Shawinigan, Quebec	91.
Do.	do.	Smelter in Grande-Baie, Quebec	198.
Do.	do.	Smelter in Arvida, Jonquiere, Quebec	163.
Do.	do.	Smelter in Kitimat, British Columbia	275.
Do.	do.	Smelter in Alma, Quebec	400.
Do.	Aluminiere de Bécancour Inc. (Alcoa Inc., 75%, and Alcan Inc., 25%)	Smelter in Beacancour, Quebec	403.
Do.	Canadian Reynolds Metals Co. Ltd. (Alcoa, 100%)	Smelter in Baie-Comeau, Quebec	438.
Do.	Aluminerie Alouette Inc. (Alcan, 40%; Aluminium Austria Metall Québec, 20%; Hydro Aluminum, 20%; Société Générale de Financement du Québec, 13.33%; Marubeni Québec Inc., 6.67%)	Smelter in Sept-Iles, Quebec	244.
Do.	Aluminerie Lauralco Inc. (Alcoa, 100%)	Deschambault, Quebec	249.
Asbestos	LAB Chrysotile, Inc. (private, 100%)	Lac d' Amiante du Quebec, Ltee, Quebec	160 (fiber).
Do.	do.	Bell Mine, near Thetford Mines, Quebec	70 (fiber).
Do.	Jeffrey Mine Inc.	Jeffrey Mines at Asbestos, Quebec	250 (fiber).
Cement	Lafarge Canada Inc.	Bath, Ontario	1,176 (dry-process).
Do.	do.	Woodstock, Ontario	814 (wet-process).
Do.	do.	Exshaw, Alberta	1,422 (dry-process).
Do.	do.	Kamloops, British Columbia	324 (dry-process).
Do.	do.	Richmond, British Columbia	1,319 (wet-process).
Do.	do.	St. Constant, Quebec	1,157 (dry-process).
Do.	do.	Brookfield, Nova Scotia	621 (dry-process).
Do.	St. Lawrence Cement Inc. (Holcim AG of Swiss)	Joliette, Quebec	1,475 (dry-process).
Do.	do.	Mississauga, Ontario	2,000 (wet and dry).
Do.	Ciment Québec Inc. (Esssroc Group, 50%, and private, 50%)	Saint-Basile, Quebec	1,571 (dry-process).
Do.	ESSROC Canada Inc. (Italcementi Group)	Picton, Ontario	792 (wet and dry).
Do.	Federal White Cement Ltd.	Woodstock, Ontario	544 (dry-process).
Do.	St. Marys Cement (Canada) Inc. (Votarantim Ciment)	Bowmanville, Ontario	1,377 (dry-process).
Do.	do.	St. Marys, Ontario	645 (dry-process).
Do.	Lehigh Inland Cement Ltd. (Heidelberg Cement Group)	Edmonton, Alberta	1,380 (dry-process).
Do.	do.	Delta, British Columbia	1,356 (dry-process).
Coal	Elk Valley Coal Partnership (Consol Energy Inc., Fording Inc., and Luscar Energy Partnership, 59%, and Teck Cominco Limited, 41%)	Coal Mountain Mine at Sparwood, British Columbia	2,500 (open pit), 3,200 (plant).
Do.	do.	Elkview Mine near Sparwood, British Columbia	6,000 (open pit).
Do.	do.	Fording River Mine near Elkford, British Columbia	10,000 (open pit), 9,500 (plant).
Do.	do.	Greenhills Mine near Elkford, British Columbia	4,500 (open pit), 5,000 (plant).
Do.	do.	Line Creek Mine near Sparwood, British Columbia	9,000 (open pit).
Do.	do.	Cardinal River Mine near Hinton, Alberta	8,000 (open pit).
Do.	Western Canadian Coal Corp.	Wolverine Creek Mine, British Columbia	3,000 (open pit).
Do.	Northern Energy and Mining Inc.	Trend Small Mine, British Columbia	1,000 (open pit).
Columbium (niobium) metric tons	Cambior Inc.	Niobec Mine, Chicoutimi, Quebec	3,450 Nb content.

See footnotes at end of the table.

TABLE 2--Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[2]
Copper		Boliden Westmin (Canada) Limited	Myra Falls Mine, British Columbia	9,000.
Do.		Falconbridge Limited (Noranda Inc., 58.9%, and Falconbridge Limited, 41.1%)	Sudbury Division, Sudbury, Ontario	4,250.
Do.		do.	Strathcona and Timmins operations in Timmins, Ontario	4,860.
Do.		do.	Smelter in Timmins, Ontario	440.
Do.		do.	Kidd Creek Mine, Timmins, Ontario	4,000 (ore).
Do.		do.	Montcalm Mine in Timmins, Ontario	2,000 (ore).
Do.		do.	Raglan Mine, Quebec	2,000 (ore).
Do.		do.	Louvicourt Mine, Quebec	2,000 (ore).
Do.		do.	Smelter in Thompson, Manitoba	686 (projected).
Do.		do.	Bell Allard Mine, Murdochville, Quebec	4,000 (ore).
Do.		do.	Horne Smelter in Noranda, Quebec	770.
Do.		Highland Valley Copper (Teck Cominco Limited, 63.9%; BHP Billiton Ltd., 33.6%; others, 2.5%)	Kamloops, British Columbia	4,500.
Do.		Inco Limited	Thompson district, Manitoba	Variable (polymetallic).
Do.		do.	Smelter in Sudbury, Ontario	500.
Do.		do.	Refinery in Sudbury, Ontario	170.
Do.		Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and Japanese consortium, 50%)	Huckleberry Mine in Omineca, southeast of Houston, British Columbia	37 (Cu contained).
Do.		Imperial Metals Corporation	Mount Polley Mine at Williams Lake, British Columbia	17 (Cu contained).
Do.		Northgate Exploration Limited	Kermss Mine, British Columbia	28 (Cu contained).
Diamond	carats	BHP Billiton Diamonds Inc.(BHP Billiton Group), 80%; Charles Fipke, 10%; Stewart Blussom, 10%	Ekati Mine in Lac de Gras region, Northwest Territories	5,350,000.
Do.	do.	Diavik Diamond Mines Inc., 60% (Rio Tinto plc); Aber Diamond Mines Ltd., 40% (Aber Diamond Corporation)	Diavik Mine in Yellowknife region, Northwest Territories	6,000,000.
Gold		Barrick Gold Corp.	Holt-McDermott Mine at Harker Township, Ontario	405 (ore).
Do.		do.	Bosquet Mines 1 and 2, northwestern Quebec	954 (ore).
Do.		Kirkland Lake Gold Inc.	Macassa Mine at Teck Township, northern Ontario	473 (ore).
Do.	kilograms	Princeton Mining Corp.	Similco Mine in Princeton, British Columbia (suspended)	450 (metal).
Do.		Kinross Gold Corporation	Lupin Mine in Contwoyo Lake, Northwest Territories (suspended)	612 (ore).
Do.		Miramar Mining Corporation	Giant Mine in Yellowknife, Northwest Territories	407 (ore).
Do.		do.	Giant mill-tailings in Yellowknife, Northwest Territories	3,265 (ore).
Do.		Newmont Canada Limited	Golden Giant Mine in Hemlo, Ontario	1,080 (ore).
Do.		Placer Dome Inc.	Campbell Mine in Red Lake, Ontario	584 (ore).
Do.		do.	Detour Lake Mine in Northeast Ontario	1,278 (ore)
Do.	metric tons	do.	Dome Mine in South Porcupine, Ontario	9.8 (metal).
Do.		do.	Sigma and Kiena Mines in Val d'Or, Quebec	730 (ore).
Do.		Teck-Corona Corp. (Teck Corp., 100%)	David Bell Mine in Hemlo, Ontario	456 (ore).
Do.	kilograms	Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and Japanese consortium, 50%)	Huckleberry Mine in Omineca, southeast of Houston, British Columbia	250 (metal).
Do.	do.	Imperial Metals Corp.	Mount Polley Mine in Williams Lake, British Columbia	3,100 (metal).
Do.	do.	Northgate Exploration Ltd.	Toodogone River, British Columbia	8,700 (metal).
Graphite		Strategic Exploration Inc.	Kearney Lake, Ontario	W.

See footnotes at end of the table.

TABLE 2--Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[2]
Gypsum	Atlantic Gypsum Resources Inc.	Fischell Brook at St. George's, Newfoundland	1,300.
Do.	Georgia-Pacific Corp.	River Denys, Sugar Camp, Nova Scotia	1,460.
Do.	Little Narrows Gypsum Co. Ltd. (USG Corp., 100%)	Little Narrows, Nova Scotia	1,640.
Do.	National Gypsum (Canada) Ltd. (Aancor Holdings Corp., 100%)	Milford, Nova Scotia	3,300.
Do.	Westroc Industries Ltd.	Windermere, British Columbia	1,170.
Iron and steel	Iron Ore Company of Canada (Rio Tinto Ltd., 58.72%; Mitsubishi Corporation, 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%)	Carol Lake, Labrador	16,000 (concentrate), 12,000 (pellets).
Do.	Québec Cartier Mining Co. (Dofasco Inc., 50%)	Mount Wright, Quebec	16,950 (concentrate), 7,500 (acid pellets), 657 (sinter).
Do.	Wabush Mines Ltd. (Stelco Inc., 37.9%; Dofasco Inc., 24.2%; Cliffs Mining Co., 22.8%; Acme Steel Co., 15.1%)	Wabush, Labrador, and Pointe Noire, Quebec	6,200 (concentrate).
Do.	Dofasco Inc.	Hamilton, Ontario	3,642 (pig iron), 4,500 (crude steel).
Lead	Brunswick Mining and Smelting Corp. Ltd. (Noranda Inc., 100%)	No. 12 Mine in Bathurst and smelter in Belledune, New Brunswick	74 (Pb contained).
Do.	Hudson Bay Mining and Smelting Co., Limited (HudBay Minerals Inc., 100%)	Flin Flon and Snow Lake, Manitoba	60 (Pb-Zn contained).
Do.	Teck Cominco Limited	Trail, British Columbia	120 (refined lead).
Do.	Breakwater Resources Ltd.	Nanisivik Mine on Baffin Island, Northwest Territories	785 (ore).
Do.	Boliden Limited	Myra Falls, British Columbia	800 (ore).
Limestone	Lafarge Canada Inc.	Steep Rock, Manitoba	906 (quarry).
Do.	Atlantic Industrial Minerals Inc.	Iris Cove, Sydney, Nova Scotia	720.
Do.	Inland Cement Ltd. (CBR Materials Corp.)	Cadomin, Alberta	2,160.
Do.	do.	do.	2,160 (quarry).
Do.	Havelock Co. (Kickenson Mines Co., 100%)	Havelock, New Brunswick	864 (limestone).
Do.	Continental Lime Ltd.	Faulkner, Manitoba	1,440 (crushed stone).
Magnesium	Timminco Limited	Haley Station, Ottawa, Ontario	6 (smelter).
Do.	Norsk Hydro Canada Inc.	Becancour, Quebec	48 (smelter).
Molybdenum	Huckleberry Mines Ltd. (Princeton Mines Corp., 60%, and Japanese consortium, 40%)	Southeast of Houston, British Columbia	635 (Mo contained).
Nickel	Falconbridge Limited (Noranda Inc., 58.9%, and Falconbridge Limited, 41.1%)	Craig, Fraser, Lindsley, and Lockerby in Sudbury district, Ontario	54 (metal contained).
Do.	do.	Raglan Mine in Ungave, Quebec	23 (metal contained).
Do.	do.	Smelter in Falconbridge, Ontario	45 (rated capacity).
Do.	do.	Montcalm Mine in Timmins, Ontario	2,000 (ore).
Do.	Inco Limited	Gertrude, Stobie, Creighton, Copper Cliff North and South, Garson-Offsets, McCreedy East and West, Coleman, Crean Hill, and Totten in Sudbury district, Ontario	106 (metal contained).
Do.	do.	Smelter in Sudbury, Ontario	110 (metal contained).
Do.	do.	Refinery in Sudbury, Ontario	57 (metal contained).
Do.	do.	Refinery in Port Colborne, Ontario	30 (metal contained).
Do.	do.	Thompson, Birchtree Mines in Manitoba	62 (metal contained).
Do.	do.	Smelter in Thompson, Manitoba	82 (metal contained).
Do.	Sherritt International Corp.	Refinery in Fort Saskachewan, Alberta	24 (metal contained).

See footnotes at end of the table.

TABLE 2--Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[2]
Petroleum:[1]				
Gas	million cubic meters	BP Canada Inc. (The British Petroleum Co. plc, London, 100%)	Noel Area, northern Alberta; Chauvin, Sibbald, North Pembina, Alberta	47.
Crude	million 42-gallon barrels	do.	do.	12.
Gas	billion cubic meters	do.	do.	1.8.
Crude	thousand 42-gallon barrels	Imperial Oil Ltd. (Exxon Mobil Corp., 70%, and others, 30%)	Judy Creek, Cold Lake, Alberta; Mackenzie Delta, Beaufort Sea, Yukon and Northwest Territories	670.
Gas	million cubic meters	do.	do.	36.4.
Crude	million 42-gallon barrels	Mobil Oil Canada Ltd. (Exxon Mobil Corp., 100%)	Hibernia, Grand Banks, southeast of Newfoundland and Sable Island, Nova Scotia, and others in Alberta	26.1.
Gas	billion cubic meters	do.	do.	3.0.
Crude	million 42-gallon barrels	do.	Terra Nova, near to Hibernia, Jeanne d'Arc Basin, Newfoundland	25.0.
Gas	billion cubic meters	do.	do.	2.0.
Crude	million 42-gallon barrels	Norcen Energy Resources Ltd. (Hollinger Inc., 59%, and Hees International, 41%)	Pembina, Bodo, Majorville, Alberta	12.1.
Do.	do.	Oakwood Petroleums Ltd. (Sceptre Resources Ltd., 100%)	Grantham, Hays Ronalane, Peace River, Normandville, Randell, Alberta; and Grizzly Valley, British Columbia	24.6.
Do.	do.	PanCanadian Petroleum Ltd. (Canadian Pacific Enterprises, 87%, and others, 13%)	Rycroft, Wembley, Elk Point, Rio Bravo, Alberta	19.7.
Gas	billion cubic meters	do.	do.	3.53.
Crude	million 42-gallon barrels	Shell Canada Ltd. (Shell Investments, 79%, and others, 21%)	Dimsdale, Little Smoky Lake, Sousa, Alberta; Midale, Benson, Saskatchewan	22.2.
Gas	billion cubic meters	do.	do.	6.53.
Crude	million 42-gallon barrels	Suncor Inc. (Sun Co. Inc., United States, 75%, and Ontario Energy Resources, 25%)	Kidney, Zama Lake, Cosway, Albersun Prevo, and Medicine River, Alberta; and Leitchville, Unwin, Saskatchewan	4.1.
Crude	thousand 42-gallon barrels	Texaco Canada Petroleum Inc. (Texaco Inc., United States, 78%, and others, 22%)	Eaglesham, Virgo, Alberta; and Desan, British Columbia	158.
Gas	million cubic meters	do.	do.	67.3.
Crude	million 42-gallon barrels	UNOCAL Canada Ltd. (UNOCAL Corp., United States, 100%)	Calgary, Alberta	14.7.
Potash (K_2O equivalent):		Potash Corp. of Saskatchewan Inc. (PotashCorp) (private, 100%)	Lanigan, near Lanigan, Saskatchewan	3,828 (KCl).
Do.		do.	Rocanville, southeast Saskatchewan	2,295 (KCl).
Do.		do.	Allan Division, Allan, Saskatchewan	1.885 (KCl).
Do.		do.	Cory, near Saskatoon, Saskatchewan	1,361 (KCl).
Do.		do.	Patience, near Saskatoon, Saskatchewan	1.033 (KCl).
Do.		do.	Sussex, New Brunswick	1,068 (KCl).
Do.		International Minerals & Chemical Corp. (Canada) Ltd. [IMC Fertilizer Corp., 75%, and Potash Corp. of Saskatchewan Inc. (PotashCorp.), 25%]	Esterhazy, southeast Saskatchewan	953 (KCl).
Do.		Agrium Products Inc.	Vanscoy, Saskatchewan	1,750 (KCl).
Salt and brine operations		The Canadian Salt Co.	Pugwash, Nova Scotia	1,400 (rock salt and brine salt).
Do.		do.	Iles-de-la-Madeleine, Quebec	1,625 (rock salt).
Do.		do.	Ojibway, Ontario	2,600 (rock salt).
Silver		Prime Resources Group Inc.	Eskay Creek Mine in British Columbia	340.
Do.	metric tons	Breakwater Resources Ltd.	Caribou Mine in Bathurst, New Brunswick	7.5 (mill feed).
Do.		Kirkland Lake Gold Inc.	Macassa Mine in Ontario	438 (mill feed).
Do.		Barrick Gold Inc.	Holt-McDermott Mine in Ontario	876 (mill feed).

See footnotes at end of the table.

TABLE 2--Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[2]
Sodium chlorate production using salt	Dow Chemical Canada Inc. (Dow Chemical Co., 100%)	Fort Saskatchewan, Alberta	524 (caustic soda).
Do.	do.	Sarnia, Ontario	350 (caustic soda).
Do.	General Chemical Canada Ltd.	Amherstburg, Ontario	363 (sodium carbonate).
Sulfur:			
Petroleum refinery capacities	Consumer's Cooperative Refineries Ltd. (Federated Cooperatives Ltd., 100%)	Regina, Saskatchewan	54.
Do.	Esso Petroleum Canada (Exxon Mobil Corp., 100%)	Sarnia, Ontario	50.
Do.	Sulconam Inc. (Petro Canada, 7.6%)	Montreal, Quebec	108.
Main sulfur extraction plants (sour gas and oil sands)	Amoco Canada Petroleum Co., Ltd. (Amoco Corp., 100%)	East Crossfield-Elkton, Alberta	650.
Do.	Canadian Occidental Petroleum, Ltd.	East Calgary-Crossfield, Alberta	610.
Do.	Chevron Canada Resources Inc. (ChevronTexaco Corp., 100%)	Kaybob South III, Alberta	1,281.
Do.	Husky Oil Ltd.	Ram River, Ricinus, Alberta	1,646.
Do.	Shell Canada Ltd.	Waterton, Alberta	1,120.
Principal SO_2 and H_2SO_4 production capacities	Canadian Electro Zinc Ltd. (CEZ) (Noranda Inc., 90.17%)	Valleyfield, Quebec	430 (H_2SO_4).
Do.	Inco Limited	Copper Cliff, Ontario	950 (H_2SO_4).
Do.	Falconbridge Limited (Noranda Inc., 50%, and Trelleborg AB, 50%)	Kidd Creek, Ontario	690 (H_2SO_4).
Do.	ESSO Chemical Canada (Exxon Mobil Corp., 100%)	Redwater, Alberta	910 (H_2SO_4).
Titanium slag	QIT-Fer et Titane, Inc. (Rio Tinto Group, 100%).	Sorel-Tracy, Quebec	1,100 (Sorelslag). 250 (UGS slag).
Uranium metric tons	Cameco Corp. (Cameco Corp., 50.025%; COGEMA Resources Inc., 37.1%; Idemitsu Inc., 7.875%; TEPCO Inc., 5.0%).	Cigar Lake, Saskatchewan	6,500 (oxide).
Do. do.	do.	Key Lake, Saskatchewan	6,395 (oxide).
Do. do.	do.	McArthur River Mine, Saskatchewan	5,751 (oxide).
Do. do.	do.	Rabbit Lake, Saskachewan	5,445 (oxide).
Zinc	Breakwater Resources Ltd.	Nanisivik Mine on Baffin Island, Northwest Territories	60 (Zn contained).
Do.	do.	Bathurst, New Brunswick	1,100 (Zn in concentrate).
Do.	Brunswick Mining and Smelting Corp. Ltd. (Noranda Inc., 100%)	Bathurst, New Brunswick	232 (Zn in concentrate).
Do.	Falconbridge Limited. (Noranda Inc., 49.9%)	Timmins operations and smelter in Timmins, Ontario	212 (Pb-Zn contained), 133 (slab zinc).
Do.	do.	Kidd Creek complex, Ontario	145 (Zn in concentrate).
Do.	Hudson Bay Mining and Smelting Co., Limited (HudBay Minerals Inc., 100%)	Snow Lake concentrator, Manitoba	1,125 (Pb-Zn ore).
Do.	do.	Flin Flon Mine and Smelter in Manitoba	115 (slab zinc).
Do.	Teck Cominco Limited	Smelter in Trail, British Columbia	290 (slab zinc).
Do.	Boliden Limited	Myra Falls Mine in Strathcona Provincial Park, British Columbia	110 (Zn ore).
Do.	Noranda Inc.	Bell Allard Mine in Matagami, Quebec	85 (Pb-Zn ore).
Do.	do.	Valleyfield in Montreal, Quebec	260 (Zn in concentrate).

W Withheld to avoid disclosing company proprietary data.

[1]Projections of annual capacity involve matching decline curves against later discoveries and are generalized extrapolations only based on data presented in the Canadian Oil and Gas Handbook, 2001 and subsequent years. Ownership of various companies and proportionate participation in various leaseblocks and/or joint ventures changes continually. The ownership proportions shown here must be considered to be illustrative only.

[2]Abbreviations used for commodities in this table include the following: Cu--copper; H_2SO_4--sulfuric acid; KCl--potassium chloride; Mo--molybdenum; Nb--niobium; Pb--lead; and Zn--zinc.

TABLE 3
CANADA: RESERVES OF MAJOR MINERALS IN 2005

(Thousand metric tons unless otherwise specified)[1]

Commodity		Reserves
Asbestos, fiber		35,700 [e]
Coal (anthacite, bituminous, and lignite)		6,578,000 [2]
Copper		10,000
Gold	metric tons	1,500 [3]
Gypsum		450,000 [e]
Iron ore		1,700,000 [e]
Lead		1,600
Molybdenum		450
Natural gas	billion cubic meters	1,600 [2]
Nickel		6,600
Petroleum crude	million barrels	16,500 [2]
Potash, K_2O equivalent	million metric tons	4,400 [e]
Salt	thousand short tons	264,000 [e]
Silver	metric tons	47,000
Sodium sulfate	thousand short tons	84,000 [e]
Sulfur		160,000 [e]
Uranium		420 [4]
Zinc		11,000

[e]Estimated; estimated data are rounded to three significant digits; may not add to totals shown.

[1]2004 and 2005 Canadian Minerals Yearbook, Natural Resources Canada, except for natural gas and petroleum crude; U.S. Geological Survey Mineral Commodity Summaries 2006.

[2]BP Statistical Review of World Energy June 2006.

[3]Excludes metal in placer deposits.

[4]Recoverable at prices of $100 or less per kilogram of uranium.