

Canadian Mine Openings, Closings, Expansions, Extensions and New Mine Developments

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OVERVIEW

In the face of continued weak gold and base-metal prices, 2001 turned out to be one of the most depressed years for mining in Canada in recent decades. During the year, at least fifteen mines closed and only two small new mines were brought into production (Tables 1 and 2), continuing a recent trend in which gold and base-metal mine closures have outpaced mine openings since 1997. Of the two new mines that came on stream, one was a gold mine and the other was an industrial mineral mine. Of the fifteen mine closings, seven were permanent closures (three gold, one base-metal, and three industrial minerals) and eight were production suspensions (six gold, one base-metal and one uranium). Three of the mines that closed (one gold, one base-metal and one industrial mineral) were owned and operated by foreign companies.

The new mines that opened in 2001 were the Hammerdown gold mine in Newfoundland and Labrador and the Ashcroft basalt granules mine in British Columbia. With a planned annual output of 250 000 t of basal roofing granules, the Ashcroft mine is a significant industrial mineral operation in southern British Columbia. However, in terms of value of expected production and employment, these two mines are small operations and would be considered significant only from a regional perspective in 2001.

The year 2001 marked the closure of two significant mines in Canada. In Nova Scotia, the Prince coal mine closed in November due to high costs and a lack of private sector interest. The Prince mine, which came on stream in August 1975, was the last mine in Canada that was owned and operated by the federal government. In British Columbia, the Sullivan zinc-lead-silver mine, a world-class mine, closed in August

due to depletion of ore reserves. The Sullivan mine was first developed for production in 1909. Other mine closures across Canada in 2001 are described below.

In Newfoundland and Labrador, the Nugget Pond gold mine closed in December due to depletion of underground ore reserves. The Coal Creek open-pit coal mine in New Brunswick closed in August due to depletion of pit reserves. In Quebec, the Francoeur gold mine closed in November due to ore exhaustion and the Luzenac talc-soapstone mine closed in April after the discovery of asbestos fibre in talc concentrates. In British Columbia, the Golden Bear gold mine, the first heap leach gold mine in the province, completed its final year of production in late 2001.

In addition to production suspensions and mine closures, production cutbacks continued at several mines in 2001, especially at gold, base-metal, coal, uranium and iron mines, which created additional employment losses during the year. However, job losses through production cutbacks amounted to less than 200 in 2001. Although this was an improvement when compared with the 250 job losses in this category in 2000, it extended a trend that started in 1997 and that has negatively affected regional economies.

In an effort to cut costs, mining companies continued to consolidate mine operations or maintain recently struck operation-sharing accords since 2000, notably at McWatters Mining Corporation's Sigma gold mine (a pre-expansion consolidation at the Sigma-Lamaque mining complex) in Quebec; at Barrick Gold Corporation and Teck Cominco Limited's David Bell gold mine and Williams mill, and at Newmont Canada Limited's Holloway mine and Barrick Gold Corporation's Holt-McDermott mill, all in Ontario; and at Miramar Mining Corporation's Con and Giant gold mines in the Northwest Territories. While cost-cutting measures continued at all mines, significant results were achieved at several gold and base-metal mines, such as the Bouchard-Hébert zinc-copper-gold-silver mine and LaRonde gold mine in Quebec; the Creighton, McCreey East and Garson nickel-copper mines and the Red Lake and Williams gold mines in Ontario; the Birchtree nickel-copper mine and the New Britannia gold mine in Manitoba; and the Kerness South gold mine in British Columbia.

Despite widespread mine closings and production cutbacks at some mines, there were at least 10 significant mine expansion and extension projects across Canada (Table 2). However, there were no significant new project announcements in 2001 and all 10 projects were the continuation of existing programs that began in recent years. These were the Carol Lake iron ore operation in Labrador; the LaRonde gold-zinc-copper-silver mine and the Niobec niobium mine in Quebec; the Red Lake gold mine, the Kidd Creek zinc-copper-silver mine, the Creighton, McCreedy East and Stobie nickel-copper mines, and the Lac des Iles palladium-platinum-gold-copper-nickel mine in Ontario; and the Birchtree nickel-copper mine in Manitoba.

The total capital cost for bringing the two new mines into production in 2001 was estimated at about \$40 million, the lowest in more than a decade. However, over \$360 million was estimated to have been spent by companies on mine expansions and mine-life extensions, one of the highest investment levels in over a decade. Given the generally depressed mineral commodity prices and market conditions, this indicates that relatively high levels of capital investment, compared with exploration spending, have been maintained in Canada in recent years, reflecting the need for current producers to maintain or expand production capability through mine-site and new project developments, even during hard times. As more mines are expected to open or re-open in 2002, capital investment next year is expected to be higher.

REGIONAL PERSPECTIVE

During 2001, eight provinces and one territory were affected by mine openings or closings. In terms of employment, ore capacity and production losses, British Columbia suffered the most, followed by Nova Scotia, Quebec and Manitoba. In terms of the overall impact on mining, except for placer gold operations, the Yukon now has no producing mines and the Government of Canada no longer involves itself in the direct operation of a mine nor has it any mine ownership interest in Canada.

Newfoundland and Labrador

The small 375-t/d, high-grade Hammerdown gold mine near Baie Verte, Newfoundland and Labrador, was brought into production in early July 2001 at an estimated capital cost of about \$10 million. The mine was developed by Richmond Mines Inc. in time to replace the company's nearby Nugget Pond gold mine, which subsequently closed in December due to ore depletion. The Nugget Pond mine began commercial production in April 1997 and was a high-grade and low-cost mine. Gold production from Hammerdown was expected to be 25 000 oz in 2001. Planned

annual production is estimated at 50 000 oz. At the start of production, mine reserves stood at 443 000 t grading 16.11 g/t (0.47 oz/st) gold, or 210 000 oz. The mine hosts an additional resource of 334 000 t grading 11.31 g/t (0.33 oz/st) gold, or 110 000 oz. The remaining mine life is estimated at six years. Although 50 mining jobs were created when the Hammerdown mine opened, the jobs essentially replaced most of the remaining ones at the Nugget Pond mine when it closed, resulting in the net loss of 10 mining jobs due to mine openings and closings in Newfoundland and Labrador at the end of 2001.

Nova Scotia

On November 16, 2001, the Prince coal mine near Sydney closed as the mine owner failed to secure a buyer for the mine, resulting in the loss of 440 mining jobs. The 3850-t/d Prince mine was the largest remaining coal mine in Nova Scotia. The mine began production in August 1975. It was one of two coal mines in Nova Scotia that were owned by the Government of Canada and operated by the Cape Breton Development Corporation (DEVCO), a Crown corporation. The other coal mine was the Phalen mine, which closed in December 1999. Both the Prince and Phalen (the larger of the two) mines were high-cost underground coal mines in which substantial coal resources still remain. Overall, in 2001, Nova Scotia incurred net losses of 440 mining jobs and 3850 t/d of mine production capacity due to the mine closure.

With the closure of the Prince mine, the Government of Canada no longer has a direct ownership interest in any mine nor involves itself in the operation of a mine in Canada. Therefore, the year 2001 not only put an end to the continued federal subsidy to mining in the region, but it also marked an end to any direct federal government competition with the mining industry in Canada.

New Brunswick

The small 470-t/d Coal Creek coal mine near Minto closed in August due to exhaustion of its thermal coal reserves, resulting in the loss of 20 mine workers. The mine was one of five original coal mines in the area that were developed by N.B. Coal Limited to supply the nearby NB Power's power station. With the closure of Coal Creek, the only coal mine that remains open in the area is the Salmon Harbour mine, which is the last producing coal mine in the province. Salmon Harbour, originally scheduled to close in 2004, may close in 2003 to coincide with the early closure of the power plant. Due to poor market conditions, production was suspended at Potash Corporation of Saskatchewan Inc.'s Penobsquis potash mine near Sussex in November for six weeks to reduce excess inventory. Mining in other regions of New Brunswick, however, was not affected by mine openings or closures in 2001. In fact, the Brunswick

zinc-lead-copper mine, the province's sole metals producer, was able to increase production by increasing throughput to offset weak metal prices.

Quebec

Three mines closed and there were no mine openings in Quebec in 2001. The 1225-t/d Francoeur gold mine near Rouyn-Noranda closed in November due to depletion of economic ore reserves and failure to prove up the newly discovered Zone 7 at depth. The small Luzenac talc-soapstone mine near Saint-Pierre-de-Broughton closed in April due to the discovery of asbestos in the talc concentrates, making the concentrates unmarketable. In mid-February, production was suspended at the Sigma-Lamaque gold mine near Val-d'Or due to high costs. Subsequently, owner McWatters Mining Inc. successfully obtained approval from the Superior Court of Quebec of a plan to restructure its shares, debts and other liabilities to stabilize the company's financial position. A debt reduction and mine redevelopment and financing plan was put in place involving SOQUEM INC., Investissement Québec and Canada Economic Development. The plan will include the expansion of the Sigma-Lamaque mill from its current 3000-t/d capacity to 5000 t/d. Production from the open-pit operation is scheduled to begin in the fourth quarter of 2002 and to reach full production in the second quarter of 2003. Gold production is expected to be 150 000 oz annually over a seven-year mine life at an average total operating cost of US\$212/oz.

As the result of a significant cut in contracts by its clients due to continued depressed business, Wabush Mines announced in September 2001 that it was temporarily shutting down its iron ore mining and pellet production in October and later extended the shut-down to November 19, reducing its production plan for 2001 by 6% to 4.5 Mt. Similarly, Quebec Cartier Mining Company's Mount Wright mine and pellet plant were shut down for a month in December.

Overall, in 2001, Quebec suffered net losses of some 4400 t of daily ore capacity and about 180 direct mining jobs from mine openings and closings. As two of the three mines that closed in 2001 were gold mines, the province continued to suffer from the recent decline of its gold and base-metal mining industry, which started in 1999 when one base-metal and four gold mines closed.

Ontario

In Ontario, production was suspended at two gold mines and there were no new mines or re-openings in 2001. The 1000-t/d Glimmer mine near Matheson closed in May due to weak gold prices and the 250-t/d Edwards mine shut down in July due to high costs, resulting in the loss of 140 mining jobs. At the Edwards mine, only small amounts of ore reserves

are remaining and recent efforts to find more ore on site have not been successful. Nevertheless, owner River Gold Mines Inc. intends to continue further deep exploration on the property when gold prices are significantly more attractive. Improvements in gold prices since March 2002 have been encouraging to the company. At the Glimmer mine, partners Exall Resources Limited and Glimmer Resources Inc., since resolving a long-standing dispute relating to their respective ownership interest in the mine in 2000, were negotiating financing with a view to re-opening the mine for production. Exall is now the mine's majority owner and operator. Overall, in 2001, Ontario incurred net losses of 1250 t/d of ore production capacity and 140 direct mining jobs as a result of mine openings and closings.

Manitoba

During 2001, one mine closed and there were no new mine openings or re-openings in Manitoba. In August, production was suspended at the 1000-t/d Bissett gold mine, located 170 km northeast of Winnipeg, causing the loss of 230 mining jobs. The Chisel North zinc-copper mine near Flin Flon formally began production in July 2000. However, the official opening of the mine by the company was held a year later on June 1, 2001. The mine is part of the \$400 million "777 Project" at Flin Flon being developed by Hudson Bay Mining and Smelting Co., Limited. A second mine under the project is the larger 777 mine, which is scheduled to begin production in late 2003 with commercial production expected in 2004. In addition to the two mines, the 777 project will result in an upgraded and more environmentally friendly copper smelter, an expansion of the Flin Flon concentrator, a new-technology electrolytic zinc cell-house, and many productivity improvements.

Saskatchewan

Production was suspended at the Rabbit Lake uranium operation in June 2001 after the milling of stockpiled ore was completed. The mine employed a work force of 150. About 50 workers were kept on site for care and maintenance. Initially, underground mining activity at Rabbit Lake was suspended in 1999 and the suspension was extended to 2001 in the wake of continued weak uranium prices. As a result of the shut-down, the province incurred net losses of some 1000-t/d of uranium ore production capacity and 100 mine jobs. However, as a result of improvements in uranium prices since the fourth quarter of 2001, along with a forecast for a further increase in demand for uranium in the foreseeable future, owner Cameco Corporation announced a decision to re-open the Eagle Point mine for production in the summer of 2002. At the McArthur River uranium mine, located some 280 km north of La Ronge, underground drilling successes in the No. 3 and No. 4 zones and reinterpretation of existing drill data for the No. 1

and No. 2 zones, for which ore grades were underestimated, resulted in the outlining of additional ore reserves in 2001. In late January 2001, mine reserves were re-established at 845 000 t grading 21.18% U₃O₈, compared with 668 000 t grading 17.33% of U₃O₈ at the end of 1999 when the mine began production. This resulted in a 50% increase in uranium reserves and an additional eight years to the 10+ years of originally expected mine life at the mine. The McArthur River mine is the world's largest and highest-grade uranium mine.

British Columbia

With the opening of one new industrial mineral mine but the closing of four major metal mines in 2001, British Columbia suffered a third consecutive year of being hit hard by mine closings. The new mine that opened was the 750-t/d Ashcroft basalt roofing granules mine near Ashcroft. The open-pit mine, developed by I.K.O. Industries Ltd. at a capital cost of some \$25 million-\$30 million, was brought on stream in July, creating 60 mining jobs. Its annual production is estimated at 250 000 t. Production was suspended at the 18 000-t/d Mount Polley open-pit gold-copper mine near Williams Lake in September due to weak metal prices. About 240 of the 250 workers were laid off. Prior to the shut-down, a new mineralized zone was discovered on the property. Owner Imperial Metals Corporation has since been conducting studies to extend mine reserves and resources and to lower costs in an effort to reactivate the mining operation. At the Golden Bear gold mine, located some 150 km west of Dease Lake, production was completed in late 2001. The mine, which first began production in November 1989, had been a conventional open-pit and underground operation until 1997 when it became the first heap leach gold mine in the province. In early December, production was halted at the 4000-t/d Myra Falls underground zinc-copper-gold mine near Campbell River on Vancouver Island, also due to weak metal prices. In March 2002, an agreement was reached between owner Boliden Limited and employees, unions, suppliers and customers to cut costs and streamline operations and the mine was re-opened. However, as part of the agreement, the work force was reduced by 17% and wages, salaries and contracts with suppliers and contractors were adjusted. The largest impact on British Columbia's mining industry in 2001 was the closure of the 9000-t/d Sullivan zinc-lead-silver mine near Kimberley. After 92 years of active production, the world-class Sullivan mine closed on December 21. More than 410 of the remaining 444 workers were laid off. About 31 workers were kept on site for maintenance and environmental work. The impact of mine closings in British Columbia in 2001 also dealt the mining industry a significant blow as the closure of the Sullivan mine and production suspensions at the Myra Falls mine temporarily eliminated the province as a zinc producer in Canada between December

2001 and March 2002. Overall, in 2001, however, the province incurred significant net losses of some 31 000 t/d of ore capacity and over 1100 mining jobs.

Yukon

Although mining at the Brewery Creek gold mine was suspended in late 2000 due to weak gold prices, gold production continued in 2001 from the heap leaching operation. About 70 jobs were lost when the mine shut down in December 2001. At year-end 2001, the mine was without mineable reserves and only about 92 000 t grading 1.45 g/t gold of measured and indicated resources were remaining. Over the final months of 2001, owner Viceroy Resources Corporation completed a Heads of Agreement with the Government of Canada providing for the establishment of a reclamation trust. The trust will be funded by more than \$8 million in cash deposits already set aside by Viceroy to finance future reclamation work at the Brewery Creek mine. Under the agreement, Viceroy will be able to draw funds from the trust to accomplish the decommissioning and reclamation work as required under the closure plan. Since the closing of the Brewery Creek mine, the Yukon is without any producing hard-rock mines.

MINE EXPANSIONS AND EXTENSIONS

Despite continued low prices for many mineral commodities in 2001, at least ten significant mine expansion and extension projects, mostly precious and base-metal mines, were newly started, continued or further expanded in the year (Table 2): one in Newfoundland and Labrador, two in Quebec, six in Ontario, and one in Manitoba. Two of these projects were new starts and the rest were continuations of existing programs, including six world-class mines. One expansion project and one mine-life extension project were concluded in 2001.

Newfoundland and Labrador

Although Iron Ore Company of Canada's \$1.1 billion, six-year expansion and modernization program for its mine, concentrator and pellet plants in Labrador and Quebec (which started in October 1998) continued in 2001, it was put into low gear as iron ore demand and prices were weak. As a result, completion of a \$361.5 million program to reactivate a pellet plant that was mothballed in 1982, at Sept-Îles, Quebec, has been postponed. The plant was originally scheduled to re-open in 2002 with the creation of 140 long-term jobs.

Quebec

The US\$218 million expansion program that started in 1997 at the LaRonde gold mine in Quebec entered

Phase 2 in 2001. Phase 1 of the expansion program, which included the completion of sinking of the Penna Shaft to a depth of 7065 m and the expansion of mill capacity to 4550 t/d from 3265 t/d in 2000, resulted in record gold production of 234 860 oz of gold in 2001, an increase of 35% over 2000. The cash cost in 2001 averaged US\$155/oz, an 18% decrease from the previous year. In 2001, capital expenditures amounted to some \$36 million, substantially lower than 2000 (\$68 million) and 1999 (\$69 million), as most of the physical infrastructure for the expansion to 4550 t/d was completed prior to 2001. After a year of production, mine reserves were higher than a year before due to continued successes in mine-site exploration and development. As of December 31, 2001, mineable reserves stood at 33.03 Mt grading 3.08 g/t gold, 4.05% zinc, 0.36% copper and 78.86 g/t silver. Mineral resources stood at 30.6 Mt grading 5.48 g/t gold, 0.52% copper, 0.44% zinc and 22.97 g/t silver. The gold content of reserves and resources amounted to 8.5 million oz, compared with 7.8 million oz in 2000 (an increase of 28% over 1999), making the LaRonde deposit the largest gold deposit in Canada and one of the largest in the world. Phase 2 of the expansion program will see a further expansion of mill capacity to 6370 t/d by the end of 2002. Gold production in 2002 is expected to increase to 340 000 oz at a cash cost of US\$130/oz, and to reach 400 000 oz by 2004 at a cash cost of US\$100/oz or lower when the lower gold-copper-rich portion of the orebody is fully developed. Recent exploration has identified a potential new ore zone east of LaRonde on the El Coco property.

At the Niobec niobium mine near Chicoutimi, a \$15.7 million, two-phase capital program that began in 1998 to develop deep ore and expand production capacity was substantially completed in early 2001. During 2001, capital expenditures were \$2 million, compared with \$6.2 million in 2000 and \$3.8 million in 1999. Also during 2001, mill capacity, which was expanded at a cost of \$4 million, was increased to 2700 t/d from 2400 t/d. Production in 2001 was 3006 t of niobium, a 20% increase over 2000. As of December 31, 2001, mine reserves stood at 18.2 Mt grading 0.68% Nb₂O₅, a 60% increase over 2000 (11.4 Mt grading 0.73% Nb₂O₅), extending the mine life by another six years to at least 2016. In March 2001, Tech Corporation sold its 50% interest in the Niobec mine to Mazarin Inc. for \$48 million. Mazarin also became the operator of the mine with partner Cambior Inc. responsible for the worldwide marketing of the ferroniobium. In 2002, the partners plan to maintain the levels of niobium production and capital investment of 2001, but will evaluate plans to gradually increase production by another 20% in order to maintain their market share as world use of ferroniobium is expected to increase. Niobec is the only producer of niobium in North America and is one of three important producers in the world.

Ontario

Continued successes in mine-site exploration and development since the re-opening of the Red Lake gold mine at Balmertown in 2000 led to a series of upward adjustments to the mine's ambitious production expansion and mine-life extension program in 2001. The Red Lake mine produced 85 115 oz of gold in 2000, its first year of production resumption. In 2001, gold production, mainly from the High Grade Zone (HGZ), was a record 503 385 oz at a cash cost of US\$59/oz, significantly exceeded the original feasibility study's forecasted annual production of 240 000 oz at a cash cost of US\$88/oz, making the Red Lake mine Canada's largest gold-producing mine and one of the two lowest-cost gold mines (the other being the Eskay Creek mine in British Columbia). For 2002, gold production was forecast at 475 000 oz at a cash cost of less than US\$70/oz. As of December 31, 2001, ore reserves in the HGZ were 1.7 Mt grading 69.3 g/t (2.02 oz/st) gold, for a total of 3.78 million oz, an increase in gold content of 25% over 2000. The high-grade resources have increased to 430 000 t grading 92.6 g/t (2.70 oz/st) gold, for a total of 1.28 million oz. In 2002, an exploration program at the mine will focus on the depth and east and west extensions of the HGZ, the extensions of the lower-grade sulphide mineralization at depth, and the newly discovered Far East Zone.

A \$220 million expansion program that started in 2000 at the Lac des Iles palladium mine near Thunder Bay continued in 2001. A new concentrator, which was completed in June 2001, boosted the mine's ore throughput capacity to 15 000 t/d from 2400 t/d. However, a number of milling and concentrator circuit-related problems reduced throughput performance and recovery to below the designed rates in 2001. Most of the problems have since been corrected and annual palladium production from the mine is expected to increase in 2002 to 250 000 oz, or about 5% of the world's annual supply of palladium. Since December 2001, the mine has undergone a cost-reduction and streamlining exercise to reduce mining operation and ancillary services with a work force reduction. During 2001, the faulted extension of the Main High Grade Zone at depth was discovered and was referred to as the "Offset High Grade" Zone. The intercepts within this zone were exceptional with an average palladium grade of 5.2 g/t over a true thickness of 23 m. As of December 31, 2001, ore reserves at the mine were 93.5 Mt grading 1.53 g/t palladium (4.6 million oz), 0.17 g/t platinum, 0.12 g/t gold, 0.06% copper and 0.05% nickel. Measured and indicated resources stood at 65.9 Mt grading 1.58 g/t palladium (3.3 million oz), 0.17 g/t platinum, 0.11 g/t gold, 0.05% copper and 0.05% nickel. A further 73 Mt were classified as inferred, grading 1.57 g/t palladium, 0.15 g/t platinum, 0.10 g/t gold, 0.05% copper and 0.05% nickel. The mine life, based on current reserves and rate of production, will be at least

17 years from 2002. At full production starting in 2002, annual mine output is expected to be 250 000 oz of palladium, 23 000 oz of platinum, 18 000 oz of gold, 6 million lb of copper and 2 million lb of nickel. The average cash cost over the mine life, net of by-product credits and royalty, is estimated at US\$200/oz of palladium. The mine currently employs a work force of 275, compared with 130 prior to the expansion. The Lac des Iles mine is Canada's only primary palladium mine.

At the Kidd Creek copper-zinc-silver mine in Timmins, the development of Mine D – a \$640 million deep development program to extend the mine life at Kidd Creek – was accelerated in 2001. During 2001, development was focussed on the section between 2100 m (6800 ft) and 3100 m (10 000 ft), giving access to an additional 10.3 Mt of reserves and 14.1 Mt of resources in two stages. While Stage 1 of the development will take the mine to the 2700-m level, Stage 2 will extend the mine down to 3100 m, making Kidd Creek the deepest base-metal mine in the world. Stage 1 involves the development of 15.7 Mt of ore grading 2.82% copper, 5.74% zinc and 58 g/t silver, whereas ore for the Stage 2 development is estimated at 10.5 Mt grading 2.20% copper, 5.27% zinc and 97 g/t silver. As of December 31, 2001, ore reserves at the Kidd Creek mine, including Mine D, totalled 24.98 Mt grading 2.2% copper, 6.32% zinc and 68 g/t silver. The mine also hosted a small indicated resource of 348 000 t grading 2.06% copper, 6.69% zinc and 30 g/t silver, and an inferred resource of 14.15 Mt grading 3.35% copper, 4.90% zinc and 91 g/t silver, which came essentially from Mine D. Work has begun to sink a new underground shaft from about 1460 m to 3100 m. This shaft will replace the No. 3 shaft once Mine D is brought on stream. Production from Mine D is scheduled to begin in 2004 at a rate of 2 Mt of ore annually. The current mine-life extension project at Kidd Creek is by far the largest deep ore development and mine extension project in Canada.

In the Sudbury Basin, Inco Limited's three production expansion and mine-life extension programs for its nickel-copper operations continued in 2001. At the Creighton mine, the first phase of the US\$125 million Creighton Deep Project, which involves the development of proven reserves of 2.8 Mt grading 3.45% nickel and 2.97% copper between the 7400-ft and 7660-ft levels, was substantially completed in 2001. Production from this ore, which began in 2001, is expected to last through to 2013. Capital expenditures in 2001 were estimated to be some \$20 million. In the second phase, development will extend down to the 8180-ft level to develop and mine some 3.1 Mt of probable reserves grading 3.62% nickel and 3.25% copper between 2005 and 2019. Creighton Deep is scheduled to be operational in 2002; annual production from the mine is expected to be 10 900 t of nickel, 9500 t of copper and 28 000 oz of

platinum group metals. As the current average grades of Inco's Ontario Division mines are 1.3% nickel and 1.2% copper, the deep development project at Creighton is undoubtedly one of the company's most significant mine extension and expansion projects in Ontario in recent years. The Creighton mine, discovered in 1856 and brought on stream in 1901, celebrated a century of continuous production in 2001. It is Inco's oldest operating mine. At the McCreedy East mine, a new \$46 million (US\$33 million) capital program, which was initiated in June 2000 to develop the newly discovered high-grade nickel deposit nearby, forged ahead in 2001. It will involve mine development of the Main and adjacent West orebodies containing 8 Mt grading 1.88% nickel, 0.84% copper and 0.91 g/t platinum group metals. Mine production is expected to increase to 4350 t/d from the current 2700 t/d when full production is reached in late 2004, with metal production of 21 772 t of nickel and 41 700 t of copper. The mine has other mineral zones and has the potential to extend its current life of 15 years. The McCreedy East mine, which underwent a \$194 million expansion between 1997 and 1999, is one of Inco's four key mines in Ontario and one of the company's lowest-cost mines in the province. The other three are the Creighton, Copper Cliff North and Copper Cliff South mines. At the Stobie mine, the development of a low-grade component of the Stobie mine that started in 2000 was completed in 2001. This development and other related mine-life extension work in the main part of the mine is expected to enable it to produce over 20 000 t of contained nickel annually over the next 15 years starting in 2001.

Manitoba

A US\$48 million (\$70.4 million) plan to deepen the Birchtree nickel mine near Thompson to expand production and to extend the mine life by at least 15 years began in 2001 and was progressing as planned. The two-year capital program will deepen the mine and increase the daily production capacity to 3175 t from 1635 t while reducing costs by 25%. Capital investment in 2001 is estimated at \$35 million. A redesigned mine development plan by a joint Inco and union team could see further lowering of costs and accelerated cash flow. As well, deepening the mine will increase ore reserves to 13.6 Mt grading 1.79% nickel. After deepening, the mine is expected to reach full production in 2004. Inco is also studying the deepening of its Thompson 1-D orebody and is re-surveying the entire Thompson Nickel Belt. These activities are all part of Inco's strategy to focus on discovering new mineralization at and near existing mines and previously known deposits.

In addition to the above major projects, several mines across Canada have also undergone relatively significant expansion or mine-life extensions in 2001. In an effort to lower production costs, expansion continued

at the Sigma-Lamaque mining complex near Val-d'Or, Quebec. In Manitoba, as part of the \$400 million 777 Project to develop two new mines (the Chisel North mine near Snow Lake already began production in 1999; the 777 mine in Flin Flon is still under development), expansion of the Flin Flon concentrator continued in 2001. The new 777 shaft is scheduled for completion by the end of 2002. In Alberta, a decision to mine an additional 1.2 Mt of metallurgical coal has extended the mine life at the Luscar coal mine by six months to the end of 2002 as a result of improved market conditions for coal. There was also renewed interest in developing the Cheviot coal project near Hinton, possibly as early as 2003. At the Polaris zinc-lead-silver mine in Nunavut, better-than-projected pillar recovery, combined with the addition of 350 000 t of ore from a 6000-m drilling program, is expected to extend the mine life to August 2002. The mine was previously scheduled to close at the end of 2001.

In addition to new mine developments, the major mine expansion and extension programs described above continue to indicate that, due to difficult times in recent years brought about by lingering weak metal prices and financing difficulties, mining companies in Canada have been concentrating their financial resources on mine-site exploration and development instead of off-site exploration and developing new mines. The results also show that mining companies were able to continue to discover new ore at existing mines. The successes of such discoveries and follow-up developments have enabled the mines to extend their lives and expand production, which in turn has enabled the mines to reduce production costs and stay competitive and economically viable. Although most expansion or extension projects seldom resulted in large increases in new mining jobs, over 300 new jobs were created from such projects in 2000 and 2001, most significantly at the LaRonde and Lac des Iles mines; these were sufficient to mitigate job losses due to production cutbacks at many gold, uranium and coal mines in 2000 and, to a lesser extent, in 2001 as most new jobs were created in 2000.

IMPACT

In 2001, the two small new mines brought on stream some 1125 t of daily ore production capacity and created some 100 mining jobs, the smallest amount of daily ore capacity and lowest number of new jobs in more than a decade. However, about 56 300 t/d of ore capacity and 2400 jobs were lost from mine closures and production suspensions, resulting in a net loss of 13 mines, significant net losses of nearly 55 200 t of daily ore capacity and more than 2300 direct mining jobs. The largest contributors to the job losses were the Prince, Bissett, Mount Polley, Myra Falls and Sullivan mines. Layoffs at these mines constituted

78% of the net loss from mine closures in 2001. The same five mines also contributed to 65% of the net capacity loss in the year.

In addition, production cutbacks again resulted in many job losses during the year, especially at gold, base-metal, uranium and coal mines. Total job losses due to production cutbacks during the year were estimated at about 200. Although this was an improvement over 2000 and a significant improvement over 1999 in which more than 250 and 900 jobs, respectively, were lost from production cutbacks, it nevertheless continued the trend of job losses in addition to those from mine closings. This also makes 2001 the fifth consecutive year of job losses due to cutbacks at producing mines across Canada.

Mine openings ensure immediate access to new or redeveloped sources of economic mineral supply, new production capacity and capability, and new mining jobs. They also reflect Canada's mine-building ability and its attractiveness to mining investment in the face of global competition and globalization. In 2001, mine openings continued to be outnumbered by mine closings and a recent trend in which base-metal mines are lacking in both number and size also appears to have persisted. Gold and basalt granules mine openings during the year represent dismal additions to Canada's total minerals and metals production capability. Overall, at full capacity, production from new mines in 2001 is expected to add a meager 1.7 t (50 000 oz) of gold and 250 000 t of basalt roofing granules annually (Table 3) to Canada's total minerals and metals production. While all of the new gold production will come from the Hammerdown mine in Newfoundland and Labrador, all of the new basalt roofing granules production will come from the Ashcroft mine in British Columbia. Gold production from the Hammerdown mine is expected to be adequate to offset production losses from the closure in 2001 of the Nugget Pond mine located some 140 km northeast of Hammerdown.

Table 4 shows that new mines in 2001 have also added over 6.9 t, or 201 300 oz, of gold reserves and 18 Mt of basalt roofing granule reserves to Canada's total reserves of this metal and mineral. Except for basalt roofing granules, gold reserves from the new mine would be insufficient to replenish depleted reserves due to production and to sustain Canada's gold production capability.

NEW DEVELOPMENTS EXPECTED TO BECOME MINES IN 2002

Preliminary estimates, based on mine development activities in 2001 and the first half of 2002, indicate that eight mines, two of which will be new mines, could come on stream in 2002. Among the most promising new mines are Melford (gypsum) in Nova

Scotia and Mishi (gold) in Ontario. In addition, the Beaufor and Joe Mann gold mines in Quebec, the Macassa gold mine in Ontario, the Myra Falls zinc-copper-gold-silver mine in British Columbia, and the long-awaited CanTung tungsten mine in the Northwest Territories all have re-opened in the first half of 2002, and the Eagle Point uranium mine in Saskatchewan is scheduled to resume production in August. As well, two diamond projects, namely Misery and Koala North, now part of the Ekati mining complex at Lac de Gras, Northwest Territories, are scheduled to come on stream in 2002. Production began at the Misery kimberlite pipe in January and test underground mining also started at the Koala North pipe.

In addition, several previous mine expansion and extension projects, as well as new ones that were initiated in 2001, are expected to continue in 2002 with others likely to be announced during the year. These mine expansions and mine-life extensions, together with new mine developments, are central to sustaining mining and production in Canada. In the face of weak prices for many minerals and metals and without having to resort to significant layoffs, mine expansion remains an effective option by which production costs can be lowered and productivity increased at an existing mine. Such an option is especially beneficial for mines that have significant new mine-site ore discoveries, for example, the LaRonde and Niobec mines in Quebec; the Lac des Iles, Red Lake, Kidd Creek, Creighton, McCreedy East and Stobie mines in Ontario; and the Birchtree mine in Manitoba, all of which have been discussed above, as well as the Ekati diamond mine and many others that are still in the planning stage.

OUTLOOK

The overall weak global demand for metals and depressed gold and base-metal prices since 1997 lingered on throughout most of 2001 and continued to put a lid on exploration and new mine development across Canada. Exploration spending and capital investment on new mine development, as well as base-metal mine reserves (particularly copper and zinc), reached alarming levels in 2001, bringing Canada's mine production capability for these metals to its lowest level since 1981. Not surprisingly, the number of mine openings in Canada in 2001 declined to its lowest level in more than a decade while mine closings continued to outnumber mine openings. Canada's traditionally strong gold and base-metal mining camps were particularly affected. As well, while previously marginal mines have fallen prey under the circumstances, some mines that were previously profitable have now become marginal.

Canadian companies continued to respond to these adverse market conditions by closing down high-cost

mines, consolidating operations by integrating mining operations, cutting back on production and work force, negotiating salary and wage concessions from workers, imposing or extending vacation shut-downs, revamping mining methods, expanding production capacity, or postponing mine openings and developments. However, many mines appear to have reached their limits for further technical or economic improvements and the costs of further improvement would outweigh the anticipated benefits. In these cases, mine shut-down becomes an inevitable option. This situation has also resulted in accelerated production and premature mine closures such as in the cases of the Sullivan mine in 2001, Nanisivik in 2002, and Ruttan in 2003. Most mines are expected to continue to focus their efforts on extending mine life and improving operating costs.

Currently, the most damaging factor for mine development and mine openings in Canada is the economic uncertainty in the United States, Japan and western Europe. Since the current economic slowdown in the United States set in during the second half of 2000, there has been no convincing sign of sustained economic recovery. This has affected trade and demand for minerals in North America and western Europe. As well, the long-awaited economic recovery in Japan since the metal downturn that started in 1997 has never materialized. Although demand for metals in China remains strong, it is not yet sufficient to displace the overall negative impact from the American and Japanese economic malaise. For this reason, current metal price doldrums are not likely to recover in the foreseeable future. As a result, many new mine development and re-development projects in Canada that were shelved since 1997 and subsequently revived for development since early 2000 have again been negatively affected and quiet postponements abound. Although there has been an improvement in both exploration and mine financing in 2001, rallied in part by improved demand for nickel and copper in late 2001, metal prices in general have fallen back in the second quarter of 2002.

However, amidst a depressed market for copper, zinc and lead, some bright spots do exist. Since March 2002, gold prices have recovered to above the US\$300/oz mark. This gold price recovery has a significant effect on stimulating exploration and development and many gold development projects that were shelved in 2001 have again been revived. Should gold prices be sustained at US\$320/oz or higher, many gold mines can be expected to open or re-open over the next two years. Platinum group metals, coal and diamond prices were also maintained at a relatively healthy level in 2001 and the first half of 2002, and the outlook for uranium and iron ore has also improved.

Still, an overall sustained global economic recovery is needed to stimulate demand for minerals and metals

if we are to see improved prospects for mining across Canada. In view of the current worldwide geo-political and economic uncertainty, the short-term outlook (less than two years) for significant new mine developments and mine openings in Canada is dim except for mines that have already been committed for production such as the Diavik and 777 projects. Only gold and uranium and, to some extent, diamonds have a somewhat more positive outlook.

Notes: (1) Information in this review, based mostly on company reports and communications with companies, was current as of June 30, 2002. (2) This and other reviews, including previous editions, are available on the Internet at www.nrcan.gc.ca/mms/cmy/index_e.html.

NOTE TO READERS

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TABLE 1. MINE OPENINGS AND CLOSINGS IN CANADA, 2001

Province? Territory	New Mines			Mines Re-Opened			Mines Suspended			Mines Closed		
	Precious Metals	Base Metals	Other Minerals/ Metals	Precious Metals	Base Metals	Other Minerals/ Metals	Precious Metals	Base Metals	Other Minerals/ Metals	Precious Metals	Base Metals	Other Minerals/ Metals
Newfoundland and Labrador	1	-	-	-	-	-	-	-	-	1	-	-
Nova Scotia	-	-	-	-	-	-	-	-	-	-	-	1
New Brunswick	-	-	-	-	-	-	-	-	-	-	-	1
Quebec	-	-	-	-	-	-	1	-	-	1	-	1
Ontario	-	-	-	-	-	-	2	-	-	-	-	-
Manitoba	-	-	-	-	-	-	1	-	-	-	-	-
Saskatchewan	-	-	-	-	-	-	-	-	1	-	-	-
British Columbia	-	-	1	-	-	-	1	1	-	1	1	-
Yukon	-	-	-	-	-	-	1	-	-	-	-	-
Canada, total by commodity group	1	-	1	-	-	-	6	1	1	3	1	3
Total Canada		2			-			8			7	

Source: Natural Resources Canada, based on company reports.
- Nil.

TABLE 2. MINE OPENINGS, RE-OPENINGS, EXPANSIONS, EXTENSIONS, SUSPENSIONS AND CLOSURES IN CANADA IN 2001

Mining Project/Remarks	Location	Province/ Territory	Capacity (tonnes/day)	Employment During Mine Life	Date of Opening, Re-Opening, Expansion, Extension, Suspension or Closure	Mine or Plant Type	Main Commodities	Company
MINE OPENINGS								
Precious Metals								
Hammerdown	Baie Verte	Nfld.	375	50	July 3	U/G	Gold	Richmont Mines Inc.
Remarks: The Hammerdown gold mine near Baie Verte, Newfoundland and Labrador, began production on July 3, 2001. The mine was developed by Richmont Mines Inc. to replace its Nugget Pond mine some 140 km away. Ore from Hammerdown was trucked to the mill at Nugget Pond for processing. The Nugget Pond mine closed in December 2001 due to ore depletion. In 2001, estimated gold production from the Nugget Pond and Hammerdown mines totalled some 56 500 oz at a cash cost of about US\$140/oz, with about 25 000 oz from Hammerdown. Planned annual gold output from Hammerdown is estimated at 50 000 oz. At the start of production in July 2001, ore reserves at the mine stood at 443 000 t grading 16.11 g/t (0.47 oz/st) gold, or 210 000 oz. The mine hosts an additional resource of 334 000 t grading 11.31 g/t (0.33 oz/st) gold, or 110 000 oz. The mine life is estimated at six years. The capital cost of developing the mine is estimated at about \$10 million.								
Other Minerals								
Ashcroft	Ashcroft	B.C.	(e) 750	60	July	O/P	Basalt granules	I.K.O. Industries Ltd.
Remarks: The Ashcroft mine at Ashcroft, British Columbia, was brought on stream in July 2001, creating 60 mining jobs. The mine, developed at a capital cost of some \$25 million-\$30 million, is owned and operated by I.K.O. Industries Ltd. through a wholly owned subsidiary, I.G. Machines and Fibers Limited. Annual production of basalt roofing asphalt granules is planned at 250 000 t. At the start of production, mine reserves were estimated at about 18 Mt.								
EXPANSIONS AND EXTENSIONS								
Precious Metals								
LaRonde	Val-d'Or	Que.	4 550	360	1997-2004	U/G	Gold	Agnico-Eagle Mines Limited
Remarks: During the past 14 years, the daily ore production rate at the LaRonde gold mine has been expanded four times. But the recent discovery of extensive gold, silver, copper and zinc mineralization at depth enabled the mine to embark on its most ambitious capital expansion program. Phase 1 of this \$218 million, two-phase program, which was originally announced in 1997 and subsequently revised, was completed at the end of 2000 with the completion of the Penna Shaft to a depth of 7065 m. At the same time, mill throughput increased to 4550 t/d from 3265 t/d. This facilitated the record production of 234 860 oz of gold in 2001, an increase of 35% over the previous year. The cash cost in 2001 was US\$155/oz, an 18% decrease from the previous year. In 2001, capital expenditures amounted to \$36.3 million, substantially lower than those of 2000 and 1999 of \$68.4 million and \$68.9 million, respectively, as most of the physical infrastructure for the expansion to 4550 t/d was completed prior to 2001. As of December 31, 2001, ore reserves stood at 33.03 Mt grading 3.08 g/t gold, 4.05% zinc, 0.36% copper and 78.86 g/t silver. Mineral resources stood at 30.6 Mt grading 5.48 g/t gold, 0.52% copper, 0.44% zinc and 22.97 g/t silver. Gold contents of the total reserves and resource amount to some 8.5 million oz, making the LaRonde mine the largest gold deposit in Canada and one of the largest in the world. The next phase of the expansion program will see mill capacity increased to 6370 t/d by the fourth quarter of 2002. Gold production in 2002 is expected to reach 340 000 oz at a cash cost of about US\$130/oz. When the lower gold/copper-rich portions of the orebody are fully developed in the second half of 2003, annual gold production from the mine is expected to reach the 400 000-oz level at a cash cost below US\$100/oz in 2004. Recent exploration has identified a potential new gold zone east of LaRonde on the El Coco property.								
Red Lake	Balmertown	Ont.	550	(e) 175	2000-2001	U/G	Gold	Goldcorp Inc.
Remarks: Since the re-opening of the Red Lake mine in August 2000, both production and ore reserves at the mine have grown considerably. In 2001, gold production from the mine, mainly from the High Grade Zone, was a record 503 385 oz at a cash cost of US\$59/oz, significantly exceeded the original business plan (feasibility study) forecast annual production of 240 000 oz at a cash cost of US\$88/oz. This makes Red Lake the largest gold-producing mine in Canada. The mine produced 85 115 oz of gold in 2000 - its first year of production resumption. For 2002, gold production from the Red Lake mine is forecast at 475 000 oz at a cash cost of less than US\$70/oz. As of December 31, 2001, ore reserves in the High Grade Zone (HGZ) were 1.7 Mt grading 69.3 g/t (2.02 oz/st) gold, for a total of 3.78 million oz, an increase in gold content of 25% over 2000. The high-grade resources have grown to 430 000 t with a grade of 92.6 g/t (2.70 oz/st) gold, for a total of 1.28 million oz. The 2002 exploration program at the Red Lake mine will focus on the depth and east and west extensions of the HGZ, the extensions of the lower grade sulphide mineralization at depth, and the newly discovered Far East Zone.								

Lac des Iles	Thunder Bay	Ont.	2 400	275	2000-2002	O/P	Palladium, platinum, gold, copper, nickel	North American Palladium Ltd.
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Remarks: Following an extensive exploration program in 1999 and a detailed feasibility study completed in May 2000, a \$220 million expansion program was launched at the Lac des Iles mine to expand production. A new concentrator, which was completed in June 2001, boosted the ore throughput capacity from 2400 t/d to 15 000 t/d. Annual palladium production from the mine is expected to increase to 250 000 oz, or 5% of the world's annual palladium supply, by 2002. The mine life is estimated to be 17 years. However, throughput has been disappointing, caused by difficulties with the refurbished pebble crusher, unanticipated constraints with the flotation cleaner circuit, and the inability of the semi-autogenous grinding (SAG) mill to operate at the designed rate. A new, larger pebble crusher was installed in October 2001, resulting in finer material for the SAG mill. This, together with modifications to the grinding and flotation circuits, has improved mill throughput and recoveries. However, in the long run, a secondary crusher, modifications to the grinding circuit, and possibly an expansion of the flotation circuit would be needed. Since December 2001, the mine has undergone a cost-reduction and streamlining exercise to reduce mining operation and ancillary services with a work force reduction. The mine produces a single bulk concentrate containing palladium, platinum, gold, copper and nickel. The concentrate is trucked to Sudbury, Ontario, for smelting by Inco Limited and Falconbridge Limited, and then shipped to these companies' respective European operations for refining. In 2001, the faulted extension of the Main High Grade zone at depth was discovered, referred to as the "Offset High Grade" zone. The intercepts within this zone were exceptional with an average palladium grade of 5.2 g/t over a true thickness of 23 m. As of December 31, 2001, ore reserves were 93.5 Mt grading 1.53 g/t (4.6 million oz) palladium, 0.17 g/t platinum, 0.12 g/t gold, 0.06% copper and 0.05% nickel. Measured and indicated resources totalled 65.9 Mt grading 1.58 g/t (3.3 million oz) palladium, 0.17 g/t platinum, 0.11 g/t gold, 0.05% copper and 0.05% nickel. In addition, inferred resources totalled 73 Mt grading 1.57 g/t palladium, 0.15 g/t platinum, 0.10 g/t gold, 0.05% copper and 0.05% nickel. At full production, starting in 2002, annual output is expected to be 250 000 oz of palladium, 23 000 oz of platinum, 18 000 oz of gold, 6 million lb of copper and 2 million lb of nickel at a cash cost of US\$200/oz of palladium. The mine currently employs 275 people, compared to 130 prior to the expansion. The Lac des Iles mine is Canada's only primary palladium mine.

Niobec	Chicoutimi	Que.	2 700		1998-2001	U/G	Niobium, ferroniobium	Cambior inc. and Mazarin Inc.
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Remarks: A \$15.7 million capital program, which started in 1998, to deepen the Niobec mine shaft to develop deep mineral reserves in the lower or third block, to develop a ramp, and to install a new crusher was substantially completed in early 2001. During 2001, capital expenditures were estimated to be \$2 million, compared to \$6.2 million in 2000 and \$3.8 million in 1999. As of December 31, 2001, ore reserves at the mine stood at 18.2 Mt grading 0.68% Nb₂O₅ (niobium oxide), a 60% increase over 2000 (11.4 Mt grading 0.73% Nb₂O₅). More than 90% of the overall mineral reserves are located above level 1450 and can be mined using the current underground infrastructure. This will reduce the development costs required for their extraction. As a result of the substantial increase in ore reserves, the mine life is now estimated at over 16 years. Mill capacity, expanded at a capital cost of \$4 million, was increased to 2700 t/d from 2400 t/d. Production in 2001 was 3006 t of niobium, a 20% increase over 2000. Niobec is the only producer of niobium in North America and is one of three important producers in the world. The mine produces a pyrochlore concentrate that is transformed into ferroniobium grading 66% niobium using an aluminothermic converter. The product is added to steel and various alloys to improve mechanical properties and corrosion resistance. In March 2001, Teck Corporation sold its 50% interest in the Niobec mine to Mazarin Inc. for \$48 million. Mazarin is the mine operator while Cambior inc. is responsible for the worldwide marketing of the ferroniobium. In 2002, the partners plan to maintain the niobium production and capital investment levels of 2001, but are evaluating plans to gradually increase production by an additional 20% in order to maintain their market share as world use of ferroniobium is expected to increase.

Kidd Creek	Timmins	Ont.	12 500	(e) 950	2000-2004	U/G	Copper, zinc, silver	Falconbridge Limited
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Remarks: The development of Mine D, a deep ore development program to extend the mine life at Kidd Creek, was accelerated in 2001. The \$640 million mine extension project, which was announced in July 2000, is focused on development of the mine from a depth of 2100 m (6800 ft) to 3100 m (10 000 ft), giving access to an additional 10.3 Mt of reserves and 14.1 Mt of resources in two stages. As of December 31, 2001, ore reserves at the Kidd Creek mine, including Mine D, totalled 24.98 Mt grading 2.2% copper, 6.32% zinc and 68 g/t silver. The mine also hosted a small indicated resource of 348 000 t grading 2.06% copper, 6.69% zinc and 30 g/t silver, and an inferred resource of 14.15 Mt grading 3.35% copper, 4.90% zinc and 91 g/t silver, which came essentially from Mine D. In the development of Mine D, Stage 1 will take the mine from 2100 m to about 2700 m in depth and Stage 2 will take it to a depth of 3100 m. This will make Kidd Creek the deepest base-metal mine in the world. Overall, the Stage 1 portion of the mine contains about 15.7 Mt of ore grading 2.82% copper, 5.74% zinc and 58 g/t silver. The Stage 2 portion contains 10.5 Mt grading 2.20% copper, 5.27% zinc and 97 g/t silver. Work has begun on a new underground shaft that will go from about 1460 m to 3100 m. This new shaft will replace shaft no. 3 once Mine D is operational. Ore production from Mine D is planned at 2 Mt annually. The development of Mine D has been accelerated and the mine is expected to begin production in 2004. To date, the project is on budget and on schedule.

Creighton	Sudbury	Ont.	(e) 3 500	525	2001-2013 (Phase 1), 2005-2019 (Phase 2)	U/G	Nickel, copper, cobalt, precious metals	Inco Limited
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Remarks: A US\$125 million, two-phase capital program to extend the mine life and to expand mine production at the Creighton nickel mine in Sudbury, Ontario, continued in 2001. The Creighton Deep project, which was announced by Inco Limited in April 1998, aims to develop a 6-Mt high-grade, low-cost nickel-copper deposit at depth at the Creighton mine over the next two decades. Phase 1 of the project, from 2001 to 2013, which involves mine development between the 7400-ft and 7660-ft levels, will develop proven reserves of 2.8 Mt grading 3.45% nickel and 2.97% copper located between the 7400 and 7660 levels. Production from this ore, which was scheduled to begin in 2001, is expected to continue through 2013. Capital expenditures incurred on the project amounted to US\$14 million in 2000. In Phase 2, development will extend to the 8180-ft level between 2005 and 2019, during which some 3.1 Mt of probable reserves grading 3.62% nickel and 3.25% copper will be developed and mined. In contrast, the current average grades of the Ontario Division mines are 1.3% nickel and 1.2% copper. When Creighton Deep is fully operational (originally planned for 2002), annual production is expected to be 10 900 t of nickel, 9500 t of copper and 28 000 oz of platinum group metals. The Creighton orebody was discovered in 1856. The mine, which began production in 1901, celebrated a century of continuous production in 2001. Creighton is Inco's oldest operating mine.

McCreedy East	Sudbury	Ont.	2 700	180	2000-2004	U/G	Nickel, copper, cobalt, precious metals	Inco Limited
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Remarks: Since its opening in 1996, the McCreedy East nickel mine in Sudbury continued to expand production. Shortly after a \$194 million expansion program to increase daily ore capacity to the 2700-t level was completed at year-end 1999, the discovery of a high-grade nickel deposit nearby prompted further plans to expand the operation. In June 2000, Inco Limited announced a new \$46 million (US\$33 million) capital program to develop this orebody. It will involve mine development of the Main and adjacent West orebodies containing 8 Mt grading 1.88% nickel, 0.84% copper and 0.91 g/t platinum group metals. Mine production is expected to increase to 4350 t/d from the current 2700 t/d when full production is reached in late 2004. At this rate, metal production will be 22 million kg (48 million lb) of nickel and 42 million kg (92 million lb) of copper annually, up from the current 13 million kg (29 million lb) of nickel and 37 million kg (82 million lb) of copper. The expansion of the McCreedy East mine will provide Inco's Ontario Division with another source of low-cost production for at least another 15 years. Further mine-life extensions are likely as the mine has other mineral zones with excellent potential. The McCreedy East mine is one of Inco's most productive mines with ore handling and materials transportation accessible by existing infrastructure at Inco's nearby Coleman mine. It has been designated by Inco as one of four key mines in its Ontario Division. The other three, Creighton, Copper Cliff North and Copper Cliff South, are all in the Sudbury area. These four mines are also the company's lowest-cost mines in Ontario.

TABLE 2 (cont'd)

Mining Project/Remarks	Location	Province/ Territory	Capacity (tonnes/day)	Employment During Mine Life	Date of Opening, Re-Opening, Expansion, Extension, Suspension or Closure	Mine or Plant Type	Main Commodities	Company
Stobie	Sudbury	Ont.	(e) 4 000	250	2000-2001	U/G	Nickel, copper, cobalt, precious metals	Inco Limited
Remarks: Inco Limited decided in 2000 to proceed with development of a low-grade component of the Stobie mine. This development, along with the related extension of the main portion of the Stobie mine, is expected to result in aggregate production of over 20 000 t/y of contained nickel from the mine over a period of 15 years starting in 2001.								
Birchtree	Thompson	Man.	1 635	150	2001-2002	U/G	Nickel, copper, cobalt, precious metals	Inco Limited
Remarks: In February 2000, Inco Limited announced a US\$48 million (\$70.4 million) capital program to extend the life of the Birchtree nickel mine near Thompson, Manitoba, to 2016. The two-year project will deepen the mine and increase production to 3175 t/d from 1635 t/d while reducing costs by approximately 25%. As well, ore reserves will increase to 13.6 Mt grading 1.79% nickel. This mine-life extension work was progressing as planned in 2001. The mine is expected to reach full production in 2004. A joint effort by a company/union co-design team made the deepening financially viable by redesigning the mine development plan to further lower costs and accelerate cash flow. The Birchtree mine operated from 1966 to 1977, returning to production most recently in 1989. Inco is also studying the deepening of its Thompson 1-D orebody and is re-surveying the entire Thompson Nickel Belt. Both activities are part of Inco's overall exploration strategy to focus on discovering new mineralization near current mines and previously known deposits. This strategy has proven to be successful in recent years.								
Other Commodities								
Carol Lake	Labrador City	Nfld.	(e) 49 500 (conc. and pellet)	n.a.	1998-2003	O/P	Iron	Iron Ore Company of Canada
Remarks: A \$1.1 billion, six-year comprehensive capital investment program that started in October 1998 continued in 2001. About \$650 million, or 60%, of the investment will be spent on upgrading and expanding the company's Carol Lake mine, concentrator and pellet plant near Labrador City. Another \$361.5 million will be spent on reactivating the pellet plant at Sept-Îles, Quebec, which was mothballed in 1982. However, completion of the Sept-Îles iron pellet plant, originally scheduled for 2002, was postponed due to poor market conditions for iron ore in the first half of 2001. Although recent stabilization of iron ore prices may offer hope for the resumption of the Sept-Îles plant, better prices would be needed to put the overall investment program on track.								
MINE CLOSINGS								
Production Suspensions								
Precious Metals								
Sigma-Lamaque	Val-d'Or	Que.	3 000	90	February 14	U/G	Gold	McWatters Mining Inc.
Remarks: Production at the Sigma-Lamaque Complex was suspended in February 2001 due to high costs. Subsequently, owner McWatters Mining Inc. successfully obtained approval from the Superior Court of Quebec of a plan to restructure its shares, debts and other liabilities to stabilize the company's financial position. The plan has resulted in the reduction of McWatters' total indebtedness from \$30.2 million to \$4.4 million, but at significant dilution for shareholders. In addition, SOQUEM INC. (part of the Société générale de financement du Québec (SGF) development agency that invests with the private sector to promote industrial development in Quebec) would acquire a 40% interest in Sigma-Lamaque for \$20 million and would fund \$5.8 million of the estimated \$31 million capital cost for re-opening and expanding the mine. The agreement between McWatters and SOQUEM will be in the form of a limited partnership under which McWatters will be the mine's operator. The partnership is conditional on the transfer to SOQUEM of the rights to the \$19.6 million of financing already secured by McWatters for the project from Investissement Québec (\$17 million) and Canada Economic Development (\$2.6 million). McWatters must also contribute \$8.8 million in initial and working capital. The plan will include an expansion of the mill to 5000 t/d from the existing 3000 t/d. Production from the open-pit operation is scheduled to begin in the fourth quarter of 2002, reaching full production in the second half of 2003. Annual gold output is expected to be 150 000 oz over a seven-year mine life at an average total operating cost of US\$212/oz.								
Edwards	Wawa	Ont.	(e) 250	(e) 51	July 5	U/G	Gold	River Gold Mines Ltd.
Remarks: Production at the Edwards gold mine near Wawa was suspended due to high costs. However, only small amounts of ore reserves are remaining and recent efforts to find more ore have not been successful. Owner River Gold Mines Ltd. intends to conduct further deep exploration on the property when gold prices are significantly more attractive.								

Glimmer	Matheson	Ont.	1 000	90	May 10	U/G	Gold	Exall Resources Limited and Glimmer Resources Inc.
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Remarks: Production was suspended in May 2001 at the Glimmer gold mine due to depressed gold prices. The joint-venture partners were negotiating financing with a view to restarting production. In 2000, Glimmer and Exall resolved litigation between the two companies relating to proportional ownership interests in the mine.

Bissett	170 km NE of Winnipeg	Man.	1 000	230	August	U/G	Gold	Harmony Gold Mining Company Limited
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Remarks: Production at the Bissett gold mine in Manitoba was suspended in August 2001 due to high costs and weak gold prices. Harmony Gold Mining Company, a South African-based company, bought the mine from bankrupt Rea Gold Corporation in mid-1998 and commissioned the 1000-t/d mill in October that year.

Mount Polley	Williams Lake	B.C.	18 000	250	September	O/P	Gold, copper	Imperial Metals Corporation
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Remarks: Production was suspended in September 2001 due to weak metal prices. About 10 workers were kept on site for care and maintenance.

Brewery Creek	Dawson City	Y.T.	(e) 11 000	70	December	O/P & HL	Gold, silver	Viceroy Resource Corporation
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Remarks: Mining was suspended in late 2000 due to weak gold prices. However, gold production continued in 2001 through heap leaching. Seasonal mining operated an average of 210 days a year. The leach plant has a load capacity of 11 000 t/d. As of December 31, the mine was without mineable reserves and the remaining measured and indicated resources stood at 92 000 t grading 1.45 g/t gold containing 43 000 oz of gold. Planned mine reclamation work will be funded by more than \$8 million in cash deposits already set aside by mine owner Viceroy Resource Corporation.

Base Metals

Myra Falls	Campbell River	B.C.	4 000	439	December	U/G	Zinc, copper, gold	Boliden Limited
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Remarks: Production was suspended in early December 2001 due to weak metal prices. After an agreement had been reached with employees, unions, suppliers and customers regarding an extensive action plan to improve operating efficiency, a decision was made to re-open the mine in March 2002. Under the plan, the work force will be reduced by approximately 17% and wages, salaries and contracts with suppliers and contractors will be adjusted. The Myra Falls mine has been in production for 36 years and has been owned and operated by Boliden since 1998.

Other Minerals

Rabbit Lake (2)	Rabbit Lake	Sask.	1 000	100	June	Surface stockpile	Uranium	Cameco Corporation
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Remarks: Mining was suspended in 1999 and 2000 and the shut-down was extended to 2001 in the wake of continued weak world uranium prices. However, milling continued to process stockpiled ore until June 2001. About 50 of the 150 employees were kept on site. Plans were to re-open the Eagle Point mine for production in 2002.

Closures

Precious Metals

Nugget Pond	Baie Verte	Nfld.	350	61	December	U/G	Gold	Richmont Mines Inc.
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Remarks: Mine closed in December 2001 due to ore exhaustion. The mine began production in April 1997.

Francoeur	Rouyn-Noranda	Que.	1 225	62	November 30	U/G	Gold	Richmont Mines Inc.
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Remarks: Mine closed on November 30, 2001, due to ore exhaustion. The mine began production in October 1991.

Golden Bear	Dease Lake	B.C.	360	70	December	O/P, U/G, HL	Gold	Wheaton River Minerals Ltd.
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Remarks: The Golden Bear gold mine, located some 150 km west of Dease Lake in northern B.C., closed in late 2001 due to ore depletion. The mine first began production in November 1989 and was a conventional open-pit and underground mine until 1997 when it became the first heap leach mining operation in B.C.

Base Metals

Sullivan	Kimberley	B.C.	9 000	444	December 21	U/G	Zinc, lead, silver	Teck Cominco Limited
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Remarks: After 92 years of active production, the world-class Sullivan mine closed on December 21, 2001. The deposit was discovered in 1892 and was acquired and developed for production in 1909 by Cominco Ltd. (formerly the Consolidated Mining and Smelting Company of Canada). About 31 workers were kept on site for maintenance and environmental work.

TABLE 2 (cont'd)

Mining Project/Remarks	Location	Province/ Territory	Capacity (tonnes/day)	Employment During Mine Life	Date of Opening, Re-Opening, Expansion, Extension, Suspension or Closure	Mine or Plant Type	Main Commodities	Company
Other Minerals								
Prince	Sydney	N.S.	3 850	440	November 16	U/G	Coal	Cape Breton Development Corporation
Remarks: The Prince coal mine near Sydney, Nova Scotia, closed in November 2001 as the company failed to secure a buyer for this high-cost mine. The mine, together with the Phalen mine nearby which was closed in December 1999, is part of a federal corporation established in the late 1960s to wean Cape Breton away from coal mining. That goal changed with the energy crisis of the early 1970s and coal was given a reprieve. But the operations had been plagued by problems ever since, losing an estimated \$1.8 billion over the past 30 years. The Prince mine began production in August 1975.								
Coal Creek	Minto	N.B.	(e) 470	20	August	O/P	Coal	N.B. Coal Limited
Remarks: The Coal Creek coal mine closed in August 2001 due to pit ore depletion. It was one of N.B. Coal Limited's two last producing coal mines near Minto, New Brunswick. The Salmon Harbour open-pit mine is the company's remaining coal mine; it supplies thermal coal to a nearby NB Power plant.								
Luzenac	Saint-Pierre-de-Broughton	Que.	(e) 165	(e) 25	April 24	O/P	Talc, soapstone	Luzenac Inc.
Remarks: Mine closed on April 24, 2001, due to the discovery of asbestos fibre in talc concentrates. The number of workers at the talc and soapstone operations in 2000 was estimated at 14 and 13, respectively.								

Source: Natural Resources Canada, based on company reports and communications with companies (information current as of March 31, 2002).

(e) Estimate; HL Heap Leach; n.a. Not available; O/P Open pit; U/G Underground.

(1) In most cases of mine closings, employment represents the number of employees at the time of closing of the mine and the mill. (2) Due to weak uranium prices, mining at the Eagle Point uranium mine at Rabbit Lake was suspended in 1999 and 2000 and the shut-down was later extended to cover 2001 to synchronize with the shut-down of the Rabbit Lake mill in June 2001.

TABLE 3. NEW PRODUCTION FROM MINE OPENINGS IN CANADA IN 2001

Mining Project	Main Commodities	Estimated Annual Production			
		Gold (oz)	Gold (g)	Zinc (t)	Basalt Roofing Granules (t)
NEW OPERATIONS					
Precious Metals					
Hammerdown	Gold	50 000	1 555 000	–	–
Other Mineral Commodities					
Ashcroft	Basalt roofing granules	–	–	–	250 000

Source: Natural Resources Canada, based on company reports and communications with provinces.
– Nil.

TABLE 4. NEW MINERAL RESERVES FROM MINE OPENINGS IN CANADA IN 2001

Mining Project	Proven-Probable Mineral Reserves			In-Situ Metal Reserves			
	Main Commodities	Tonnage (tonnes)	Grade	Gold (oz)	Gold (g)	Zinc (t)	Basalt Roofing Granules (t)
NEW OPERATIONS							
Precious Metals							
Hammerdown	Gold	(e) 388 700	16.11 g/t gold	201 300	6 261 900	–	–
Other Mineral Commodities							
Ashcroft	Basalt roofing granules						18 000 000

Source: Natural Resources Canada, based on company reports and communications with provinces.
– Nil; (e) Estimated.