

General Review

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OVERVIEW

Global economic activity was mixed in 2002 as most economies experienced uneven and choppy performances. Global Gross Domestic Product (GDP) was estimated at 3.0% growth, up from 2.3% in 2001. However, business investment continued to be weak and consumer spending, although buoyant, slowed relative to its strong performance of the past several years. Part of the general economic malaise and uncertainty was due to the fall-out from the terrorist attacks in the United States on September 11, 2001, the subsequent global war on terrorism and, late in the year, international tensions over Iraq. Consequently, the global mineral industry experienced a continuation of sluggish demand and excess capacity resulting in relatively weak prices for most mineral commodities. A notable exception was gold, which benefited from the global political tensions and economic uncertainties to post significantly higher prices during the year.

Canada's real GDP, measured at market value in 1997 prices, increased by 3.3% in 2002 to \$1.07 trillion, compared to a growth rate of 1.9% in 2001. Both interest rates and inflation remained low, but pressures in the Canadian economy pushed both to levels higher than in 2001. The average annual unemployment rate rose to 7.7% and the value of the Canadian dollar vs. the U.S. dollar averaged \$0.6368, down slightly from 2001. Total Canadian merchandise exports (Customs basis) decreased to \$396.3 billion, down by 1.9% from \$404.0 billion in 2001 and \$413.2 billion in 2000. Imports (Customs basis) totaled \$348.4 billion, compared to \$343.1 billion in 2001 and \$356.9 billion in 2000.

Preliminary estimates for the value of production¹ for all sectors of the Canadian mining and fuel extraction industry totaled \$77.0 billion, down 7.3% from \$83.0 billion in 2001 and the record high of \$83.8 billion in 2000. The fuels sector declined as prices for natural gas and natural gas by-products fell. When fuels are excluded, the value of production for the mining industry remained flat at \$18.0 billion. Of this, metal production declined by 1.3% to \$10.2 billion while nonmetallic production increased by 1.8% to \$7.8 billion.

The value of total exports for non-fuel mining and mineral processing products (including coal) increased by 4.3% to \$51.0 billion. The 2002 export figure represents 12.9% of Canada's total exports. Canadian imports of non-fuel mining and mineral processing products (including coal) totaled \$48.5 billion, up 3.8%. As a result, the balance of trade (total exports minus imports of these commodities) showed a surplus of \$2.4 billion.

Prices for many of the major mineral commodities were relatively weak and flat in 2002, although there were notable exceptions. Of the major nonferrous metals, nickel and copper were higher at year-end compared to the start of the year, whereas zinc, lead and aluminum were lower. For precious metals, gold and platinum were up significantly during the year, silver was up marginally, and palladium was down sharply.

Significant developments affecting the Canadian mining industry in 2002 included:

- Corporate operating profits falling for the second year in a row;

¹ Throughout this article, the volume and value of production are based on estimates using shipments from domestic sources as the measure of mine production, as published in *Canada's Mineral Production, Preliminary Estimates*, Statistics Canada, cat. no. 26-202-XIB. Foreign ores, e.g., bauxite, are therefore not included.

- Exploration activity being up for the second consecutive year;
- The Government of Canada implementing legislation to meet its obligations under the Kimberley Process Certification Scheme for rough diamonds;
- Consolidation of virtually all metallurgical coal operations in Canada under the agreement to form the Fording Canadian Coal trust;
- The revival of the Voisey's Bay nickel project as Inco Limited and the Government of Newfoundland and Labrador came to agreement on its development;
- The Diavik diamond mine, Canada's second diamond project, completing advanced pre-development work and moving towards an early 2003 start-up;
- Decreased employment in mining; and
- Mine openings that equaled mine closings.

The outlook for the global economy in 2003 is clouded by many factors, notably significant geopolitical tensions and under-performing economies around the world. Higher energy prices were also beginning to dampen economic activity in late 2002 and early 2003. Global GDP growth in 2003 is expected to continue, albeit at a relatively subdued rate. These factors also bring uncertainties to mineral commodity markets. With the exception of some mineral commodities, such as gold, which is viewed by many as a haven for investment in times of trouble, and nickel, with increasing demand now evident in China and Asia, most commodity activity will likely remain sluggish and lacklustre in 2003. Therefore, until the uncertainties are diminished and capital investment spending firms up, the demand for mineral commodities will likely remain soft and unclear. If so, negative impacts can be expected on the operating and financial performance of most mining companies, including Canadian companies, in 2003.

THE CANADIAN ECONOMY

The Canadian economy exceeded initial expectations in 2002 as GDP grew by 3.3%, compared to 1.9% in 2001, notwithstanding global geopolitical, financial and economic weaknesses. The economy was particularly strong in the first six months of the year before softening to an annualized growth rate of 1.6% in the last quarter. Capacity utilization for the last quarter of the year was 82.9% (manufacturing at 84.3%), compared to 81.7% (manufacturing at 82.1%) for the first quarter of 2002. Inflation and interest rates remained at low levels, even though some inflationary pressures were present during the year.

In response to these market conditions, the Bank of Canada lowered its target overnight rate by 25 basis points to 2.00% in January, but later raised the rate by 25 basis points in each of April, June and July to reach 2.75%. Rate announcements in September, October and December left the rate unchanged. For the year, the rate

increased by 50 basis points from 2.25% to 2.75%. This increase contrasts with the United States where the federal funds rate fell from 1.75% at the beginning of the year to 1.25% at year-end. Thus, there was a spread of 1.5% between the key U.S. and Canadian rates as 2002 came to a close. The annual inflation rate (Consumer Price Index) remained in the Bank of Canada's annual target range of 1-3%, averaging 2.2% in 2002, down from 2.6% in 2001 and 2.7% in 2000. The value of the Canadian dollar vs. the U.S. dollar averaged \$0.6368, down from \$0.6458 for 2001. This represents a 1.4% decline and continues the trend of the 1990s when the dollar lost nearly a third of its value.

Consumer spending continued to be robust in 2002. Canada Mortgage and Housing Corporation announced that new housing starts increased by 26.0% to 205 034 units in 2002 as homebuyers took advantage of continuing lower mortgage interest rates and improved employment opportunities. Similarly, the Canadian Real Estate Association reported that existing house sales across Canada on the Multiple Listing Service increased by 10.6% in 2002 to reach 421 227, an all-time high. Overall, building construction was strong as Statistics Canada announced that the value of building permits reached \$46.0 billion in 2002 in real terms, the highest since 1989 and an increase of 16.2% over 2001. Of this total, residential permits accounted for \$29.1 billion.

Automotive companies reported that new vehicle sales in Canada rose to a record 1.7 million in 2002, an increase of 8.5% over 2001, due in part to a continuation of the strong buyer incentives, including zero interest financing, introduced to maintain sales following the September 11th

CANADIAN ECONOMIC CONDITIONS

Leading Indicators	2001	2002	% Change
Real GDP (\$ billions, 1997 chained prices)	1 040.40	1 074.5	+3.3
Consumer prices (% annual change)	+2.0	+2.7	n.a.
Operating profits (\$ billions)	138.6	146.3	+5.6
Unemployment rate (% annual average)	7.2	7.7	+6.9
Merchandise trade balance (balance of payments basis) (\$ billions)	64.0	54.6	n.a.
Housing starts (000)	162.7	205.0	+26.0
Canada/U.S. exchange rate (annual average)	0.6458	0.6368	-1.39
International current account balance (\$ millions)	26 864	23 366	n.a.
Global economic output (% change)	+2.3	+3.0	n.a.

Sources: Statistics Canada; Canada Mortgage and Housing Corporation; International Monetary Fund.
n.a. Not applicable.

terrorist attacks in 2001. Of this total, passenger car sales rose 7.5% to 934 000. On the production side, automotive manufacturers in Canada produced 1.35 million passenger cars in 2002, up 4.1% from 2001.

The average annual unemployment rate rose to 7.7% in 2002 from 7.2% in 2001, even though employment rose by 3.7%, or 560 000, the highest annual growth rate since 1987. This compares to employment growth of 0.2%, or 25 000, in 2001 and 2.2%, or 325 500, in 2000.

On the trade front, total Canadian merchandise exports fell to \$396.3 billion from \$404.0 billion in 2001, a decline of 1.9%. In 2000, exports totaled \$413.2 billion. The trade surplus (exports minus imports) declined to \$47.9 billion, compared to the \$60.9 billion trade surplus in 2001 and \$56.3 billion in 2000. Imports totaled \$348.4 billion in 2002 compared to \$343.1 billion in 2001 and \$356.9 billion in 2000.

Global economic activity (GDP) increased in 2002 by 3.0%, up from 2.3% in 2001 but down from 4.4% in 2000 and 3.7% in 1999. The U.S. economy rose by 2.4% in 2002 compared to only 0.3% in 2001. The European Union declined from 1.4% growth in 2001 to 0.8% in 2002 while the United Kingdom fell from 2.0% to 1.6%, France from 1.8% to 1.2%, and Germany from 0.6% to 0.2%. Japan declined from 0.4% growth in 2001 to 0.3% in 2002. China rose from 7.3% in 2001 to 8.0% in 2002 while South Korea rose from 3.0% growth in 2001 to 6.1% in 2002.

THE CANADIAN MINERAL INDUSTRY

The Canadian mineral industry can be characterized by the following four stages of processing activity:

- Stage 1: Mineral extraction and concentrating industry (for example, gold mining, and sand and gravel/quarrying);
- Stage 2: Smelting and refining industry (for example, nonferrous smelting and refining, alloying, and the production of primary steel);
- Stage 3: Nonmetals and metals-based semi-fabricating industries (for example, copper rolling, casting and extruding, and concrete products); and
- Stage 4: Metals fabricating industries (for example, manufacturing of ornamental metal products and machine parts).

While much of this article focuses on Stage 1 activities (the activities of the mining industry), a description of the mineral industry as a whole (Stages 1 to 4) provides a more comprehensive picture of its importance to Canada. In the context of this article, the mineral industry should be taken to exclude the extraction and processing of crude petroleum and natural gas, but to include both the coal and uranium mining industries.

CANADIAN MINERAL INDUSTRY IN 2002

Leading Mining Indicators	2001	2002	% Change
Value of mineral production (excluding oil and gas) (\$ millions)	19 534	19 570	+0.19
Exploration expenditures (\$ millions)	513	573	+11.8
Metal Price Index (1997=100)			
Precious metals	83.3	94.3	n.a.
Base metals	73.9	74.5	n.a.
Direct mining employment (000)	50.5	47.4	-6.1
Value of minerals and mineral products domestic exports (\$ billions)	47.4	49.6	+4.5
Mining company operating profits (\$ billions)	2.3	1.6	-30.6
Worldwide mine equity financing (\$ billions)	4.4	10.5	+137.6

Sources: Natural Resources Canada; Statistics Canada; Gamah International.

n.a. Not applicable.

Note: All the indicators above, with the exception of the Metal Price Index and mining company operating profits, include the coal mining industry.

GDP OF THE MINERAL INDUSTRY

In 2002, the mineral industry, as defined above, contributed \$36.4 billion to Canada's total GDP, an increase of 3.1% over 2001, or 3.7% of Canada's total GDP of \$977.6 billion. (In this section, all figures are based on GDP at basic prices in chained 1997 dollars.) Mining (mineral extraction and concentrating – Stage 1) contributed 26.0% of the industry's GDP in 2002 while smelting and refining (Stage 2) added a further 21.7% to the total. Nonmetals and metals-based semi-fabricating (Stage 3) accounted for 21.0% and metals fabricating (Stage 4) accounted for the remaining 31.4%.

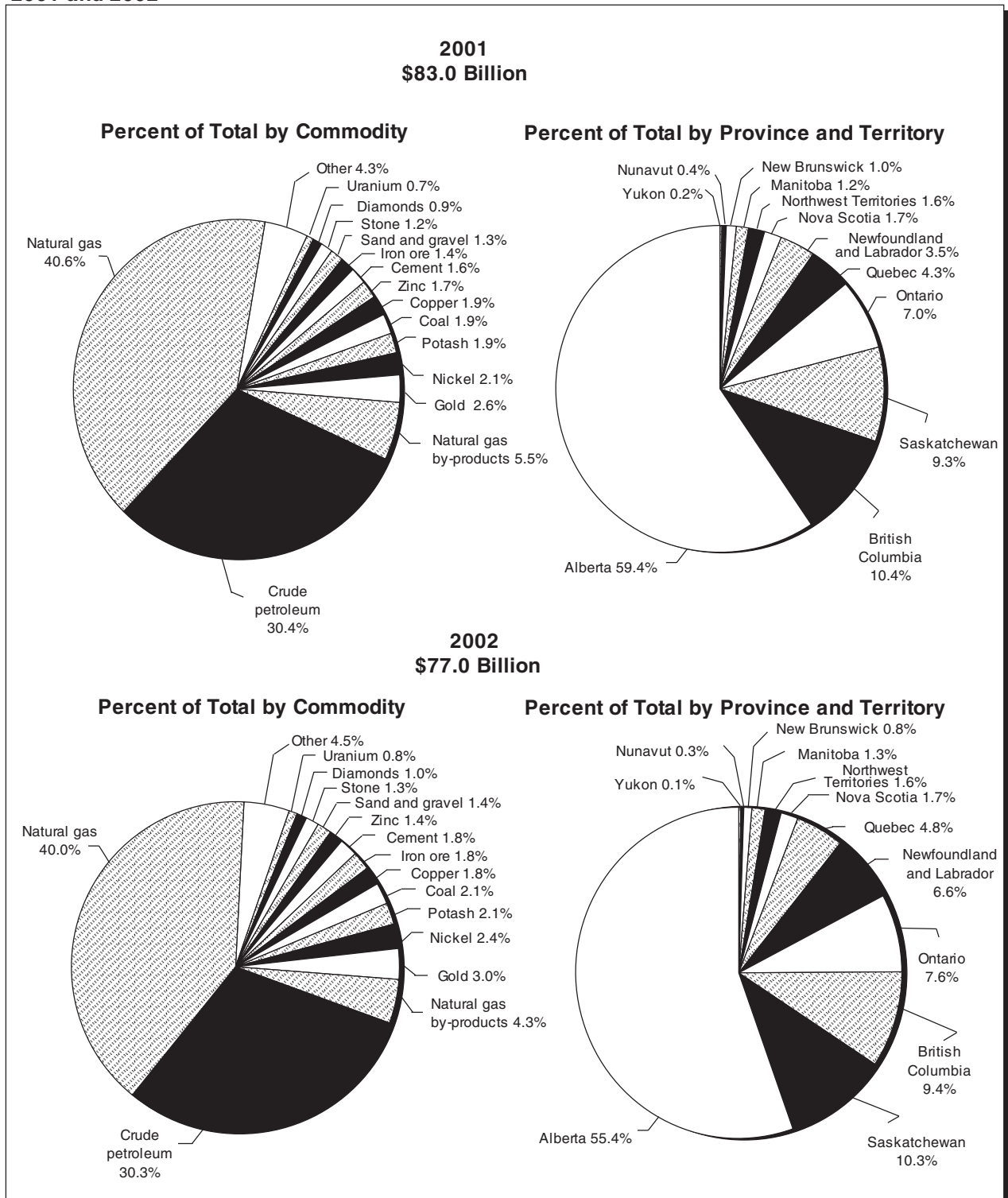
For mining (Stage 1) in 2002, GDP dipped by 0.2% to \$9.5 billion as coal mining decreased by 12.3% to \$988 million and metal mining decreased by 5.8% to \$5.0 billion. Nonmetals and quarries rose by 9.7% to \$3.2 billion. GDP for services related to mining and oil and gas fell by 20.0% to an estimated \$4.1 billion in 2002.

CANADIAN MINERAL PRODUCTION

Production From Canadian Mines, Quarries and Oil/Gas Wells

Based on preliminary estimates and using shipments as the measure of mine production, the total value of Canadian mineral production (including fuels) amounted to

Figure 1
Value of Mineral Production, Percent Shares by Commodity and by Province and Territory, 2001 and 2002



Sources: Natural Resources Canada; Statistics Canada.

Notes: The provincial/territorial shares may not add to 100% due to rounding. P.E.I. mineral production is too small to illustrate.

\$77.0 billion, down 7.3% from \$83.0 billion in 2001. In 2000, an all-time high of \$83.8 billion was recorded. The value of production of the metals and nonmetals group remained unchanged in 2002 from 2001 at \$18.0 billion, while a drop in prices for natural gas and its by-products resulted in a decrease of 9.3% in the total value of the fuels group to \$59.0 billion.

The value of metals production fell by 1.3% to \$10.2 billion in 2002 from \$10.4 billion in 2001 as significant decreases occurred for the platinum group metals, cobalt, lead and zinc. Gold, nickel, copper, iron ore and zinc achieved values in excess of \$1 billion. Gold was the only metal produced in Canada that had a value of production over \$2 billion in 2002. It was Canada's leading metal with a value of \$2.3 billion, an increase of 7.4% due entirely to higher prices as gold output fell by 6.9%.

Table 1 shows the value and volume movements of the major mineral commodities produced in Canada for the years 2001 and 2002.

The value of nonmetals production rose to a record high of \$7.8 billion in 2002, an increase of 1.8% over 2001. Increases in the value of cement, stone, diamonds, clay products, lime, peat and gypsum more than offset decreases in the value of potash, sand and gravel, salt and asbestos. Production values in excess of \$1 billion were recorded by potash, cement, and sand and gravel. Potash remained the leading nonmetal produced in Canada. The mining of potash accounted for \$1.6 billion in value, a slight decline of 1.2% from 2001 as output was off by 0.6%.

The value of production for mineral fuels fell by 9.3% in 2002 to \$59.0 billion from the record high of \$65.0 billion reached in 2001. Falling natural gas prices in 2002 led to natural gas at \$23.3 billion and natural gas by-products at \$3.3 billion, a decline of 30.8% and 28.1%, respectively.

VALUE OF CANADIAN MINERAL PRODUCTION⁽¹⁾

	2001 (r)	2002 (p)	Change
	(\$ millions)		(%)
Metallic minerals	10 359.3	10 225.1	-1.3
Nonmetallic minerals	7 617.2	7 751.8	1.8
Total non-fuels	17 976.5	17 976.9	-
Fuels	64 991.3	58 974.3	-9.3
Total minerals	82 967.8	76 951.1	-7.3

Sources: Natural Resources Canada; Statistics Canada, *Canada's Mineral Production, Preliminary Estimates*, 2002, cat. no. 26-202-XIB.

- Nil; (p) Preliminary; (r) Revised.

(1) The value of non-fuels production is based on shipments.
Note: Numbers may not add to totals due to rounding.

The volume of production of natural gas was the same as in 2001 while natural gas by-products were up by 0.8%. Increasing oil prices and higher output (up 5.8%) led to a sharp increase of 22.3% in the value of crude oil production to \$30.8 billion in 2002. The value of coal increased by 2.3% to \$1593.1 million as the result of higher prices since production fell by 5.0%.

Based on the value of production for 2002, the top non-fuel commodities were gold (\$2.3 billion), nickel (\$1.9 billion), potash (\$1.6 billion), copper (\$1.4 billion), iron ore (\$1.4 billion), cement (\$1.4 billion), zinc (\$1.1 billion), and sand and gravel (\$1.0 billion). In terms of the production of Canada's leading minerals, increases in mine output of 5% or greater were recorded by diamonds, iron ore, gypsum, silver, and platinum group metals, whereas declines of 5% or more were experienced by lead, asbestos, zinc, salt, gold and copper.

Geographically, the importance of the industry may be more significant on a regional and community basis as, in many parts of Canada, particularly in the North, it provides a major economic stimulus. Well over 100 communities were heavily reliant on mining in 1996 and approximately 600 000 Canadians lived in these communities.

Regionally, four provinces continued to dominate the value of Canada's non-fuel mineral output in 2002, accounting for 75.3% of the total. Ontario contributed the largest share of the non-fuel mineral output at 32.0% of the total value while Quebec contributed 20.5%, Saskatchewan, 12.8%, and British Columbia, 10.0%. For the other provinces and territories, Newfoundland and Labrador was at 5.4%; the Northwest Territories, 4.8%; Manitoba, 4.6%; New Brunswick, 3.5%; Alberta, 3.3%; Nunavut, 1.5%; Nova Scotia, 1.4%; and the Yukon, 0.2%. The value for Ontario increased by 2.1% to \$5.8 billion, Quebec was up by 2.4% to \$3.7 billion, Saskatchewan was down by 0.3% to \$2.3 billion, and British Columbia was down by 6.2% to \$1.8 billion. When coal is included, the value of Saskatchewan production rises to \$2.5 billion, which is a decline of 0.2% from 2001, and the value of British Columbia production increases to \$2.8 billion, which is a decrease of 1.8% compared to 2001.

Alberta is Canada's major fuels producer with a value of \$42.0 billion in 2002, accounting for 71.3% of Canada's total. With the exception of uranium, Alberta produces a full complement of mineral fuels, including crude petroleum, natural gas, natural gas by-products, and coal. Other provinces with significant mineral fuels production are Saskatchewan at 9.6% and British Columbia with 9.2% of Canada's total. Newfoundland and Labrador accounted for 6.9% and the other provinces and territories accounted for the remaining 3.0%.

There were nine mine openings in 2002 (one new mine and eight re-openings) and nine mine closings (six mine closures and three suspensions). Given the size and type

of the mines that were opened or closed, there was a balance in both the number and relative importance of these mines.

From 1997 to 2001, there had been more closings than openings each year. That trend was broken in 2002. If gold prices remain above US\$320/oz, more mine openings than closings can be expected in 2003. The fact that the six permanent closings outnumbered the one new opening was, however, a negative factor. Nevertheless, the situation has improved compared to the previous four years and a recovery in mine development and mine openings appears to be on the way in Canada.

Provincially, one new mine opened in Ontario. Three mines re-opened in Quebec, two re-opened in Ontario, and one each in Saskatchewan, British Columbia and the Northwest Territories. There were two mine closures in Nunavut and one each in Nova Scotia, Quebec, Manitoba and Saskatchewan. The three suspensions occurred in Nova Scotia, Quebec and Saskatchewan.

Mineral and Metal Production From Recycled and Imported Materials

Annual statistical series of Canada's mineral production to date have only included the production and value of minerals and metals obtained from Canadian-mined ores and concentrates. Statistics on the production and value of recycled materials or minerals and metals obtained from imported ores, concentrates, and recycled minerals and metals have not been generally available, despite the fact that Canada is a major producer of metals, most notably aluminum, from imported ores. Work has started on the development of new statistical series to present information that will characterize the production of these materials in Canada.

MINERAL AND METAL COMMODITY PRICES

In general, mineral and metal commodity prices remained soft in 2002 with a few exceptions such as gold, platinum and nickel. On the demand side, global economic conditions remained weak and uneven with the notable exceptions of China and South Korea. Indeed, GDP for the world economy is estimated to have increased by 3.0% in 2002, up from 2.3% in 2001.

Of the major base metals, only nickel and copper finished 2002 at price levels higher than they started the year, whereas zinc, lead and aluminum ended the year with lower prices than at the beginning. On the supply side, there was rationalization of mine capacity for many commodities on a global basis, due in part to weak international commodity prices and the relative increased strength of local currencies against the U.S. dollar.

Based on trading on the London Metal Exchange (daily closings), nickel opened 2002 at US\$2.65/lb with inventories at 19 188 t and finished the year at US\$3.22/lb with inventories at 21 990 t. From its low at US\$2.55/lb in early January, nickel hit its high in mid-July at US\$3.50/lb. Prices reacted in response to stronger demand in major end-use nickel markets, particularly in Asia, and an indication of a tightening of supply at year-end. Stocks reached a low of 16 596 t in mid-April and peaked at 29 130 t in mid-June. Copper opened the year at US64.9¢/lb, decreased slightly to its low of US64.5¢/lb in early January, increased to its high of US76.6¢/lb in early June, and declined in the last half of the year to close the year at US69.7¢/lb. Positive price pressures were evident as copper use increased during the year, especially in China and South Korea, while production fell. Shortages in concentrates were having an impact on smelter and refinery production, particularly late in the year. Copper stocks began the year at 799 225 t, which was the low for the year and then increased to a high of 980 075 t in early May before declining to 856 400 t at year-end. Aluminum began the year at US60.1¢/lb, increased to US65.2¢/lb in late March, declined to a low of US57.9¢/lb in early October and finished the year at US59.8¢/lb. Even though usage levels increased, notably in China, primary aluminum production also increased, thus maintaining the surplus of supply and contributing to overall price weakness. Indeed, inventories increased steadily from 821 250 t (yearly low) at the beginning of the year to 1 301 075 t in early September before falling slightly to 1 242 700 t at the end of the year.

Zinc began 2002 at US34.7¢/lb, moved up to US38.2¢/lb in mid-March, and then declined to its low for the year of US32.9¢/lb in mid-August before inching up to US34.0¢/lb to close out the year. Although zinc use increased and production declined in 2002, a continuing large zinc supply surplus exerted downward pressure on prices. Stocks began the year at 433 350 t, the low for the year, peaked at 656 950 t in mid-November, and closed out the year at 651 150 t. The price of lead declined in 2002, ending the year at US19.1¢/lb, compared to US23.5¢/lb at the beginning of the year. Its high was US24.4¢/lb in mid-January while its low was US18.3¢/lb in early October. Lead use fell during the year, as did lead production, resulting in a global market that was relatively in balance. Inventories began the year at 97 700 t, decreased to a low of 97 400 t shortly thereafter in early January, reached their high in early August at 197 400 t, and then declined to finish the year at 184 025 t.

For precious metals, gold closed out the year at US\$342.75/oz, up by 23.1% from US\$278.35/oz at the beginning of 2002, even though jewellery demand was down. Investment-related demand factors were significant, notably poor equity markets, a reduction in gold producers' hedging, the weakness of the U.S. dollar in currency markets, and concern over a new war in the Persian Gulf. There was a significant late-year surge in December

as gold hit its high for the year at US\$349.30/oz as fears of a new Gulf War escalated. The low for the year was reached in early January at US\$277.75/oz. Silver prices began the year at US\$4.59/oz, hit a high of US\$5.0975/oz in mid-July from a low of US\$4.2350/oz in late January, and ended the year at US\$4.6650/oz, even though global demand rose while production fell in 2002. During the year, China, the largest seller of official government silver, announced that it would be using two million oz of silver in 2002 to issue a series of commemorative coins. Following depletion of the silver stockpile by the United States Defense Logistics Center, the United States Mint received legislative authority to buy silver on the open market for its coinage program.

The price of platinum rose significantly in 2002 from US\$481/oz at the beginning of the year to US\$598/oz at year-end, an increase of 24.3%, due in large part to increased demand for platinum for use in automotive catalytic converters. The low was reached in early February at US\$453/oz with the high achieved in late December at US\$607/oz. Palladium began the year at US\$434/oz, reached its peak in mid-January at US\$435/oz, declined to a low of US\$222/oz in late December, and ended the year recovering only slightly to US\$233/oz as a result of excess supply in the marketplace. Because of the recent history of price volatility of this hard-to-procure metal, which is mainly supplied from Russia, major industrial users, such as automotive producers and dental alloy manufacturers, have been trying to become less dependent on palladium by using less of it and seeking alternatives. As well, many automakers are trying to reduce the use of platinum group metals in general.

For other mineral commodities, the spot price for uranium (U_3O_8) was quoted at US\$10.20/lb at the end of 2002, an increase of more than 6% from US\$9.60/lb a year earlier. During the same period, long-term contract prices for uranium increased from US\$9.25/lb to US\$10.50/lb, an increase of 13.5%. At year-end, high-grade cobalt was selling at US\$6.50-\$6.80/lb, up from a 15-year low of about US\$6.10/lb in the fall, compared to US\$6.80-\$7.40/lb a year earlier. Potash was quoted at US\$110-\$115/t for standard grade f.o.b. Vancouver, compared to about US\$128/t a year earlier. The price for sulphur, f.o.b. Vancouver, at the end of 2002 was US\$32-\$39/t, compared to US\$15-\$22/t at the end of 2001.

International coal and iron ore prices are largely determined by annual Japanese reference or benchmark contract pricing. On this basis, the coal price in 2002 for metallurgical coal (hard coking) increased by 12.7% to US\$48.20/t f.o.b., while thermal coal (steaming coal) decreased by 16.4% to US\$34.50/t f.o.b. Reference prices for iron ore fines and lump ore into the Japanese market decreased by about 2.4% to US\$28.28¢/long ton unit f.o.b. and by 5.0% to US\$36.13¢/long ton unit f.o.b., respectively. Iron ore pellet prices for European markets (CVRD bench-

mark pricing) were set with a decrease of 3.4% at US\$47.36¢/t unit f.o.b.

RESERVES

During 2001, Canadian reserves of copper, nickel, lead, zinc, molybdenum, silver and gold declined significantly. This continued the declining trend that began in the early 1980s for base metals and in the late 1980s for gold. Lead reserves decreased by 26%, zinc reserves decreased by 12%, gold reserves declined by 11%, copper reserves and silver reserves each decreased by 10%, nickel reserves decreased by 9%, and molybdenum reserves decreased by 2%.

EMPLOYMENT IN THE MINERAL INDUSTRY

Combined employment in the four stages of the mineral industry (including coal mining) is estimated to have reached 360 851 in 2002, up slightly from 359 489 in 2001 and 359 106 in 2000. The mineral industry thus accounted for approximately 2.9% of the national employment level of 12.5 million (full-time workers) in 2002.²

Employment in Stage 1 (metal, nonmetal [including structural materials] and coal mining) decreased by 6.1% to an estimated 47 423, down from 50 511 in 2001. Employment in metal mining decreased by 10.3% to 23 944, non-metal mining remained nearly the same at 17 779, and coal mining fell by 5.5% to 5700 during 2002.

Employment levels for Stages 2 and 3 were lower in 2002 compared to the previous year. Employment in Stage 2 decreased by 4.5% to 51 465. Most of the employment decrease was in the smelting and refining of nonferrous metals. Stage 3 employment fell by 1.0% to 84 942 even though employment grew in some sectors, such as iron foundries, clay product and refractory manufacturing, and ready-mix concrete manufacturing. Stage 4 employment increased by 4.6% to 177 021 as employment gains were exhibited by all sub-groups, notably structural metal products, ornamental metal products, and stamped, pressed and coated products. The level of employment in the sector that provides support for mining, quarries, and oil and gas wells, such as drilling and exploration activities, increased

² These statistics take into account the change from the Standard Industrial Classification (SIC) based employment data to the North American Industrial Classification System (NAICS). This new classification standard is used by the three partners in the North American Free Trade Agreement (NAFTA), i.e., the United States, Mexico and Canada.

by 6.9% to 53 726 in 2002. In 2002, the estimated number employed in mining diamond drilling was 1194, the same as in 2001. Because there is no establishment-based survey undertaken at this time either by Natural Resources Canada or by Statistics Canada for support activities to mining, these numbers should be viewed with caution.

MINERAL INDUSTRY TRADE

Canada is one of the world's largest exporters of minerals and metals. The export of these commodities and more refined mineral products has a significant impact on Canada's overall merchandise balance of trade and, hence, on the national standard of living. In 2002, the value of domestic exports of minerals and mineral products, including fuels, decreased by 3.4% to \$96.9 billion from \$100.3 billion in 2001 (Table 2).

The United States was again by far the leading destination for Canada's total minerals and mineral product exports (non-fuel, but including coal) with \$39.1 billion in 2002. This represented 77.0% of total exports with the European Union at 9.3%, Japan (Canada's second largest export country) at 3.6%, Mexico (Canada's thirteenth largest export country) at 0.7%, and all other countries at 9.5%. Exports to the top 20 countries accounted for 97.6% of total Canadian exports. Based on the four stages of production, the United States accounted for 37.8% of Stage 1 exports, 74.7% of Stage 2 exports, 91.5% of Stage 3 exports and 91.9% of Stage 4 exports.

The value of total domestic exports of metallic minerals and mineral products (four stages of production, excluding fuels) rose by 5.3% to \$38.1 billion, compared to \$36.1 billion in 2001. On a commodity basis, important increases in the value of exports were exhibited by gold (+22.3%), iron and steel (+10.3%), nickel (+3.4%) and aluminum (+3.3%). Notable decreases were shown by platinum group metals (-37.5%), copper (-12.5%), cobalt (-14.0%) and zinc (-1.3%). Two commodities, aluminum and iron and steel, accounted for 52.4% of these total exports in 2002. For Stage 1 metallic commodities only, total domestic exports increased by 1.9% to \$3.6 billion in 2002. For individual metallic commodities in Stage 1, domestic exports declined for platinum group metals (-26.8%), copper (-19.0%) and zinc (-10.7%), while exports increased for gold (+95.3%), molybdenum (+77.8%) and iron ore (+14.2%). Three commodities, iron ore, copper and aluminum, represented 57.4% of all Stage 1 metallic exports in 2002.

The total value of domestic exports of nonmetallic minerals and mineral products (four stages) increased by 2.4% to \$9.5 billion from \$9.3 billion in 2001. Notable increases were experienced by potash and potassium compounds (+7.4%), nitrogen (+7.0%), cement (+5.7%) and

diamonds (+2.8%), while decreases occurred for peat (-11.4%), salt and sodium compounds (-11.2%), and glass and glassware products (-8.7%). Three commodities, potash and potassium compounds, glass and glassware, and nitrogen, accounted for 47.2% of total nonmetallic domestic exports. For Stage 1 only, total domestic exports of nonmetallic commodities increased by 3.2% to \$4.2 billion from \$4.1 billion in 2001. Exports of note that increased were potash and potassium compounds (+7.4%) and diamonds (+0.6%). Important declines were seen for asbestos (-8.6%), peat (-4.7%), and sulphur and sulphur compounds (-0.3%). Potash and potassium compounds accounted for 56.7% of all Stage 1 nonmetallic domestic exports in 2002 while diamonds accounted for 18.1% of the total.

For mineral fuels, the total value of domestic exports fell by 9.5% to \$49.6 billion in 2002 from \$54.9 billion in 2001. Natural gas exports decreased by 26.6% to \$18.8 billion while petroleum exports increased by 8.4% to \$27.0 billion. Domestic exports of coal and coke fell from \$2.0 billion in 2001 to \$1.8 billion in 2002, a decrease of 7.5%. Of the total mineral fuels domestic exports (four stages), natural gas accounted for 37.9% and petroleum for 54.5%. Approximately 77.8% of all domestic exports of mineral fuels occur at Stage 1.

The value of total imports of minerals and mineral products, including fuels (four stages), increased by 1.2% to \$65.1 billion in 2002 from \$64.3 billion in 2001. Excluding fuels, but including coal, imports rose to \$48.5 billion in 2002, up from \$46.8 billion, an increase of 3.7%. Of this amount in 2002, shipments from the United States accounted for 66.5% of the total with the European Union accounting for 9.0%, Mexico for 3.5%, Japan for 2.6%, and all other countries for 18.4%. The top 20 countries accounted for 93.0% of total imports. For the four stages of production (excluding fuels, but including coal), total imports from the United States accounted for 68.4% of Stage 1 imports, 37.4% of Stage 2 imports, 68.3% of Stage 3 imports and 69.4% of Stage 4 imports.

The total value of metal imports rose to \$38.8 billion in 2002 from \$37.1 billion in 2001, an increase of 4.7%. Notable in 2002 were increases for gold (+23.8%), iron and steel (+8.4%) and aluminum (+3.5%), and decreases for platinum group metals (-26.3%) and copper (-12.8%). Two commodities, aluminum and iron and steel, accounted for 54.9% of all metal imports in 2002. For nonmetals, import values were down fractionally (-0.5%) to \$8.3 billion from \$8.4 billion in 2001. Commodities of note included declines for nitrogen (-25.5%) and glass and glassware products (-5.8%), and increases for diamonds (+20.6%) and clay and clay products (+11.8%). Two commodities, glass and glassware products and clay and clay products, accounted for 45.7% of total imports of nonmetals in 2002.

The balance of trade generated (total mining exports, including fuels, minus total mining imports, including fuels) decreased by 9.8% in 2002 to \$34.0 billion. This trade surplus compares to \$37.7 billion in 2001 and \$31.6 billion in 2000. For the total Canadian economy, the trade surplus fell to \$47.9 billion in 2002 (-21.4%) from \$60.9 billion in 2001 and \$56.3 billion in 2000.

INVESTMENT BY THE MINERAL INDUSTRY

Information on exploration expenditures and capital spending provides a useful indication of market conditions and of the perspectives that management and investors in the Canadian mining industry hold on future market conditions in relation to present productive capacity. At the end of 2002, there were 194 mining companies listed on the Toronto Stock Exchange with an aggregated market capitalization of some \$107 billion. Twenty-two of these companies had market capitalization of over \$1 billion. In addition, there were a further 947 exploration and mining companies listed on the TSX venture exchange. Approximately one third of the world's equity capital for exploration and mining was raised by TSX and TSX venture-listed companies.

Exploration Expenditures

Final exploration data for 2001 show that exploration and deposit appraisal expenditures amounted to \$512.9 million, an increase of 3.3% over the \$496.7 million in 2000. Final figures for 2002 show an increase of 11.8% to \$573.4 million. Spending intentions for 2003 indicate a further 19.3% increase to \$684.2 million.

In 2002, increases in exploration and deposit appraisal expenditures were experienced in most regions, with the exceptions of New Brunswick, the Yukon and the Northwest Territories. Ontario and Quebec were the only provinces with expenditures in excess of \$100 million with \$139.0 million and \$111.2 million, respectively. The two provinces accounted for 43.6% of total Canadian expenditures.

The level of mineral exploration activity is closely linked to mineral commodity prices. As commodity prices are showing signs of renewed strength, the mineral exploration industry has responded with increased activity.

Capital Investment

Mine complex development expenditures (including capital expenditures for construction and machinery and equipment) were \$2.1 billion in 2002, down 18.6% from 2001, due mainly to major projects in Quebec, Ontario and the Northwest Territories reaching completion. The

Northwest Territories at 25.2%, Ontario at 21.5% and Quebec at 18.9% were the three leading jurisdictions for mine complex development expenditures. Company intentions reported for 2003 indicate a further decline to \$1.9 billion.

According to Statistics Canada, preliminary actual expenditures in 2002 for capital for construction, materials and equipment in the mining and mineral processing industries decreased sharply by 22.2% to \$4.5 billion. Revised intentions for 2003 indicate a strong rebound to \$5.4 billion.

For the total Canadian economy in 2002, capital investment (construction, materials and equipment) reached \$204.3 billion, an increase of 2.0% over the \$200.3 billion expected in 2001. Revised estimates for 2003 show a further increase to \$212.5 billion.

Technology Investment

Preliminary estimates for 2002 show that total intramural research and development expenditures by the mining industry reached \$46 million, the same as in 2001. These levels are lower than the revised figure of \$52 million in 2000. Intentions for expenditures in 2003 are estimated to rise to \$49 million.

HIGHLIGHTS IN THE CANADIAN MINING INDUSTRY

Corporate Developments

Corporate operating profits in the Canadian mining industry were \$1.6 billion in 2002, compared to \$2.3 billion in 2001 and \$3.1 billion in 2000. Capacity utilization for mining stood at 81.1% for the last quarter of 2002 compared to 80.6% for the first quarter of the same year. Over the same period, the capacity utilization rate for primary metals went from 89.4 to 93.7%.

In February, De Beers Canada Mining submitted an environmental assessment report for its Snap Lake underground diamond mine, located approximately 220 km northeast of Yellowknife, Northwest Territories. On the basis of receiving all necessary approvals and permits by the third quarter of 2003, the company estimates that construction of Canada's third diamond mine could begin in 2004, which could mean a start-up in late 2005 and full production by 2006. The proposed mine is expected to produce 1.5 million carats annually over a 22-year life at a daily production rate of 3000 t. The projected capital cost is US\$320 million.

In February, Teck Cominco Limited, Indian and Northern Affairs Canada and the Yukon government announced the

termination of their Memorandum of Understanding (MOU) on the management of assets at the inactive Faro lead and zinc mine in the Yukon. In August 1999, the three parties had entered into an MOU to keep the assets of the mine site intact in anticipation of the re-opening of the Faro operation should metal prices improve. Because higher prices failed to materialize, the arrangement was terminated. The interim receivership of the Faro property is still the subject of court proceedings in Ontario. The previous owner of the mine, Anvil Range Mining Corporation, closed the mine and went into receivership in early 1998.

In March, Boliden AB announced that it was resuming production at its underground zinc-copper mine at Myra Falls, British Columbia, which has been closed since December 2001. The decision was made after an agreement was reached with employees, unions, suppliers and customers regarding an extensive action plan. The plan contains measures aimed at improving the operating efficiency of the mine and includes a reduction of the work force by approximately 17%. Myra Falls has been in production for 36 years and has been owned by Boliden since 1998.

In March, Noranda Inc. announced that it would permanently close its Gaspé copper smelter located in Murdochville, Quebec, effective April 30, 2002. In November 2001, the company had announced its intentions to temporarily close the smelter for at least six months in response to weak market and economic conditions. However, following a comprehensive study, Noranda concluded that there was no economically feasible solution to continue operating the smelter. The smelter, which began operations in 1955, became a custom copper smelter in late 1999. Since then, the smelter treated purchased copper concentrate from around the world, along with secondary copper materials, and employed, on average, 300 workers.

On April 1, North American Tungsten Corporation Limited began commercial production from its CanTung tungsten mine following a nine-month development and pre-production time period. Annual production is expected to be 350 000 MTUs (1 metric tonne unit equals 10 kg) of high-grade tungsten concentrates based on a mill throughput design of 870 t per day. The mining operation is located in the Northwest Territories near the Yukon border, north of Watson Lake, Yukon.

In April, SIAMtec, a limited partnership company, was formed by Noranda Inc. (75%) and STAS (25%) to market and distribute Noranda's mining automation technologies. STAS, a Canadian company that specializes in marketing high-tech equipment, has been involved with Noranda since 1995 to support the implementation of Noranda's technologies. Since 1988 when Noranda began developing mining automation technologies, these technologies

have been successfully implemented at nine different mining operations in four countries, including Noranda mines.

For Voisey's Bay developments, please refer to the Nickel chapter in this edition of the *Canadian Minerals Yearbook*.

In October, the Sherritt Coal Partnership II made a takeover bid for all the shares of Fording Inc. In response, Fording initiated action to convert itself into a coal income trust and then proposed to combine with Teck Cominco Limited and the Westshore Terminals Income Fund to become a multi-party coal trust. Following several counterbids, the parties on both sides came together in early January 2003 to form the Fording Trust Partnership. Teck Cominco will own 35% (this could increase an additional 5% if certain operational and marketing objectives are met by March 31, 2007) with the remaining 65% to be owned by the Fording Canadian Coal Trust. The Partnership will combine the metallurgical coal assets of Fording, Teck Cominco, the Luscar Energy Partnership and CONSOL Energy Inc. These include Teck Cominco's Elkview mine, Fording's Greenhills and Fording River mines, Luscar/CONSOL's Line Creek mine in southeastern British Columbia (Elk River Valley), Luscar/CONSOL's Luscar mine, their undeveloped Cheviot property in southwestern Alberta, and their 46.4% interest in Neptune Bulk Terminals (Canada) Ltd. located in North Vancouver, British Columbia. The Partnership will negotiate a long-term port contract with Westshore Terminals' port facility at Roberts Bank, British Columbia, based on commercial terms previously negotiated between Fording Inc. and Westshore. In a related separate transaction, Fording is selling its prairie thermal coal operations and assets, subject to a royalty on production from certain coal properties, to the Sherritt Coal Partnership II for \$225 million.

The Fording Canadian Coal Trust will be owned 38.6% by Fording shareholders, 22.7% by the Sherritt Coal Partnership II (a partnership of Sherritt International Corporation and the Ontario Teachers Pension Plan Board), 9.1% by Teck Cominco Ltd., 9.1% by Westshore Terminals Income Fund, 7.7% by the Ontario Teachers' Pension Plan, 6.8% by the Luscar Energy Partnership, and 6.8% by CONSOL Energy Inc. The Fording Trust Partnership will be operated by Teck Cominco and managed by Fording, and will rank as the second-largest metallurgical coal company in the world, supplying about 20% of the seaborne high-quality metallurgical coal market (about 25 Mt/y). Shareholders approved the complex transaction in February 2003.

In November, Noranda Inc. provided a progress report on the Magnola magnesium plant at Danville, Quebec. Magnola is owned 80% by Noranda and 20% by La Société générale de financement du Québec (SGF). In March 2003, Métallurgie Magnola Inc. announced that it would be idling the plant. The shut-down took place in mid-April and is for an indefinite period until improved

magnesium prices enable the viable operation of the plant. Approximately 380 people were employed at the plant. It is estimated that Noranda and SGF have jointly invested \$1.3 billion in the construction and start-up of Magnola since 1997.

In December, Cameco Corporation (which already owns 15.0% of Bruce Power), TransCanada PipeLines Limited and BPC Generation Infrastructure Trust, a trust established by the Ontario Municipal Employees Retirement System (OMERS), agreed to purchase 79.8% of Bruce Power Limited Partnership (Bruce Power) from British Energy plc, which currently holds an 82.4% interest. The Power Workers' Union and The Society of Energy Professionals will obtain the remaining 2.6%. Bruce Power operates the Bruce nuclear electricity-generating complex near Kincardine, Ontario. The purchase price under the agreement is estimated to be about \$950 million, of which \$770 million (\$630 million in cash when the deal closes) goes to British Energy, \$100 million to the Government of Ontario, and \$220 million to cover certain liabilities. In addition, the consortium of Cameco, TransCanada and OMERS will acquire the 50% interest that Bruce Power holds in Huron Wind, Ontario's first commercial wind farm. As a result of the agreement, Cameco purchases an additional 16.6% interest in Bruce Power, bringing its total interest to 31.6%. TransCanada and BPC will each acquire a 31.6% interest in Bruce Power, and the unions, who currently own a 2.6% interest, will obtain an additional 2.6% at closing to bring their total ownership to 5.2%. Cameco's uranium fuel supply management responsibility to Bruce Power remains.

In December, Noranda Inc. announced that it was planning to operate its Brunswick lead smelter at Belledune, New Brunswick, on an eight-month seasonal basis, shutting down for four consecutive months each year beginning in July 2003. Citing low treatment charges and a weak forecast for the lead market, Noranda expects to produce about 78 000 t of lead and 5 million oz of silver on this annual operating schedule. As well, beginning in 2003, the Brunswick smelter will withdraw from custom smelting. During the four-month shut-down period, staff and hourly employees will be laid off except for a minimum number required to keep the plant on care and maintenance. Approximately 470 people are currently employed at the smelter.

The Diavik diamond mine at Lac de Gras in the Northwest Territories continued with advanced development in 2002 towards its projected start of diamond production in January 2003. The project is located on a 20-km² island in Lac de Gras approximately 300 km from Yellowknife. Four kimberlite pipes will be mined over an estimated 20-year life using a work force of approximately 450. The project is an unincorporated joint venture between Diavik Diamond Mines Inc. (DDMI) (60%) and Aber Diamond Mines Ltd. (40%); DDMI is the operator. DDMI is a

wholly owned subsidiary of Rio Tinto plc and Aber is a wholly owned subsidiary of Aber Diamond Corporation. Late in the year, overburden removal from the A-154 open pit was actively under way, as were commissioning trials of the processing and recovery plants. In December, recovered diamonds were sent to Diavik's production splitting facility in nearby Yellowknife for cleaning and preparation for valuation for royalty purposes. Total project expenditures to the end of 2002 were estimated to be \$1.22 billion with the expected total cost to be \$1.25 billion following completion.

Tiffany and Co. announced in October that it would open a diamond-cutting and polishing facility in Yellowknife to process its share of diamonds from the Diavik mine. Tiffany owns 14.7% of Aber and has an agreement with Aber to sell US\$50 million worth of diamonds annually over a 10-year period.

Other important events in 2002 included:

- Miramar Mining Corporation and Hope Bay Gold Corporation combining their assets, with the resulting company, Miramar, having a 100% interest in the Hope Bay gold project in Nunavut, located some 865 km north of Yellowknife and 170 km southwest of Cambridge Bay;
- Kinross Gold Corporation, TVX Gold Inc., and Echo Bay Mines Ltd. agreeing to merge their three companies, making the new Kinross the world's seventh largest primary gold producer (the deal officially closed in February 2003);
- Employees at Noranda's Horne copper smelter at Rouyn-Noranda going on strike in June (at year-end the strike was still ongoing with the facility operating at more than 70% of capacity with management and non-union personnel); and
- Dofasco Inc. and Companhia Auxiliária de Empresas de Mineração (CAEMI) of Brazil announcing that they were reducing their co-ownership of Quebec Cartier Mining Company (QCM) (Dofasco indicated that its current iron supply contract with QCM would remain in place).

Government Initiatives

The Government of Canada, the provincial and territorial governments, the mineral industry and others undertook a number of activities to promote and support Canada's minerals and metals industry and mining-related equipment and services sectors in 2002.

At the federal level, specific activities in 2002 to promote Canada's trade, carried out by Natural Resources Canada, included participation/support at the following events: the

Prospectors and Developers Association of Canada's annual convention held March 9-13 in Toronto; the Indaba-Investing in African Mining Conference held February 11-14 in Cape Town, South Africa; the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Tradex held April 28-May 1 in Vancouver; EXPOMIN held May 4-11 in Santiago (Chile); an E-commerce workshop held May 24 in Sudbury; ELECTRA-MINING held September 30-October 4 in Johannesburg, South Africa; Naturallia, held October 28-31 in Rouyn-Noranda; and the ministerial mission to India held from November 10 to 16.

Table 3 summarizes some of the major initiatives undertaken by the federal, provincial and territorial governments in support of the Canadian mining industry.

PROFILES OF THE LEADING MINERALS PRODUCED IN CANADA

Gold

Canada has a long history of being one of the world's leading producers of gold. In 2002, Canada was the seventh largest global gold producer, trailing South Africa, the United States, Australia, China, Russia and Peru. Canada-based Barrick Inc. and Placer Dome Inc. are two of the top global gold-producing companies. In 2002, gold mining was carried out in all provinces and territories with the exception of Nova Scotia and Prince Edward Island. Gold refineries are located in Quebec and Ontario. The main use for gold is in jewellery manufacturing, with other important uses including electronics, dentistry and coinage. Gold bullion is also important as a global investment-demand product.

In 2002, gold was Canada's leading metallic mineral as the value of gold production increased by 7.4% to \$2.3 billion. The volume of shipments, however, decreased by 6.9% to 147 866.2 kg. In December, the Government of Canada sold 83 399 oz of gold, reducing its gold reserves to about 599 000 oz. When the government began gold sales in the early 1980s, official gold reserves stood at about 21 million oz.

Copper

In global terms in 2002, Canada was ranked as the seventh leading producer of copper following Chile, Indonesia, the United States, Australia, Peru and Russia. Canada-based Noranda Inc., Hudson Bay Mining and Smelting Co. Limited and Inco Limited are major world producers of copper. Copper is mined in New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia with primary smelters located in Quebec, Ontario and Manitoba and refineries located in Quebec, Ontario and British Columbia. Copper's properties, especially its high

electrical and thermal conductivity, good tensile strength, relatively high melting point and resistance to corrosion, make it and its alloys attractive for electrical transmission, water tubing, castings and heat exchangers.

In 2002, the value of copper production in Canada decreased by 7.6% to \$1.4 billion, with production down by 6.1% to 577 032.5 kg. In value terms, copper was Canada's third leading metal in 2002.

Zinc

Canada was the world's fourth largest producer of zinc in 2002, trailing China, Australia and Peru, and ahead of the United States. Canada-based Teck Cominco Ltd. and Noranda Inc. are two of the largest zinc producers in the world. In 2002, zinc was mined in New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, British Columbia and Nunavut, with metallurgical plants located in Quebec, Ontario, Manitoba and British Columbia. The main uses of zinc are as a coating (galvanizing) for steel to protect it from corrosion and in the manufacture of brass and bronze and die-casting.

In 2002, the value of zinc production decreased by 23.6% to \$1.1 billion as production fell by 11.9% to 891 924.2 kg. Zinc was Canada's fifth leading metal based on value of production.

Nickel

Canada is the world's third leading nickel producer behind Russia and Australia. In 2002, the next leading producers were Indonesia and New Caledonia. Globally, the industry is relatively small and is dominated by several large producers, including Canada-based Inco Limited and Falconbridge Ltd. In 2002, nickel was mined in the provinces of Ontario, Manitoba and Quebec with smelters in Ontario and Manitoba and refineries in Ontario and Alberta. Nickel's resistance to corrosion, high strength, pleasing appearance and suitability make it useful in many applications. Major markets include stainless steels (which use about 65% of nickel production), nickel and copper-based alloys, electroplating, alloy steels, and foundry products.

In 2002, the value of Canadian nickel production rose by 6.0% to \$1.9 billion, even though production of 178 338.1 kg represented a decline of 3.2% over 2001. Based on its value of production, nickel was Canada's second leading metal in 2002.

Iron Ore

Canada is a major producer of iron ore with North American steel producers being the major users of Canadian-mined iron ore. In global terms, Canada ranked ninth in production in 2002 behind Brazil, Australia, China, India,

Russia, Ukraine, the United States and South Africa. The major Canadian-based producers of iron ore are the Iron Ore Company of Canada, Quebec Cartier Mining Company, and Wabush Mines. Production takes place in Newfoundland and Labrador, Quebec and British Columbia. Iron ore is upgraded in Canada for steelmaking use as pellets and concentrates.

In 2002, the value of Canadian production rose by 17.1% to \$1.4 billion with production increasing by 14.2% to 31 Mt. Iron ore was Canada's fourth leading metallic mineral in terms of value in 2002.

Uranium

Canada is the world's largest producer and exporter of uranium, typically delivering over 85% of annual production to trading partners around the world. In 2002, Canada accounted for over 30% of global uranium production, followed by Australia, Niger, Namibia and Russia. All Canadian uranium production takes place in Saskatchewan and Saskatoon-based Cameco Corporation is the world's largest producer. Cameco also operates Canada's only refinery and conversion facilities in Ontario and is a partner in the Bruce nuclear power plant, also in Ontario. Canadian uranium is used exclusively as fuel for generating electricity in nuclear power plants, although a very small amount may be used to produce isotopes for applications in nuclear medicine.

Canadian uranium mines and mills set high standards for workplace safety and environmental management. Cluff Lake won awards for being Canada's safest metal mine in 1998 and 2002. Environmental management systems at the McArthur River mine and the Key Lake mill were certified under the ISO 14001 standard in 2003. The McClean Lake mine and mill, as well as the Blind River refinery and Port Hope conversion plant, have already achieved this internationally recognized standard, which outlines key requirements with which companies should comply in order to operate in an environmentally responsible manner.

In 2002, the value of shipments from mines in Canada increased by 0.5% to \$608.4 million with production also up by 0.5% to 13 055.9 tU.

Potash

Potash refers to a group of potassium-bearing minerals and chemicals. The dominant potash product is potassium chloride, a naturally occurring pink, salty mineral for which Canada is the world's leading producer and exporter. Internationally in 2002, Russia, Belarus and Germany were the other leading producers. In Canada, potash was produced in Saskatchewan and New

Brunswick, with the Potash Corporation of Saskatchewan Inc. being the largest potash producer and exporter in the world. Fertilizer use consumes over 90% of the output. Other uses include detergents, ceramics, chemicals and pharmaceuticals.

The value of Canadian production fell by 1.2% in 2002 to \$1.6 billion as production decreased by 0.6% to 8188.7 t. Potash was Canada's leading nonmetallic mineral in 2002.

Diamonds

Canada became a diamond producer in 1998 with the start-up of the Ekati mine, now owned 80% by BHP Billiton Plc, in the Northwest Territories. Diamond-cutting and polishing facilities are now operating in Canada, processing a portion of Canadian production. Besides jewellery manufacturing, tools and equipment manufacturing are important markets for diamonds. On a global scale, it is estimated that in 2001 Canada ranked fifth in terms of the value of diamond production. This ranking will increase with the start-up of the Diavik mine in 2003 and the Snap Lake project, possibly in full production as early as 2006, both located in the Northwest Territories.

In 2002, the value of diamond production in Canada increased by 11.7% to \$801.5 million as production rose by 34.1% to 4 984 000 ct.

Aluminum

Canada has been a leading producer of aluminum for some three quarters of a century with smelter production based on hydro-electric power. Aluminum is produced in two provinces, Quebec (90%) and British Columbia (10%), from imported alumina, alumina extracted from imported bauxite, and recycled materials. Because of its light and rust-resistant properties, it is used extensively in transportation, packaging, and building and construction applications. Globally, Canada was the third leading producer of primary aluminum in 2002, trailing China and Russia and ahead of the United States. The largest Canadian company, Alcan Aluminium Inc., is the world's second largest producer.

In 2002, production of Canadian primary aluminum increased 4.9% to 2.71 Mt, compared with 2.58 Mt in 2001. The value of this production, at \$5.7 billion, however, was down slightly from \$5.8 billion in 2001.

Because aluminum in Canada is initially produced entirely from imported materials, its value is not reflected in the mineral production statistics that appear elsewhere in this chapter. However, its value is reflected in the GDP of the mineral industry, where its production and processing are major components of Stages 2 and 3.

OUTLOOK AND TRENDS FOR THE CANADIAN MINERALS AND METALS INDUSTRY

The outlook for economic activity around the world at the beginning of 2003 was clouded by many factors, including geopolitical tensions, principally those involving Iraq and North Korea and the global war on terrorism, international trade disputes, and under-performing economies around the world. As well, energy prices shot up in late 2002 and into 2003 over supply concerns and a cold winter in North America. All of these factors had a dampening effect on consumer spending and business activity in early 2003, bringing uncertainties to commodity markets. Consequently, with the exception of some mineral commodities such as gold, which is viewed by many as a haven for investment in times of trouble, and nickel, which has experienced increasing demand in China and Asia, most global commodity activity will likely remain sluggish and lacklustre, at least for the first part of 2003. As we move through 2003, however, the economic picture is brighter, particularly with respect to the United States.

With the slowing of the Canadian economy in the last quarter of 2002 and a decline in the second quarter of 2003 brought about mainly by rapid appreciation of the Canadian dollar vis-à-vis the U.S. dollar and by fallout from the SARS outbreak, most economists are forecasting that real GDP growth for 2003 will be about 2%, compared to the 3.3% growth rate experienced in 2002. Capital investment is expected to slowly recover. Low mortgage rates have contributed to a strong housing market and inflation rates are expected to remain well within the Bank of Canada's target range of 1-3%. Because over 85% of Canada's exports are destined for the United States, the Canadian economy will benefit from stronger U.S. economic growth. However, the appreciation of the Canadian dollar will limit the boost that the Canadian economy receives. While importers and consumers will benefit from the stronger dollar, the negative impact on exporters will likely be the dominant effect.

Globally, forecasters were looking at about a 3.0% rate of growth in 2003, the same as in 2002 and up from the 2.3% growth experienced in 2001. The United States is forecast to grow at about 2.7% in 2003, up from 2.4% in 2002. The European Union is expected to experience growth of only about 0.6% in 2003, compared to 0.9% in 2002; China, at 8.1%, is up slightly from 8.0% in 2002, and South Korea, at 2.0% growth, is down from 2.3% in 2002. Japan, with the Bank of Japan supporting the Japanese export sector, will see its growth rate approach 2.0% in 2003, up from the 0.2% rate experienced in 2002.

In order to reduce commodity cash costs, mining companies will continue to strive to make their operations more efficient, particularly for the major metals. As well, com-

panies will continue to seek out consolidations, mergers and acquisitions, particularly where mining and processing assets can be obtained at prices cheaper than greenfield developments. Although for many commodities the demand/supply dynamics were better in 2002 than in 2001, this did not necessarily translate into higher prices or better financial results. This is also likely to continue to be the case in 2003, although gold and nickel producers, who benefited from higher prices in 2002, are likely to continue to do the same in 2003.

Importantly, in 2003, the health of the global minerals and metals industry will be very much subject to the geopolitical factors at play and the rate of recovery of capital investment spending, and on their collective impact on the demand for mineral commodities. If global uncertainties are protracted, significant negative impacts may be expected on the operating and financial performance of most mining companies, including Canadian companies, in 2003.

The Canadian mining industry experienced decreased operating profits for the second year in a row in 2002 and this trend is not expected to change in 2003. Although the industry is faced with the many uncertainties existing in the current global marketplace, it is well positioned to benefit from a meaningful upturn in global economic activity, particularly in the United States. The strong gold prices of late 2002 and 2003 should benefit many Canadian companies and strengthen exploration activity in Canada. Exploration activity is also positively driven by the continuing exploration interest for diamonds in many parts of Canada. With the exception of diamonds and nickel developments, the dearth of significant new mine development is becoming more and more of a concern for the Canadian industry.

Notes: (1) Information in this review was current as of August, 2003. However, the statistics presented in this review are subject to revision as more recent data become available. (2) This and other reviews, including previous editions, are available on the Internet at www.nrcan.gc.ca/mms/cmy/2002CMY_e.htm.

NOTE TO READERS

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TABLE 1. CANADA, PRODUCTION OF LEADING MINERALS, 2001 AND 2002^(p)

		Volume		Percent Change 2002/2001	Value		Percent Change 2002/2001
		2001 (r)	2002 (p)		2001 (r)	2002 (p)	
		(000 tonnes except where noted)			(\$ millions)		
METALS							
Gold	kg	158 875	147 866	-6.9	2 135.3	2 292.4	7.4
Nickel		184	178	-3.2	1 777.4	1 883.3	6.0
Copper		614	577	-6.1	1 535.2	1 418.9	-7.6
Iron ore		27 119	30 969	14.2	1 188.9	1 391.7	17.1
Zinc		1 012	892	-11.9	1 426.0	1 089.9	-23.6
Uranium	tU	12 991	13 056	0.5	605.4	608.4	0.5
Platinum group	kg	20 694	21 829	5.5	651.9	449.5	-31.0
Silver	t	1 265	1 344	6.2	277.9	314.5	13.2
Lead		150	99	-34.1	109.5	70.7	-35.4
Cobalt	t	2 112	2 027	-4.0	81.0	49.0	-39.5
Molybdenum	t	8 556	7 521	-12.1	73.8	x	x
NONMETALS							
Potash (K ₂ O)		8 237	8 189	-0.6	1 617.4	1 597.8	-1.2
Cement		12 986	13 201	1.7	1 348.3	1 387.5	2.9
Sand and gravel		236 486	229 535	-2.9	1 062.2	1 047.4	-1.4
Stone		124 758	119 113	-4.5	957.0	971.8	1.5
Diamonds	000 carats	3 716	4 984	34.1	717.8	801.5	11.7
Salt		13 725	12 313	-10.3	426.1	412.1	-3.3
Clay products		194.6	235.2	20.9
Lime		2 213	2 237	1.1	213.8	220.5	3.1
Peat		1 319	1 301	-1.4	186.4	190.1	2.0
Gypsum		7 821	8 847	13.1	96.0	112.7	17.5
Asbestos		277	241	-13.0	118.7	98.0	-17.5
Nepheline syenite		710	724	2.0	65.5	67.9	3.6
Sulphur, in smelter gas		762	751	-1.4	33.8	46.1	36.6
Quartz (silica)		1 613	1 556	-3.5	44.7	43.5	-2.7
Soapstone, talc, pyrophyllite		45	84	86.7	15.2	22.9	50.6
Sulphur, elemental		8 154	7 787	-4.5	1.3	0.6	-55.9
MINERAL FUELS							
Petroleum, crude	million m ³	129 810	137 357	5.8	25 181.4	30 794.5	22.3
Natural gas	000 m ³	171 388	171 348	0.0	33 677.5	23 295.9	-30.8
Natural gas by-products	000 m ³	29 321	29 542	0.8	4 575.3	3 290.8	-28.1
Coal		70 355	66 822	-5.0	1 557.1	1 593.1	2.3

Sources: Natural Resources Canada; Statistics Canada, *Canada's Mineral Production, Preliminary Estimates*, 2002, cat. no. 26-202-XIB.

.. Not available; (p) Preliminary; (r) Revised; (x) Confidential.

Notes: Numbers have been rounded. Percent changes are based on unrounded data.

TABLE 2. CANADA, VALUE OF DOMESTIC EXPORTS, TOTAL EXPORTS (INCLUDING RE-EXPORTS), IMPORTS AND BALANCE OF TRADE OF MINERALS AND MINERAL PRODUCTS, STAGES 1-4 (CUSTOMS BASIS), 1998-2002

	1998	1999	2000	2001	2002
	(\$000)				
TOTAL MINING, INCLUDING FUELS					
Domestic exports	68 382 980	71 861 697	99 760 591	100 310 690	96 899 664
Total exports	69 521 529	73 031 974	101 236 450	102 054 663	99 158 777
Imports	53 916 392	55 518 576	69 589 621	64 335 122	65 138 193
Balance of trade	15 605 137	17 513 398	31 646 829	37 719 541	34 020 584
NON-FUEL MINING					
Domestic exports	42 810 678	42 643 840	47 644 303	45 456 092	47 749 445
Total exports	43 799 352	43 671 966	48 954 359	46 785 117	49 106 962
Imports	43 104 885	43 950 354	50 206 433	45 487 105	47 220 295
Balance of trade	694 467	-278 388	-1 252 074	1 298 012	1 886 667
TOTAL NON-FUEL MINING, INCLUDING COAL					
Domestic exports	45 333 220	44 688 176	49 516 976	47 441 179	49 591 273
Total exports	46 322 890	45 719 792	50 829 143	48 770 709	50 967 018
Imports	44 246 412	45 067 034	51 370 424	46 750 352	48 518 567
Balance of trade	2 076 478	652 758	-541 281	2 020 357	2 448 451
TOTAL ECONOMY					
Domestic exports	297 509 218	331 748 264	385 658 811	375 116 189	365 139 657
Total exports	318 444 012	355 420 305	413 195 348	403 971 726	396 298 300
Imports	298 386 345	320 408 693	356 862 357	343 075 981	348 444 586
Balance of trade	20 057 667	35 011 612	56 332 991	60 895 745	47 853 714

Sources: Natural Resources Canada; Statistics Canada.

TABLE 3. MAJOR GOVERNMENT INITIATIVES IN SUPPORT OF THE CANADIAN MINING INDUSTRY

Date	Jurisdiction	Legislation/Acts	Projects	New/Renewal/Update	Budget/Cost	Description	Additional Notes/ Web Sites
March 2002	Newfoundland and Labrador		Hope Brook reclamation		\$10 million	The Hope Brook gold mine closed in 1997 and receivership and ownership of site was transferred to the provincial government in December 1999.	
April 2002	Yukon	Mineral Exploration Tax Credit (METC)		Extension to April 2003		Bill 55, <i>An Act to Amend the Income Tax Act</i> , tax credit of up to 25% on eligible expenditures.	www.btc.gov.yk.ca/marketing/investyukon/pdf/mining.pdf
April 2002	Nunavut and Government of Canada		Canada-Nunavut Geoscience Agreement	Renewal for five more years until March 31, 2008		The co-managed Canada-Nunavut Geoscience Office will continue to collect and make accessible geoscience information and expertise in Nunavut to support sustainable development, geoscience capacity building, education and training, and awareness and outreach activities. Coordinated approach between NRCan, the Nunavut Department of Sustainable Development, and the Department of Indian Affairs and Northern Development for geoscience activities in Nunavut.	
May 2002	Manitoba	Manitoba Mineral Exploration Tax Credit (MMETC)		New		MMETC is a non-refundable 10% personal income tax credit for resident investors in eligible flow-through shares of qualifying mineral exploration companies. No cap on maximum eligible investment by an individual investor and no limit on the maximum amount of the tax credit. MMETC will parallel and top up the 15% federal exploration flow-through share tax credit. Resident of Manitoba, all exploration activity must be undertaken in Manitoba.	www.gov.mb.ca/itm/mrd/busdev/incentives/mmetc.html
May 2002	Manitoba	Mineral Exploration Assistance Program (MEAP)		Renewal for three more years until March 31, 2005	\$2.5 million per year	MEAP provides financial assistance for non-fuel mineral exploration in Manitoba. Offerings correspond to spring/summer and fall/winter mineral exploration phases. Program provides assistance of up to 25% for approved eligible expenditures to a maximum of \$300 000 per recipient per fiscal year. Two-tier percentage of offering approach, up to 35% of approved eligible expenditures to a maximum of \$400 000 per recipient per fiscal year is available.	www.gov.mb.ca/itm/mrd/busdev/incentives/meap-off.html
May 2002	Manitoba	Manitoba Prospectors Assistance Program (MPAP)		Renewal for three more years until March 31, 2005	\$125 000 per year	To encourage mineral prospecting in the province with funding available on a spring/summer and fall/winter basis. To prospectors exploring on either their own properties or open Crown mineral land. Receive up to \$9000 per applicant per year.	www.gov.mb.ca/itm/mrd/busdev/incentives/mpap-off.html
May 2002	Manitoba	<i>Mines and Minerals Act</i>		Proposed amendments		To streamline and clarify mining regulations governing the minerals industry in Manitoba and enhance the stability of land tenure, and to encourage more exploration by smaller companies and individual prospectors. Replaces both types of exploration permits with the new mineral exploration licence.	http://web2.gov.mb.ca/laws/statutes/ccsm/m162e.php
May 2002	CANMET, CERM3, UBC		Research office at Britannia Beach, B.C.	New		For research and development of environmental technologies, development and optimization of treatment and remediation processes through to refinement of methodologies for understanding the environmental risks of mine wastes. R&D on phytoremediation.	http://srmwww.gov.bc.ca/cirg/britannia/index.html
May 2002	Minerals and Metals Sector, Natural Resources Canada (NRCan)		Conceptual design study for the development of a world-class mining interpretive centre and heritage park at Britannia Beach, B.C.	New		Park theme is envisioned as "the legacy of the past - looking to the future" with the intent to showcase the history and "way of life" of Britannia Beach. Project planning involvement include the BC Mining Museum, CERM3 Research Park, and consideration of coastal First Nations people and cultures.	

TABLE 3. (cont'd)

Date	Jurisdiction	Legislation/Acts	Projects	New/Renewal/Update	Budget/Cost	Description	Additional Notes/ Web Sites
May 2002	British Columbia	Bill 54, the miscellaneous statutes amendment act (No. 2)		Amendments of <i>Mineral Tenure Act</i> and the <i>Mines Act</i>		Clarifying a titleholder's responsibilities when operating on private land allowing for the mediation and arbitration board to resolve conflicts and establish compensation when a titleholder proposes to explore on private land. Creation of a two-zone system that defines lands as either open or closed to mining. Allowing the chief gold commissioner to reinstate a mineral title that has expired.	www.legis.gov.bc.ca/37th3rd/3rd_read/gov54-3.htm
May 2002	British Columbia	<i>Mines Act</i>		Amendments to <i>Mines Act</i>		Allowing the chief inspector of mines to authorize permit exemptions for low-level mining exploration activities if the proposed work meets regulation criteria. Creation of a more transparent exemption process and a shorter turnaround on authorizations for eligible mineral exploration sites. Exempting pits and quarries from the requirement for a <i>Mines Act</i> permit when associated with authorizations issued by another provincial agency.	
June 2002	British Columbia		First geoscience partnership agreement with mineral exploration company Eastfield Resources	New		Ability to combine their geological knowledge and expertise with logistical and financial support. To study the regional geology surrounding the company's Lorraine copper-gold deposit 300 kilometres northwest of Prince George. The partnership with Eastfield Resources will support the project and produce the information that the Ministry believes is necessary to attract other potential investors to the area. The Ministry was considering partnerships with other exploration companies and indicated that preferred projects would be those that benefit multiple clients and address regional aspects of geology, geochemistry, geophysics and mineral deposits.	www.news.gov.bc.ca/#searchnews - enter keyword Eastfield Resources - highlight Ministry of Energy and Mines - Go
July 2002	NRCan and Canadian Economic Development for Quebec regions		Asbestos Institute (non-profit organization)	New	\$500 000 for funding	The contribution assists with the implementation of the responsible use of chrysotile asbestos policy as described in the Memorandum of Understanding between the Government of Canada and Canadian asbestos producers signed on March 3, 1997.	www.nrcan.gc.ca/media/newsreleases/2002/200286_e.htm
August 2002	British Columbia	<i>Environmental Assessment Act</i>	Higland Valley Copper mine, Kamloops	New		The mine was scheduled to close in mid-2005, but a project approved under the provincial <i>Environmental Assessment Act</i> to remove water from the mine to stabilize it will extend mine operations by another three and a half years until 2009.	www.eao.gov.bc.ca/epic/output/documents/p152/1036005411961_7e4d91fa452e44b6a3cfe2ad945f564.pdf
Sept. 2002	NRCan, FedNor, EDAC, provinces of Quebec and Ontario, Canadian Institute of Mining, Metallurgy and Petroleum		Naturalia International Forum		\$50 000 (NRCan contribution)	The Forum brought together business decision-makers from around the world in Rouyn-Noranda, Quebec, from October 29 to 31, 2002, to help firms widen their markets and develop alliances for technology development. The initiative was dedicated to helping small- and medium-sized mining and forestry businesses establish partnerships and alliances. More than 200 firms from five continents attended to expand distribution networks, create alliances for technology development, and sell products, services, licences and patents.	www.nrcan.gc.ca/media/newsreleases/2002/2002108_e.htm
Sept. 2002	Saskatchewan	Mineral exploration incentive program (six years)		New	\$2.1 million annually	The initiatives provide incentives for both prospector and exploration companies and provide enhanced geoscience funding.	www.gov.sk.ca/newsrel/releases/2002/09/19-731.html
			Prospector Incentive Program	New	\$100 000 annually	To encourage grass-roots mineral exploration in Saskatchewan. Qualified applicants can receive 50% of eligible costs to a maximum of \$7500 per fiscal year upon approval. Program is limited to one approved project per year per qualified applicant.	
			Exploration Incentive Program	New	\$1.1 million annually	For mineral exploration companies carrying out grass-roots exploration in Saskatchewan. Companies can receive 25% of the eligible exploration costs to a maximum of \$100 000 per year. The Exploration Incentive Program is limited to one approved project per year per applicant.	

Sept. 2002	Saskatchewan		Enhanced Geoscience Program	Update	Additional \$400 000 per year	Funding for airborne geophysical surveys to provide new information to industry and government. The regional multi-parameter airborne geophysical surveys will reduce exploration risk by increasing the knowledge base of the province's mineral resource potential.	www.gov.sk.ca/newsrel/releases/2002/09/19-731-attachment.html
			10-Year Royalty Holiday for New Gold and Base-Metal Mines	New		Each new mine developed in Saskatchewan that is regulated under this royalty system will pay no royalties for the first 10 years of operation.	www.gov.sk.ca/newsrel/releases/2002/09/19-731-attachment.html
			Competitive Diamond Royalty and Tax Structure	New		The Department of Industry and Resources will work with the diamond companies to develop a competitive royalty system for Saskatchewan. Diamond mining companies in Saskatchewan will not be subject to the Corporate Capital Tax Surcharge.	www.gov.sk.ca/newsrel/releases/2002/09/19-731-attachment.html
			Rebate for Tax applied to Fuel in Mineral Exploration and Remote Power Generation	New		Mining and mineral exploration companies will be able to operate more efficient exploration programs. Only British Columbia and Saskatchewan have been applying a tax to fuel used for off-road mineral exploration activities and power generation at remote mines.	www.gov.sk.ca/finance/revenue/ft/bulletins/ft11.pdf
September 2002	Manitoba, NRCan		59th Canadian Mines Ministers' Conference	Renew the Intergovernmental Geoscience Accord		The agreement defines the complementary roles and responsibilities of governments with respect to geoscience and ensures that governments in Canada continue to work together to give Canadians accurate geoscience information. The original Accord, signed in 1996, has facilitated numerous cooperative field projects and helped make possible the Canadian Geoscience Knowledge Network, which is making geoscience knowledge from all government geological survey agencies across Canada available through the Internet.	
November 2002	Ontario, Northern Heritage Fund Corporation		To help launch the Deep Mining Research Consortium	New	\$3.5 million over a five-year period	An initiative to develop and improve technologies for mining at depths below the 2000-m level. Will be administered by the Canadian Mining Industry Research Organization, a not-for-profit organization formed by a group of mining companies to promote and manage collaborative research in the mining sector. Pilot projects are expected to focus on identifying economical methods of developing deeper orebodies in existing mines and prolonging their life.	www.ulern.on.ca/nobi/Harris_NOBI.pdf
December 2002	The Mining Association of Canada (MAC)	Kyoto Protocol				MAC stated that the Canadian metal mining industry had decreased its energy consumption by 21% and improved its energy intensity by 20% (energy per unit of metal concentrate) in the period 1990-2000. Metal mining decreased its total GHG emissions (both direct and indirect emissions) by 19% and improved overall GHG intensity by 18.5%. Nonferrous metal mining and refining increased its GHG emissions by 1.2%, but improved its GHG intensity by 20%.	
December 2002	Government of Canada, NRCan	Bill C-14, Kimberley Process Certification Scheme (December 12, 2002)		New		Canadian certificates must accompany diamond exports from Canada beginning January 1, 2003. Natural Resources Canada will be responsible for ensuring that Canada meets its inspection and enforcement obligations under the international certification scheme. Under the scheme, the participating countries must, among other things, export rough diamonds in tamper-resistant containers and provide a certificate, validated by the government of the exporting country, confirming that the diamonds are conflict free.	http://mmsd1.mms.nrcan.gc.ca/kimberleyprocess/note_e.asp

Source: Provincial and territorial government web sites.