

2010 Minerals Yearbook

CANADA

THE MINERAL INDUSTRY OF CANADA

By Philip M. Mobbs

Canada is a nation rich in mineral resources. In 2010, Canada's mineral industry continued its recovery from the global financial crisis of 2008–9. As one of the major mining countries in the world, Canada leads the world in the production of potash (by volume). The country was estimated to rank second in the production of uranium and was among the top five countries in the production of aluminum, cobalt ore, gem-quality diamond, refined indium, nickel ore, platinum-group metals (PGM) ore, and sulfur (Apodaca, 2011; Bray, 2011; Jasinski, 2011; Kuck, 2011; Loferski, 2011; Olson, 2011; Tolcin, 2011; World Nuclear Association, 2011).

Minerals in the National Economy

Minerals were produced in all 10 Provinces and 3 Territories of Canada. Natural gas and oil production and coal and refined petroleum products were valued at about \$41.5 billion in 2010. The value of production from mining, primary metal manufacturing, and nonmetal manufacturing increased by 21% to \$36 billion¹ (Statistics Canada, 2011b, c).

In 2010, the construction industry accounted for 6.1% of Canada's real gross domestic product (GDP); the extraction of natural gas and petroleum, 3.2%; and mining and quarrying, about 0.6%. Within the mining industry, the extraction of nonmetallic minerals accounted for 0.34% of real GDP in 2010; metallic minerals, 0.26%, and coal, 0.07%. Other mineral-related sectors that contributed to real GDP included primary metal manufacturing, 1.8%, and petroleum and coal products manufacturing, 0.26% (Statistics Canada, 2011b, c).

Government Policies and Programs

In general, Provincial governments are responsible for mining activity within their respective Province. Provincial legislatures make laws concerning matters for which they have jurisdiction, which include exploration, development, production, and conservation and management of most nonrenewable natural resources. Parliament makes laws for the entire country with respect to matters assigned to it by the Canadian Constitution, and it has responsibility for the Territories. The Federal Government is responsible for the mineral activities of Federal Crown corporations; mineral activities on Federal lands and offshore; and, through the Canadian Nuclear Safety Commission, for uranium exploration, production, and waste disposal. Local or municipal governments promulgate laws on local matters, such as zoning regulations and the issuance of construction permits.

The Canadian Securities Administrators' National Instrument 43–101 sets the standards for all technical public

¹Where necessary, values have been converted from Canadian dollars (CAN\$) to U.S. dollars (US\$) at an average rate of CAN\$1.03=US\$1.00 for 2010 and CAN\$1.14=US\$1.00 for 2009.

disclosure for mineral projects. National Instrument 51–101 sets the standards for disclosure for oil and gas activities.

Saskatchewan enacted a diamond royalty system in 2010. The scheme includes a 1% royalty on the value of mine production, which begins 5 years after initial production; a stepped royalty rate (up to 10%) on profits after capital investment is fully recovered; a 100% depreciation rate of capital costs; and a processing allowance (Government of Saskatchewan, 2010).

A significant number of international mineral exploration companies were based in Canada. Canadian companies owned mining assets that were valued at about \$106 billion in 123 countries. In 2010, the proposed Corporate Accountability of Mining, Oil and Gas Corporations in Developing Countries Act (Bill C-300) was defeated in the House of Commons. Bill C-300, which would have required the Minister of Foreign Affairs and the Minister of International Trade to issue corporate accountability guidelines in the areas of environmental best practices and international human rights, had been debated since 2009 (Natural Resources Canada, 2011a).

Production

Although the volume of production increased notably for a number of mineral commodities in 2010, the volume surpassed the high levels of production in 2008 for only a few of those commodities. Output of potash increased by almost 127% in 2010 compared with that of 2009; talc, by 118%; refined petrochemical feedstock, by 70%; crude steel, by about 41%; refined silver, by 27%; lime, by 19%; nickel ore, by 17%; cobalt ore and iron ore, by almost 17%; alumina, by almost 16%; cement and nepheline syenite, by 13%; and peat, by about 12%. Production of antimony, barite, direct-reduced iron, indium, pig iron, and titanium was estimated to have increased significantly also (table 1).

Despite the mineral industry's ongoing recovery from the global financial crisis, a significant decrease in the mineral production volume in 2010 compared with that of 2009 was noted for tungsten, which decreased by about 79%; gemstones, 55%; selenium, 54%; kerosene and tellurium, about 50%; salt, 28%; gypsum, 23%; cadmium and cobalt metal, 13% each; and PGM, about 10%. Asbestos production also was estimated to have decreased (table 1).

Structure of the Mineral Industry

Canada was one of the world's most active mining countries and it had numerous mineral exploration, mine development, and mining projects underway. Canadian companies that explored in other countries accounted for a significant percentage of the world's solid mineral exploration budgets. In addition, the Metals Economics Group estimated that exploration for solid minerals in Canada accounted for about

19% of the nonhydrocarbon exploration budget of the world's mining companies. Table 2 lists the structure of the Canadian mineral industry by principal mineral commodities and major operating companies (Metals Economics Group, 2011, p. 5).

A number of new mines were opened in 2010. Ursa Major Minerals Inc. began operations at the Shakespeare nickel mine. In April, Xstrata Nickel, which was a division of Xstrata plc of Switzerland, commissioned the Nickel Rim South Mine, which is located in the Sudbury area, and ramped up production to the mine's full nameplate capacity of 1.25 million metric tons per year (Mt/yr) by October. Xstrata Nickel also restarted production from the Fraser Morgan Mine complex at Sudbury; the mine had been placed on care-and-maintenance status in 2009 owing to the significant decrease in world nickel prices (Xstrata plc, 2011, p. 1, 7).

In February, Barkerville Gold Mines Ltd. (formerly known as International Wayside Gold Mines Ltd.) acquired the QR gold mine and mill from 0373849 B.C. Ltd. (formerly Cross Lake Minerals Ltd.), which had suspended mining at QR in early 2009 during the company's reorganization. By September, Barkerville had restarted production from a newly developed area of the property (International Wayside Gold Mines Ltd., 2009; Barkerville Gold Mines Ltd., 2010).

Century Mining Corp. resumed mining and milling operations at the Lamaque gold mine. HudBay Minerals Inc. restarted operations at the Chisel North zinc mine and the Snow Lake concentrator, which had been suspended in January 2009 owing to low metal prices. North American Palladium resumed underground mining of the Roby Zone at the Lac des Iles palladium mine, which had been placed on care-and-maintenance status in 2008. North American Tungsten Corporation Ltd. reopened the CanTung Mine, which had been placed on care-and-maintenance status in October 2009 owing in part to a decrease in international tungsten prices. Western Coal Corp. restarted mining at the Willow Creek coal mine, where operations had temporarily been suspended in 2008 owing to the global economic crisis (HudBay Minerals Inc., 2009; North American Tungsten Corporation Ltd., 2009a).

In October 2010, Crowflight Minerals Inc. temporarily suspended operations at the Bucko Lake nickel mine (at which commercial ore production began in 2009) in order to replace the underground mining contractor, Dumas Contracting Ltd. Operations at the mine, which is located near Wabowden, Manitoba, remained suspended at yearend. In 2009, Goldcorp Inc. ceased mining operations at the Pamour open pit, which was part of the Porcupine Mine. In 2010, parts of the pit ramps were mined, and previously stockpiled ore was hauled to the Dome mill. The Pamour stockpile was expected to be depleted in 2011 (Crowflight Minerals Inc., 2010; First Metals Inc., undated).

At Sudbury, Ontario, Vale Canada Ltd., which was a subsidiary of Vale S.A. of Brazil, continued with the development of the Totten nickel mine and the redevelopment of the Ellen nickel mine. As part of the restructuring of Xstrata Copper Canada, which was a subsidiary of Xstrata plc, the copper and zinc metallurgical plants at the Kidd Creek facility in Timmins, Ontario, were closed in May (Xstrata plc, 2010, p. 5, 7).

Several companies changed their names during the year. BHP Billiton Diamonds Inc., which was a subsidiary of BHP Billiton Ltd. of Australia, changed its name to BHP Billiton Canada Inc. Merit Mining Corp. became Huakan International Mining Inc., and Vale Inco Ltd. changed its name to Vale Canada Ltd.

In 2010, as the global economic crisis waned and the price of minerals increased, merger and acquisition activity in the Canadian minerals industry increased. Apollo Gold Corp. and Linear Gold Corp. merged in June to form Brigus Gold Corp. Axens S.A. of France, which was a subsidiary of IFP Energies Nouvelles of France, acquired the Brockville activated alumina refinery from Rio Tinto Alcan and established Axens Canada Specialty Aluminas Inc. to operate the plant. In March, BHP Billiton Canada acquired Athabasca Potash Inc. and its Burr potash project.

Cliffs Natural Resources Inc. secured 100% interest in the Wabash Mines iron ore operation after it acquired a 44.6% interest from its former joint-venture partner ArcelorMittal Dofasco Inc. and a 28.6% interest from former partner U.S. Steel Canada. Cliffs also acquired Freewest Resources Canada Inc. Freewest had been developing the chromite resources of the McFaulds property.

FNX Mining Corp. merged with Quadra Mining Ltd. to form Quadra FNX Mining Ltd. Gerdau Steel North America Inc. acquired 100% of the shares of Gerdau Ameristeel. Jien Canada Mining Ltd., which was a partnership of Jilin Jien Nickel Industry Company, Ltd. of China (75% equity interest) and Goldbrook Ventures Inc. of Canada (25%), acquired Canadian Royalties Inc.

Kodiak Exploration Ltd. acquired Golden Goose Resources Inc., and the combined organization subsequently was renamed Prodigy Gold Inc. KNOC Canada Ltd., which was a subsidiary of Korea National Oil Corp., acquired Harvest Energy Trust, which produced hydrocarbons and operated a petroleum refinery. Harvest Energy and KNOC Canada subsequently were combined to form Harvest Operations Corp.

OneSteel Ltd. of Australia acquired AltaSteel Ltd. from Anglo American plc. Anglo's Skaw Metals Group previously had managed AltaSteel. Prophecy Resource Corp. acquired Northern Platinum Ltd. Stillwater Mining Co. of the United States acquired Marathon PGM Corp. and Thompson Creek Metals Company Inc. acquired Terrane Metals Corp., which was developing the Mt. Milligan copper-gold project.

In the oil sands sector, Athabasca Oil Sands Corp. acquired Excelsior Energy Ltd. and Excelsior's interest in the Hangingstone oil sands property. In addition, Sinopec International Petroleum Exploration and Production Co. of China acquired ConocoPhillips Co. of the United States' 9.03% interest in Syncrude Canada Ltd., which produced crude oil from oil sands, and Total S.A. of France acquired UTS Energy Corp. and UTS' interests in oil sands projects.

Apache Canada Ltd. acquired most of BP p.l.c. of the United Kingdom's natural gas exploration and production operations in western Alberta and British Columbia. Purchased assets included the Chinchaga, the Edson, the Fox Creek, the Noel, and the St. Lina natural gas operations, the Cadomin and the Doig prospects, and the Mist Mountain coalbed methane project.

Mineral Trade

In 2010, Canada's total domestic exports amounted to about \$393 billion compared with \$324 billion in 2009. Exports of crude petroleum were valued at about \$49 billion compared with \$37 billion in 2009, and exports of natural gas were valued at \$15 billion compared with about \$14 billion in 2009. Exports of metals and metal ores were valued at about \$13 billion in 2010 compared with \$9 billion in 2009, and those of metals and alloys were valued at \$35 billion compared with about \$25 billion in 2009 (Statistics Canada, 2011a).

Canada's total domestic imports amounted to about \$402 billion in 2010 compared with \$328 billion in 2009. Imports of metals and metal ores were valued at \$32 billion in 2010 compared with about \$22 billion in 2009, and imports of crude petroleum were valued at \$23 billion in 2010 compared with \$18 billion in 2009 (Statistics Canada, 2011d).

Commodity Review

Mineral exploration activity increased in 2010 compared with that of 2009, as did the rate of mineral prospect development and mining activity. For many projects, however, only the minimal exploration activity necessary for claim maintenance was conducted. Coverage of other Canadian mineral commodities is available on the Web site for Natural Resources Canada's Canadian Minerals Yearbook at http://www.nrcan.gc.ca/minerals-metals/business-market/canadian-minerals-yearbook/4070.

Metals

Aluminum.—Production of primary aluminum slightly decreased again in 2010 to 2.96 million metric tons (Mt) compared with 3.03 Mt in 2009 and 3.12 Mt in 2008 (Paquette, 2010, 2011).

Rio Tinto plc (2011, p. 43) reported record output in 2010 at the Arvida smelter (a 1.8% increase compared with that of 2009) and the Grand-Baie smelter (a 1.4% increase). Overall, the company posted a 3% decrease in aluminum production in 2010 (to 2.3 Mt, which was about 78% of Canada's aluminum production) compared with that of 2009. Production from the Kitimat smelter in British Columbia decreased by about 40,000 metric tons (t) in 2010 compared with that of 2009. The almost 18% decrease was attributed in part to the closure of potlines 7 and 8, which used Soderberg technology, as part of the ongoing Kitimat modernization project. Production from the Laterriere smelter in Quebec decreased by about 23,000 t compared with 2009 output. The almost 10% decrease was the result of a July power outage, which caused the temporary suspension of one-half of the plant's production capacity until a potline restart procedure was completed in September (Rio Tinto Alcan Inc., 2010a; Rio Tinto plc, 2011, p. 43, 80).

Rio Tinto Alcan also upgraded the pilot plant project at Saguenay, Quebec, to AP60 technology from the originally proposed AP50 configuration. The 38-pot pilot plant, which was designed with a production capacity of 60,000 metric tons per year (t/yr) of aluminum, was expected to be operational in 2013 (Rio Tinto Alcan Inc., 2010b, 2011).

Antimony.—In Canada, antimony was produced at the Beaver Brook Mine, which is located in Newfoundland and Labrador. Antimony was also recovered as a coproduct from the output of several base-metal mines in Canada and as an antimony-lead alloy that was produced from recycled lead-acid batteries.

The Beaver Brook underground antimony mine had been developed by Roycefield Resources Ltd. in mid-1997 but was placed on care-and-maintenance status in 1998 because of low international antimony prices. Beaver Brook Antimony Mine Inc. (BBAMI) subsequently acquired the facility and, in 2008, reopened the mine, which produced about 550 metric tons per day (t/d) of ore. The mill operated four days per week. In October 2009, Hunan Nonferrous Metals Corp. of China acquired BBAMI and proposed to increase the mine and mill's output. Exploration for additional resources near the mine was ongoing (McCutcheon, 2002; Stadnyk, 2009; Connelly, 2010).

In fiscal year 2009–10, the lease for the Lake George antimony mine, which is located in New Brunswick, was not renewed. Apocan Inc. had operated the mine from 1972 until 1989, when low antimony prices resulted in the suspension of operations. Apocan reopened the mine in late 1996, but mechanical problems and low international antimony prices again resulted in the suspension of operations. The mine subsequently flooded. In 2010, Apocan and the New Brunswick Department of Natural Resources continued discussions on the covering and reclamation of the tailings pile (McCutcheon, 1996, 2002; Department of Natural Resources, 2010, p. 52–53).

Other exploration activity for antimony included that of Mountain Lake Resources Inc., which completed a 10-hole 600-meter (m) drill program on the Little River antimony-gold prospect in Newfoundland (Mountain Lake Resources Inc., 2010), and the work on the Bald Hill antimony-gold property in New Brunswick where Rockport Mining Corp. completed a resource estimate in 2010 based on a 2008 drilling program. Portage Mineral Inc. acquired the property in 2010 when its subsidiary company 7600062 Canada Ltd. merged with Rockport.

Indium and Tin.—In the past few years, Teck Resources Ltd. had restored the indium metal production capacity at the Trail smelter and refinery complex in British Columbia to about 70 t/yr. Most of the ore treated at the Trail complex was imported from overseas mines of Teck Resources and others. In May, Xstrata plc permanently closed the Kidd Creek metallurgical complex in Ontario, which in the past few years had produced between 8 and 11.5 t/yr of indium metal. In Quebec, General Smelting Company of Canada (which was a division of Xstrata Zinc) produced tin alloys at its plant near Montreal (Allfantazi and Moskalyk, 2003, p. 689; Xstrata Copper Canada, 2009, p. 16; 2010, p. 15; Xstrata plc, 2011, p. 5).

A number of exploration projects for indium and tin were underway. In 2010, Adex Mining Inc. completed a 26-hole 3,734-m diamond drill program on the North Zone of the Mount Pleasant Mine property. The company evaluated the options for the production of a tin concentrate and an indium-zinc concentrate, versus the production of indium sponge metal, tin concentrate, and zinc metal from North Zone ore (Adex Mining Inc., 2010a, b; 2011a, b).

Avalon Rare Metals Inc. suspended a preliminary economic analysis (also called a scoping study) of the East Kemptville tin-indium project in order to complete an NI 43–101-compliant sampling and drill program to evaluate the tin resources of the prospect, which is located in Nova Scotia. On the Ikes Ridge property, which is located adjacent to the East Kempville Special License, Avalon completed a soil sampling program, a surface geophysics program, and a 12-hole 2,219-m drill program in 2010 (Avalon Rare Metals Inc., 2010a).

Molybdenum.—The joint venture of Thompson Creek Metals Company Inc. and Sojitz Moly Resources, Inc. operated the Endako Mine, which is located in British Columbia. Ore was mined from the Denak East, the Denak West, and the Endako pits and milled to recover a molybdenum disulfide concentrate, which was then roasted and converted to molybdenum trioxide. In 2010, drill programs included an exploration program northwest of the Denak West pit and reserve-definition infill drilling. Also in 2010, Sojitz approved the restarted Endako mill expansion program, which included the construction of a 55,000-t/d-capacity mill to replace the existing 31,000-t/dcapacity mill. The mill expansion had begun in 2008 but was suspended in December 2008 owing to the global economic crisis. Annual molybdenum production capacity was expected to be increased to about 7,200 t/yr by 2012 (Thompson Creek Metals Company Ltd., 2011, p. 34–35; undated).

Highland Valley Copper Mine, which is located in British Columbia, was operated by Teck Resources Ltd. In 2010, Highland Valley Copper's molybdenum production was about 3,100 t, which was about a 5% increase compared with that of 2009. The increase was attributed to higher molybdenum content of the ore, which was mined from the Highmont, the Lornex, and the Valley pits. A mine expansion project, which included the extension of the Highmont and the Lornex pits and the push back and stabilization of the east and west walls of the Valley pit, continued in 2010. The Valley pit's east wall stabilization project was scheduled to be completed in 2011. Teck expected that, following the completion of the expansion project, the mine life would be extended to 2025 at planned extraction rates (Teck Resources Ltd., 2010, p. 11–12; 2011, p. 11–12).

In 2010, the Gibraltar copper-molybdenum mine, which was operated by Gibraltar Mines Ltd., produced about 427 t of molybdenum, which was an almost 50% increase in molybdenum output compared with that of 2009 (Taseko Mines Ltd., 2011b). The mine, which is located in British Columbia, had been closed by the previous owner in 1998 owing to low metal prices. Gibraltar Mines, which was a subsidiary of Taseko Mines Ltd., acquired the operation in 1999 and resumed production in 2005. An initial expansion of the Gibraltar mill to 46,000-t/d capacity was completed in February 2008. Work on the planned phase 2 expansion of the mill to 55,000 t/d, which was delayed in 2008 owing to the global economic crisis, resumed in 2009 and was expected to be completed in 2011. In March, a consortium of Japanese companies, which included Sojitz Corp. (50% interest in the consortium) and Dowa Metals & Mining Company, Ltd. and Furukawa Company, Ltd. (25% each), acquired 25% equity interest in the Gibraltar copper mine for approximately \$182 million (Taseko Mines Ltd., 2010a, p. 17-19; 2010b).

In 2010, FortyTwo Metals Inc., which was a subsidiary of Roca Mines Inc., was authorized to increase production at the underground Max molybdenum mine to 1,000 t/d, which would double the average daily output achieved during the period January through July 2010. Operations at the mine and mill, which were located in British Columbia, had reached commercial production levels in April 2008. In September, however, FortyTwo Metals temporarily suspended operations at the Max Mine after the collapse of a sill pillar. Rehabilitation work was begun, redevelopment plans were discussed with Provincial authorities, and, by yearend, the mine's ventilation system had been restored (Roca Mines Inc., 2010a, p. 5–6; 2010b; 2011).

Huckleberry Mines Ltd., which was a subsidiary of Imperial Metals Corp., completed an exploration drilling program of the resources around and below the Main Zone of the Huckleberry Mine. The company started a feasibility study of mining the resource below the Main Zone. Imperial Metals completed a 13-hole 3,548-m drill program on the Catface copper-molybdenum property (Imperial Metals Corp., 2010a, p. 5; 2010b, p. 3–4).

The Province of British Columbia hosted most of Canada's molybdenum exploration activity. In 2010, exploration of the High Gold copper-molybdenum property by Argonaut Exploration Inc. included a 9-hole 2,542-m drill program. Avanti Mining Inc. completed a feasibility study of the reopening of the Kitsault Mine. The Kitsault Mine had operated from 1968 to 1972 and from 1981 until 1982; low molybdenum prices had resulted in the mine closures. New production was expected to begin about 2 years after reconstruction commences. Avanti also entered into an agreement under which Molibdenos y Metales S.A. of Chile would toll refine molybdenum concentrate produced at Kitsault. In December, Avanti announced that it planned to form a strategic alliance with SeAH Holdings Corp. of the Republic of Korea, which was to acquire about 11% of Avanti's shares and up to 30% interest in the Kitsault project (Argonaut Exploration Inc., 2011, p. 5–6; Avanti Mining Inc., 2010a-c).

Bard Ventures Ltd. drilled and began a preliminary economic assessment of the Alaskite zone of the Lone Pine molybdenum prospect. Callinan Mines Ltd. reported some molybdenum mineralization from drill core samples on the Coles Creek property and surface samples from the Troitsa property. Columbia Yukon Explorations Inc. drilled the Storie molybdenum prospect, and Copper Fox Metals Inc. began a feasibility study of a proposed 120,000-t/d-capacity mine at the Schaft Creek copper-molybdenum prospect. Copper Fox expected to complete an environmental assessment, the feasibility study, and a resource estimate of the project in 2011 (Callinan Mines Ltd., 2010; Copper Fox Metals Inc., 2011).

Finlay Minerals Ltd. completed a 6-hole 2,036-m diamond drill program on the Silver Hope copper-molybdenum-silver prospect, and Getty Copper Inc. amended a prefeasibility study of the Getty copper-molybdenum property. Happy Creek Mineral Ltd. explored the Fox tungsten-molybdenum property in British Columbia. Hi Ho Silver Resources Inc. sampled soil on the Carmi property and withdrew from an option to acquire 51% of the South Rim property from St. Elias Mines Ltd., but

Inform Resources Corp. (formerly Downtown Industries Ltd.) subsequently entered an option to acquire 75% of the South Rim property. Hi Ho Silver also abandoned its option to acquire the Silver Tip property (Finlay Minerals Ltd., 2010; Hi Ho Silver Resources Inc., 2010a; 2010b, p. 2–3; St. Elias Mines Ltd., 2010, p. 9; 2011, p. 3).

Kiska Metals Corp. explored the Falcon prospect on the Redton project and Kingsman Resources Inc. completed a 7-hole 1,066-m diamond drill program at the Luxor molybdenum prospect. Kobex Minerals Inc. withdrew from the Island Copper project (on which the Hushamu deposit was drilled in 2009 by IMA Exploration Inc., prior to that company's merger with International Barytex Resources Ltd. and Kobex Resources Ltd. to form Kobex Minerals) (Kingsman Resources Inc., 2010; Kobex Minerals Inc., 2010).

Lions Gate Metals Inc. explored the Poplar prospect. In 2011, Lions Gate proposed to drill the Popular and the Hudson Bay Mountain molybdenum prospects in British Columbia. Adjacent to the Highland Valley copper mine, Logan Copper Inc. (formerly known as SNL Enterprises Ltd.) completed a 5-hole 1,230-m diamond drill program on the Dansey and Midway sectors of the Logan Copper property (Logan Copper Inc., 2010).

Also in British Columbia, Pretium Resources Inc. completed a 17,976-m diamond drilling program and a preliminary assessment on the Snowfield property. The assessment estimated that an average of about 1,700 t/yr of molybdenum and 9 t/yr of rhenium in concentrate could be recovered as byproducts from the projected Snowfield copper-gold operation if a proposed 120,000-t/d-capacity mill was used to process ore from the Brucejack gold and Snowfield polymetallic properties. On the Kerr-Sulphurets-Mitchell (KSM) copper-gold-molybdenumsilver project, which was adjacent to the Snowfield property, Seabridge Gold Inc. completed a 30,000-m drill program and a prefeasiblity study. The study estimated that an average of about 950 t/yr of molybdenum in concentrate could be recovered from the operation if a proposed 120,000-t/d-capacity milling operation was used. At yearend, an updated prefeasibility study that incorporated the new drilling data was underway (Seabridge Gold Inc., 2010a, p. 1; 2010b, p. 1–21; Wardrop Engineering Inc., 2010, p. 1-8, 1-16).

St. Elias Mines explored the South Rim project. Serengeti Resources Inc. reported some molybdenum mineralization in samples from a 28-hole 7,600-m drill program on the Kwanika property. Touchdown Resources Inc. (formerly Touchdown Capital Inc.) reported the results from a 2-hole 617-m diamond drill program on the Sphinx molybdenum project. As part of a prefeasibility study, TTM Resources Inc. released a resource estimate on the Chu property. TTM also explored the Deeker Creek prospect (Serengeti Resources Inc., 2010; Touchdown Capital Inc., 2010).

Velocity Minerals Ltd. completed a 3-hole 1,398-m drill program on the Cassiar Moly property in British Columbia and reported the results of sampling a 4-hole 783-m drill program, which was completed in 2009, on the Mt. Haskin property. In 2010, Western Copper Corp. completed a 46-hole 12,046-m delineation and infill drill program and continued work on updating a prefeasibility study (that originally was completed in 2008) on the Casino copper-gold-molybdenum property in

British Columbia (Giroux and Casselman, 2010, p. 37; Velocity Minerals Ltd., 2010a, b).

Molybdenum exploration activity also took place in Ontario. It included that of Golden Phoenix Minerals Inc., which began exploration of the Northern Champion property; Inspiration Mining Corp., which explored the Desrosiers property; MPH Ventures Corp., which was updating the resource estimate for the Pidgeon molybdenum deposit; and Shoreham Resources Ltd., which explored the Bearhead Trend, Setting Net Lake, and Twinpeaka properties.

Activity in other Provinces included that of Adex Mining, which in 2010 evaluated its options to produce ammonium molybdate from molybdenum-tungsten ore from the Fire Tower zone of the Mount Pleasant Mine property in New Brunswick. Western Troy Capital Resources Inc. authorized the resumption of work on a feasibility study of the MacLeod Lake copper-molybdenum prospect in Quebec. Western Troy had suspended work on the study in 2009 because of the effects that it anticipated that low metal prices and uncertain energy costs would have on the study's projections. Agnico-Eagle Mines Ltd. completed a 27-hole 18,723-m diamond drill program on the Jennings Project in Yukon Territory (Western Troy Capital Resources Inc., 2009; Yukon Geological Survey, 2011, p. 56).

Nickel.—Production and maintenance employees at Sudbury, Ontario, and Port Colborne, Ontario, ratified a new union contact in July, which ended their strike that began in July 2009. The strike of unionized workers at the Ovoid Mine at Voisey's Bay, Newfoundland and Labrador, which began in August 2009, was resolved on January 31, 2011. The return of production workers at Sudbury at mid-year (and the use of contractors and nonunion workers during the strikes) allowed Vale Canada (formerly Vale Inco) to increase the company's Canadian nickel output by about 2% in 2010 compared with that of 2009. At Sudbury, Vale reopened the Ellen Mine and continued the development of the Totten Mine, which is expected to reach commercial production level in 2011. Vale Inco had suspended operations at the Ellen Mine in 2008 owing to low nickel prices. Inco Ltd. had started work on the Totten Mine in 1966 but, because of low nickel prices, had suspended development of the mine in 1972 (Tollinsky, 2009; French, 2010; Rocha, 2010; Vale S.A., 2011, p. 16, 35–38).

In November, Vale announced that it planned to close the Thompson nickel smelter and refinery by 2015. The Thompson plant processed nickel concentrates from the Manitoba division (reportedly about 55% of plant input) and from Voisey's Bay (about 45% of plant input). Owing to the planned 2013 startup of the Long Harbour processing plant on the island of Newfoundland, which would process Voisey's Bay concentrates, and the scheduled implementation of new Federal sulfur dioxide emission standards in 2015, Vale proposed to mine and mill ore only in Manitoba (Vale Canada Ltd., 2010).

The Nickel Rim South Mine was commissioned in April and reached full production capacity of 1.25 Mt/yr of ore (about 18,000 t/yr of nickel) in October. Mining operations at the Frasier Mine, which was placed on care-and-maintenance status in 2009, were resumed in 2010. Xstrata plc reported that ore production from the Sudbury division increased by 69% (Xstrata plc, 2011, p. 1, 7).

Operations at Crowflight Minerals' Bucko Lake nickel mine were suspended in October 2010 and remained suspended at yearend. Ursa Major Minerals started production from the Shakespeare Mine in the Sudbury area; output was processed at Xstrata plc's Strathcona mill.

Niobium and Tantalum.—In 2010, the niobium content of ferroniobium production from the Niobec facility in Quebec increased to 4,419 t compared with 4,169 t in 2009. IAMGOLD Corp. attributed the increase to the expansion of the facility's concentrator's ore-processing capacity to 2.2 Mt/yr. IAMGOLD also reported that the Niobec Mine's niobium reserves were increased to about 244,000 t of $\mathrm{Nb_2O_5}$ contained in ore. At the Niobec facility, IAMGOLD converted the mine's pyrochlore concentrate (58% $\mathrm{Nb_2O_5}$) to ferroniobium. In 2010, no Canadian tantalum production was reported. Tantalum Mining Corp. of Canada Ltd. (Tanco) suspended tantalum mining at the Bernic Lake Mine in 2009 owing to the lack of demand for the commodity that was associated with the global economic crisis (Cabot Corp., 2010, p. 6; Natural Resources Canada, 2010; 2011c; IAMGOLD Corp., 2011, p. 5, 13; undated).

Exploration for niobium and tantalum included that of Commerce Resources Corp., which completed a 54-hole 12,949-m diamond drill program on the Upper Fir deposit. A preliminary economic assessment of the Upper Fir, which was part of the Blue River niobium-tantalum project that was located in British Columbia, was underway (Commerce Resources Corp., 2011, p. 2–4).

In January, MDN Inc. reported that a positive scoping study on the Anita niobium and tantalum property, which also was known as the Crevier property, was completed for Les Minéraux Crevier Inc. (MCI), which was a joint venture of MDN and IAMGOLD. The property is located in Quebec. MCI subsequently completed an 8-hole 1,063-m drill program as part of a feasibility study of the Anita prospect (MDN Inc., 2010, 2011).

In 2010, Taseko Mines Ltd. completed a 23-hole 4,460-m diamond drill program on the Aley niobium project. Taseko Mines acquired the property in 2006, but in 2008 and 2009 had postponed planned exploration owing to the global financial crisis (Taseko Mines Ltd., 2011a).

In 2010, much of the early-stage niobium and tantalum exploration activity was associated with exploration for rare-earth elements. In British Columbia, American Manganese Inc. (formerly Rocher Deboule Minerals Corp.) reported niobium mineralization in rock and soil samples acquired from the Lonnie and Virgil carbonatites (also known as the Brent property). Rara Terra Capital Corp. subsequently secured an option to acquire 60% interest in the Lonnie property. The joint venture of Canadian International Minerals Inc. and Commerce Resources Corp. completed a 9-hole 1,939-m diamond drill program on the Carbo rare-earths project. Sample results also indicate niobium mineralization on the property. International Bethlehem Mining Corp. reported niobium and tantalum mineralization in addition to rare earths in a sample taken from the Myoff Creek property in British Columbia (American Manganese Inc., 2010; Canadian International Minerals Inc., 2010, undated; International Bethlehem Mining Corp., 2010).

Rare Earth Metals Inc. reported niobium mineralization in core recovered from an 18-hole 5,432-m drill program on the

Clay-Howells property, which is located in Ontario, and from core recovered from drill programs on the Red Wine property, which is located in Newfoundland and Labrador. Canadian Orebodies Inc. reported tantalum mineralization in samples taken from the Zigzag property, which was located in Ontario. In March, Canadian Orebodies agreed to earn 80% in the Zigzag lithium-tantalum property from Ultra Lithium Inc., which had acquired the property in August 2009. PhosCan Chemical Corp. continued to evaluate the potential to recover niobium from the phosphate plant tailings from the proposed Martison phosphate mining operation, which is also located in Ontario (Canadian Orebodies Inc., 2010a–c; PhosCan Chemical Corp., 2010; Rare Earth Metals Inc., 2010, p. 3–4).

In the Province of Quebec, Fieldex Exploration Inc. reported niobium mineralization in samples from the Delbreuil rare-earths-uranium property (which also was known as the Temiscamingue regional project). In 2010, a planned drilling was postponed, pending additional community outreach efforts concerning the uranium occurrence. Globex Mining Enterprises Inc. explored the Turner Falls rare-earths property. Niobium mineralization was reported in the surface samples gathered at Turner Falls, and Matamec Explorations Inc. reported the presence of niobium in samples taken from the Surprise showing on the Zeus rare-earths property. A preliminary economic assessment was completed for Quest Rare Minerals Ltd. (formerly Quest Uranium Corp.) on development of the B-zone of the Strange Lake rare-earths property. The assessment anticipated that the project would produce rare-earth oxide, niobium oxide, and zirconium oxide concentrates, and forecast that about 25% of the project's income during the life of the mine would come from the estimated value of the niobium in concentrate output (Fieldex Exploration Inc., 2010a; 2010b, p. 2; Matamec Explorations Inc., 2010; Quest Rare Minerals Ltd., 2010, p. 7; Globex Mining Enterprises Inc., 2011).

In the Northwest Territories, Avalon Rare Metals Inc. released a positive prefeasibility study of the Nechalacho rare-earth elements deposit at the Thor Lake rare-metals project. Recovery of four separate concentrates, including a rare-earth oxide, a niobium oxide, a tantalum oxide, and a zirconium oxide, was evaluated as part of the study. Avalon subsequently started work on a feasibility study. Avalon completed a 63-hole 16,188-m resource-definition drilling program in 2010, and in 2011, planned to drill an additional 29,000 m to collect 30 t of ore for additional metallurgical tests (Avalon Rare Metals Inc., 2010b, p. 4–7; 2011).

Under an option obtained from True North Gems Inc., Great Western Minerals Group Ltd. continued exploration of the True Blue property in Yukon Territory, on which True North reported niobium mineralization in samples from the property. In late 2010, Great Western decided to cease exploration activity on the property (True North Gems Inc., 2009; Great Western Minerals Group Ltd., 2011, p. 6).

Tungsten.—In October, North American Tungsten Corporation Ltd. reopened the CanTung Mine, which had been placed on care-and-maintenance status in October 2009. The company cited increased demand for tungsten and rising prices for tungsten as the impetus to resume operations. North American Tungsten also announced an increase in reserves to

1.69 Mt of ore at an average grade of 1.17% tungsten trioxide (WO₃) compared with estimated reserves of 1.02 Mt of ore at a grade of 1.08% WO₃ that was reported in 2009 (North American Tungsten Corporation Ltd., 2009b, 2010).

In British Columbia, Dentonia Resources Ltd. acquired surface samples and interpreted a magnetic survey that was flown across the Stafford tungsten project (formerly known as the Knight Inlet prospect). Freeport Resources Inc. completed an airborne geophysical survey of the Red Rose gold prospect, which included the former Red Rose tungsten mine that was closed in 1954 in response to decreased demand for tungsten. The Red Rose Mine also had produced copper, gold, and silver. In 2009, Sultan Minerals Inc. completed a 6-hole drill program and released an updated tungsten resource estimate for the Jersey-Emerald tungsten property. Sultan subsequently focused its attention on the adjacent HB lead-zinc property (which was acquired in 2010) on which the former Garnet and HB zinc mines are located. An 8-hole 545-m drill program to test for lead and zinc mineralization on the HB property was completed in 2010. Drill core samples also were tested for tungsten and other elements (Sultan Minerals Inc., 2009a, b; 2010, p. 2, 5; Freeport Resources Inc., 2010, p. 7).

In New Brunswick, a scoping study of the Mount Pleasant Mine property's Fire Tower zone, which was completed for Adex Mining in 2008, suggested that ammonium paratungstate could be produced from the molybdenum-tungsten ore. The former Mount Pleasant tungsten mine, which is located on the property and which produced tungsten concentrate, was closed in 1985 because of low tungsten prices. Cadillac Ventures Inc. mapped, sampled, and prospected on the Burnt Hill tungsten joint-venture prospect. Mineralization on the Burnt Hill joint venture with Noront Resources Inc. also included molybdenum and tin. Geodex Mineral Ltd. was exploring several tungsten prospects; many of the prospects also had indium, molybdenum, tin, and zinc mineralization. In 2010, Geodex reported the results of a 6-hole 610-m drill program on the Flume Ridge tungsten property and a 4-hole 450-m drill program on the Nashwaak tungsten property (Adex Mining Inc., 2010a; undated; Geodex Mineral Ltd., 2010c).

In December 2009, after more than 2 years of funding exploration on the Mount Pleasant West properties in New Brunswick, Teck Resources Ltd. withdrew from its option to acquire the properties. In 2010, Geodex reanalyzed selected core and surface samples from Mount Pleasant West, which resulted in the announcement of the presence of beryllium, gold, and rare-earth values in the samples. In 2010, Northcliff Resources Ltd., which was associated with Hunter Dickinson Inc., acquired 70% interest in the Sisson Brook (also known as the Sisson) tungsten project. By yearend, Northcliff started a 4,000-m drill program as part of a feasibility study that was expected to be completed by 2012. The property also contained molybdenum mineralization (Geodex Mineral Ltd., 2009; 2010a, b; 2011).

In 2008, Tyhee Development Corp. released a resource estimate of the Nicholas Lake Main zone of the Yellowknife gold project, which was located in the Northwest Territories, which indicated that the deposit also contained tungsten. In 2010, however, Tyhee released a prefeasibility study of the Yellowknife project that indicated that the company anticipated

no credit would be received from the gold refinery for the minor tungsten content of Yellowknife dore (Tyhee Development Corp., 2008; 2010, p. 151).

In Yukon Territory, Largo Resources Ltd. started a preliminary economic assessment of the Northern Dancer tungsten-molybdenum project (also known as the Logtung property) in 2010. Largo optioned the property in 2006 from Strategic Metals Ltd., which retained 30% interest in the property. Playfair Mining Ltd. continued exploration of the Clea, the Lened, and the Risby properties. In 2010, Prospector Consolidated Resources Inc. announced that it had terminated the option to acquire the Kalzas tungsten property from Copper Ridge Explorations Inc. owing to alleged discrepancies in Copper Ridge's rights to the property. Prospector had explored the property since 2007 (Prospector Consolidated Resources Inc., 2010).

Between 2006 and 2008, StrataGold Corp. drilled and sampled the Mar-Tungsten zone of the Dublin Gulch gold property in Yukon Territory. In 2009, Victoria Gold Corp. acquired StrataGold and subsequently focused on the development of the Eagle Gold heap-leach project on the Dublin Gulch property. The Mar-Tungsten zone was renamed the Wolf tungsten deposit.

In 2008, Yankee Hat expanded its exploration focus from the Fran gold mine to tungsten exploration in the Yukon Territory. It secured an option to acquire the WAU tungsten property from ATAC Resources Ltd. in April and an option to acquire the Boot, the Hidden, the Meloy, the Obvious, and the Track tungsten properties from Strategic Metals Ltd. in June; it acquired the Selwyn properties with joint-venture partner Japan Oil, Gas, and Metals National Corp. (JOGMEC) in July. In August 2008, Yankee Hat announced that it had entered into a joint exploration agreement to explore for tungsten in southeastern Yukon Territory and in the Northwest Territories with JOGMEC. Subsequently, Yankee Hat also entered into options to acquire the Achtung tungsten property, which is located in British Columbia, and the Birdtung tungsten-tin property (Yankee Hat Minerals Ltd., 2008, 2009b).

By October 2008, the Yankee Hat-JOGMEC joint venture had discovered and explored the Kidlark tungsten project, but, by late 2008, the global economic crisis had begun to affect the demand for (and the price of) tungsten, which in turn affected the availability of funding for mineral exploration and property acquisitions. In April 2009, to fulfill its commitment to tungsten project generation, Yankee Hat announced its intention to spin off its interest in its principal property (the Fran gold prospect) to Eagle Hill Exploration Corp. Eagle Hill subsequently withdrew from the negotiations for the Fran property. By midyear 2009, Yankee Hat decided not to complete the acquisition of the WAU property from ATAC. The acquisition of the Strategic Metals Ltd. tungsten properties was terminated and written off the books, and Yankee Hat also withdrew from the agreements to acquire the Achtung and the Birdtung properties (Eagle Hill Exploration Corp., 2009; Yankee Hat Minerals Ltd., 2009a, p. 10, 12; 2009b; Shedd, 2011).

In September 2010, Yankee Hat announced the renegotiation of its tungsten agreement with JOGMEC, which would allow Yankee Hat to focus on exploration of the Fran gold property.

The company's joint-venture agreement with JOGMEC subsequently was terminated and JOGMEC transferred its 75% interest in the Kidlark and the Selwyn properties to Yankee Hat. JOGMEC retained an option to reacquire 75% interest in the properties for \$1 for each property plus an amount equal to twice that Yankee Hat may spend on exploration of the properties during the option period, which would end in August 2014 (Eagle Hill Exploration Corp., 2009; Yankee Hat Minerals Ltd., 2009b; 2010a, p. 4–5; 2010b).

Industrial Minerals

Diamond.—The preliminary estimate of Canada's diamond production in 2010 was 11,773,000 carats, which was a 7.6% increase from the 10,946,000 carats produced in 2009. The value of produced diamond in 2010 rebounded to about \$2.3 billion compared with \$1.5 billion in 2009 (Natural Resources Canada, 2011c).

The Ekati Mine, which is located in the Northwest Territories, recovered diamond from several kimberlites. Production operations at each individual surface pit or underground mine were relatively short lived, although BHP Billiton Canada expected to produce from the Ekati Mine until at least 2018. Production from the Beartooth pit ended in 2009 and from the underground Panda operation in 2010. Mining continued at the Koala underground mine and at the Fox open pit, and started at the Koala North underground mine. In 2010, BHP Billiton Canada evaluated the Misery Deep project, which would resume operations at the Misery pit (which produced from 2001 until 2005) and evaluated options for surface mining at the Pigeon project. In 2010, diamond production from the Ekati Mine decreased by about 15% compared with that of 2009. The Ekati Mine accounted for about 39% of Canada's diamond production and 3% of the world's diamond production in 2009, which was the latest year for which world data were available (BHP Billiton Canada Inc., 2010a, p. 5; 2010b, p. 4–5; Kimberley Process Certification Scheme, 2010).

The joint venture of Diavik Diamond Mines Inc., which was a subsidiary of Rio Tinto plc (60% interest) and Harry Winston Diamond Limited Partnership (40%), increased output to 6.5 million carats, which was about a 17% increase compared with 2009 production but about a 30% decrease from that of 2008. Diamond output from the Diavik Mine had been reduced in 2009 owing to the global economic crisis. In March 2010, production began from underground mining operations that accessed the A154 North kimberlite pipe, the A154 South pipe, and the A418 pipe. Open pit operations, which were expected to be depleted by 2012, continued at the A154 South pipe and the A418 pipe. Diavik projected that the underground mining operations would continue until 2022 (Rio Tinto plc, 2011, p. 52, 81).

At the Snap Lake underground and the Victor open pit mines, De Beers Canada Inc. increased diamond recovery by 54% in 2010 compared with that of 2009 when production had been curtailed. Diamond output from the Snap Lake Mine, which is located in the Northwest Territories, increased by about 109% to 926,000 carats, and at the Victor Mine, which is located in Ontario, by about 19% to 826,000 carats. In late 2009, De Beers

announced that it planned to increase annual production at Snap Lake to 1.6 million carats from a projected 1.4 million carats in 2012. Exploration continued at the Delta and the Tango Extension pipes in the 16-pipe Victor kimberlite cluster (De Beers Group, 2010, p. 17; 2011, p. 28; De Beers Canada Inc., undated).

Production operations at the Jericho diamond mine, which is located in Nunavut Territory, were suspended in early 2008 owing to Tahera Diamond Corp.'s financial problems. The Department of Indian and Northern Affairs Canada had sustained the mine's care-and-maintenance status since December 2008. To facilitate the sale of the Jericho Mine, Tahera and its subsidiary Benachee Resources Inc. commissioned a new preliminary economic assessment of the mine, which was completed in January 2010. In July, Shear Diamonds Corp., which was a subsidiary of Shear Minerals Ltd., received approval from the Ontario Superior Court of Justice to purchase the Jericho Mine, associated processing facilities, and various exploration assets from Benachee and Tahera. By yearend, Shear Minerals changed its name to Shear Diamond Ltd. (Tahera Diamond Corp., 2008a–c; 2010).

Early-stage diamond exploration was underway at numerous sites in Alberta, British Columbia, Northwest Territories, Nunavut Territory, Ontario, Quebec, and Saskatchewan. Advanced Canadian diamond projects included the Gahcho Kué project, which was located in the Northwest Territories, where a feasibility study was completed for the joint venture of De Beers Canada and Mountain Province Diamonds Inc. A scoping study was prepared for the Renard project, which was located on the Foxtrot property in Quebec. The Renard project was being explored by a joint venture of Diaguem Inc., which was a subsidiary of SOQUEM Inc., and Les Diamants Stornoway Inc., which was a subsidiary of Stornoway Diamond Corp. In December, Stornoway proposed to acquire Diaguem's 50% interest in the Renard project. In Saskatchewan, a prefeasibility study was completed for the Star-Orion South diamond project, and a final feasibility study was expected to be completed in 2011. Shore Gold Inc. held 100% interest in the Star project and 66% interest in the Fort à la Corne joint venture (FALC-JV), which contained the Orion South and the Star West kimberlites. Newmont Mining Corporation of Canada Ltd. held the other 34% in the FALC–JV.

Fluorspar.—In 2010, Canada Fluorspar Inc. continued a feasibility study, metallurgical tests, and a pilot plant evaluation of the St. Lawrence fluorspar project in Newfoundland and Labrador. A 2009 technical report estimated that the project's Blue Beach vein contained about 4.4 Mt of ore with an average grade of 39% calcium fluoride (CaF₂). The Tarefare and Blowout veins contained 4.7 Mt of ore with an average grade of 44.8% CaF₂. The area had been mined for fluorspar by American Newfoundland Fluorspar Ltd. from 1936 to 1942; by Alcan Smelters and Chemicals Ltd. from 1942 until 1978, when operations ceased owing to the availability of higher quality, lower priced fluorspar from overseas; and by St. Lawrence Fluorspar Ltd. from 1986 until 1990, when the company ceased mining and milling operations owing to the low international fluorspar prices and funding difficulties (Pearse, 1979; Agnerian, 2009, p. 1-2, 1-6).

Canada Fluorspar's feasibility study and testing for the St. Lawrence fluorspar project was expected to be completed in 2011. Pending receipt of the appropriate licenses and permits, Canada Fluorspar projected that construction of new facilities, the proposed capacity expansion of the project's mill in order to produce between 120,000 t/yr and 180,000 t/yr of fluorspar concentrate, and the rehabilitation of the mine would all start in late 2011 (Canada Fluorspar Inc., 2011, undated).

Lithium.—In 2009, Tanco suspended production of lithium (spodumene) at the Bernic Lake Mine. The mine, which also was known as the Tanco Mine, is located in Manitoba.

In 2010, positive prefeasibility and feasibility studies were completed on the Quebec Lithium Project, which is located in Quebec, for Canada Lithium Corp. Construction of an open pit mine with the capacity to produce 1 Mt/yr of ore was scheduled to begin in 2011. Initial production was planned to start in late 2012, subject to financing and permitting. At full production (by 2013), the processing plant was expected to produce about 20,000 t/yr of battery-grade lithium carbonate. The project's measured and indicated mineral resources were estimated to be 46.7 Mt of ore at a grade of 1.19% lithium dioxide (Canada Lithium Corp., 2010).

A number of exploration programs for lithium were underway in Canada. Nemaska Exploration Inc. drilled and trenched the Whabouchi deposit. Mineral resources for the deposit, which is located in Quebec, were estimated to be 9.7 Mt of ore at a grade of 1.63% dilithium oxide (Li₂O). At yearend, a scoping study of the project was underway (Nemaska Exploration Inc., 2011).

In Ontario, Consolidated Abaddon Resources Inc. completed a 7-hole 1,464-m diamond drilling program at the Raleigh Lake lithium property. In early January 2011, Consolidated Abaddon changed its name to Aben Resources Ltd. In 2010, Linear Metals Corp. reported the results of a 19-hole 2,362-m drill program that was completed in 2009 on the Seymour Lake project but did not undertake any other work on the property (Consolidated Abaddon Resources Inc., 2010; Linear Metals Corp., 2010).

In February, Petro Horizon Energy Corp. acquired an option to earn up to 75% interest in the Brazil Lake property from Champlain Mineral Ventures Ltd. Petro Horizon subsequently changed its name to Greenlight Resources Inc. and completed a 28-hole 2,592-m diamond drill program at Brazil Lake, which is located in Nova Scotia (Greenlight Resources Corp., 2011).

In Quebec, First Gold Exploration Inc. completed a 143-hole 17,500-m drill program on the Lac Pivert-Rose property (formerly the Eastmain lithium property) that was started in December 2009. Resources on the Rose deposit were estimated to be 11.4 Mt of ore at a grade of 1.34% Li₂O. The ore also contained 0.03% beryllium oxide and 0.02% tantalum pentoxide. First Gold secured 100% interest in the property in 2010 and planned to begin a prefeasibility study in 2011. Jourdan Resources Inc. sampled the Pivert-Stairs property, which was adjacent to First Gold's Lac Pivert-Rose property (First Gold Exploration Inc., 2010a, b).

Also in Quebec, Glen Eagle Resources Inc. acquired the Authier property and completed a short drilling program. In May, Globestar Mining Corp. completed a 99-hole 13,379-m diamond drill program on the Moblan property. In December,

Perilya Canada Ltd. acquired Globestar. Lithium One Inc. (formerly known as Coniagas Resources Ltd.) completed an 84-hole 12,380-m drill program at the James Bay lithium project in 2009 and in 2010 reported that the prospect's mineral resources were estimated to be 11.74 Mt of ore at a grade of 1.3% Li₂O. In December, Lithium One and Galaxy Resources Ltd. of Australia signed an agreement under which Galaxy could earn 70% interest in the James Bay project (Globestar Mining Corp., 2010, p. 9–10; Lithium One Inc., 2010; undated).

Channel Resources Ltd. continued tests on the recovery of boron, bromine, lithium chloride, and potash from brines produced by natural gas wells near Fox Creek, Alberta. Gas producers reinjected the waste brines into subsurface reservoirs; revenue from minerals recovered from the brines would reduce gas producer's brine disposal costs (Channel Resources Ltd., 2010).

Early stage exploration in Ontario included work by Canadian Orebodies, which reported lithium mineralization in samples taken from Tebishogeshik showing on the Zigzag lithium-tantalum property. A short drill program was planned for early 2011. In March, Fieldex Exploration Inc. entered into an option to acquire 60% interest in the property from Mantis Mineral Corp., which had secured an option to acquire the property in October 2009. Fieldex subsequently resampled core from the Case pegmatite that had been recovered during a 2001 drill program by Platinova A/S. Cricket Resources Inc. secured an option to acquire 60% interest in the Forgan Lake property from joint-venture partners International Lithium Corp. (ILC) and ILC's parent organization, TNR Gold Corp. In 2010, Cricket sampled the property (Canadian Orebodies Inc., 2010c).

In 2010, North Arrow Minerals Inc. reexamined samples collected in 2009 from the McAvoy pegmatite on its Torp Lake project, which is located in Nunavut Territory. Also in 2010, the Federal Court of Canada invalidated the Phoenix lithium project's land use permit that had been issued to North Arrow by the Mackenzie Valley Land and Water Board. The Phoenix project is located in the Northwest Territories (North Arrow Minerals Inc., 2010).

AKA Ventures Inc. ceased exploration activity on the Quebec Lithium project (Vallee claims) in 2010 owing to suboptimal exploration results and the failure to attract a joint-venture partner. The claims were located near Canada Lithium Corp.'s Quebec Lithium project. In Ontario, Avalon Rare Metals Inc. limited activity in 2010 on the Separation Rapids lithium-tantalum project's Big Whopper petalite deposit to market development for the potential lithium product, property cleanup and maintenance, and community consultation (AKA Ventures Inc., 2010a, b).

Potash.—After BHP Billiton Canada's successful acquisition of Athabasca Potash Inc., the company proposed to expand its position in the potash sector. In August, BHP Billiton launched a \$40 billion hostile takeover bid for Potash Corporation of Saskatchewan Inc., which, according to the Globe and Mail (2010), was Canada's 24th ranked public company (by profit) in 2009. Potash Corp. had been the seventh ranked company in 2008, but it was adversely affected by the global economic crisis. BHP Billiton withdrew the offer in November (BHP Billiton, 2010, p. 1).

Mineral Fuels and Related Materials

Uranium.—In 2010, production of uranium decreased to 9,684 t (uranium content) from 10,176 t in 2009. The decrease was attributed to the temporary closure of the McClean mill. Shipments of uranium decreased to 9,927 t (uranium content) from 10,133 t in 2009 (Jacqueline Paquette, Head, Surveys Unit, Minerals and Mining Statistics Division of the Minerals, Metals and Materials Knowledge Branch, Natural Resources Canada, written commun., June 23, 2011).

Cameco received approval from the Canadian Nuclear Safety Commission to produce a maximum of about 8,000 t/yr of uranium at the McArthur River Mine, subject to a mine-life annual average of about 7,200 t of uranium. An ongoing upgrade to the Key Lake mill would increase the annual milling capacity to about 9,600 t by 2011. Successful reserve definition drilling in 2010 allowed Cameco to extend the Rabbit Lake complex's expected mine life by 2 years to 2018. Cameco also finished dewatering the Cigar Lake Mine, increased the mine's water-pumping capacity, continued remediation of the underground facilities, resumed underground development, and prepared to resume sinking shaft 2. The Cigar Lake project was expected to begin production in 2013 (Cameco Corp., 2011, p. 58–64, 72–75).

The McClean Lake project (a joint venture of AREVA Resources Canada Inc., Denison Mines Inc., and OURD Canada Company Ltd.) produced about 665 t of uranium (as uranium oxide) at the McClean mill from stockpiled ore in 2010 compared with the output of 1,388 t of uranium in 2009. The ore stockpile was depleted in June, and the mill was placed on care-and-maintenance status in August pending the supply of ore from the Cigar Lake Mine (Cameco Corp., 2011, p. 74; Denison Mines Corp., 2011, p. 9).

AREVA evaluated the Kiggavik project in Nunavut Territory and Cameco evaluated the Millennium project in Saskatchewan. In addition, about 100 other uranium exploration projects in Canada were active in 2010.

Reserves and Resources

Table 3 lists the levels of Canadian reserves of selected mineral commodities at the beginning of 2010. Data are shown in terms of metal contained in ore for the base and precious metals or recoverable quantities of mineral fuels. Reported reserves of major metals include metal in mines where production has been suspended temporarily. Crude petroleum reserves include estimated recovery from oil sands projects that were under active development (BP p.l.c., 2011, p. 6; Natural Resources Canada, 2011b).

The reserves of major metals, which are distributed unevenly throughout Canada, are located primarily in the Precambrian shield, the Rocky Mountains (Cordillera), and the Coast Ranges. In terms of proven and probable (minable) reserves of major metals, the Provinces of British Columbia, Manitoba, New Brunswick, Ontario, and Quebec were dominant (Natural Resources Canada, 2011b).

Outlook

Canada's mineral industry is primarily export oriented, and the United States is the main destination for exported Canadian minerals. Canada's continuing challenges in the mineral sector include globalization of the industry, especially competition from developing countries with minerals resources that were less costly to develop. With the easing of the global economic crisis and the rebound in international mineral commodity prices in 2010, the output of many mines and mineral processing plants increased. Mineral exploration activity also increased. The Canadian mineral industry is well positioned to expand, based on its mineral resource base and its access to the markets of China, Europe, Japan, and North America.

References Cited

- Adex Mining Inc., 2010a, Adex announces bench scale testwork to produce molybdenum oxide: Toronto, Ontario, Canada, Adex Mining Inc., May 11, 3 p.
- Adex Mining Inc., 2010b, Adex provides update on North Zone tin, indium, zinc bench scale concentrate project: Toronto, Ontario, Canada, Adex Mining Inc., June 2, 2 p.
- Adex Mining Inc., 2011a, Adex reports initial high grade drill results at Mount Pleasant: Toronto, Ontario, Canada, Adex Mining Inc., February 8, 4 p.
- Adex Mining Inc., 2011b, Adex update of activities at Mount Pleasant: Toronto, Ontario, Canada, Adex Mining Inc., March 1, 3 p.
- Adex Mining Inc., undated, Property: Adex Mining Inc. (Accessed March 2, 2011, at http://www.adexmining.com/history.php.)
- Agnerian, Hrayr, 2009, Technical report on the St. Lawrence fluorspar project, St. Lawrence, Newfoundland & Labrador: Toronto, Ontario, Canada, Scott Wilson Roscoe Postle Associates Inc., April 30, 133 p. (Accessed April 1, 2011, at http://www.canadafluorspar.com/pdf/NI_43-101_St._Lawre_Fluos_Tech_Report.pdf.)
- AKA Ventures Inc., 2010a, Management discussion and analysis for the nine month period ending September 30, 2010: Surrey, British Columbia, Canada, AKA Ventures Inc., 10 p.
- AKA Ventures Inc., 2010b, Management discussion and analysis for the six month period ending June 30—2010: Surrey, British Columbia, Canada, AKA Ventures Inc., 11 p.
- Allfantazi, A.M., and Moskalyk, R.R., 2003, Processing of indium—A review: Minerals Engineering, v. 16, issue 8, August, p. 687–694.
- American Manganese Inc., 2010, Lonnie-Virgil occurrence returns significant rare earth element & niobium values from rock chip & soil samples:

 American Manganese Inc., October 1. (Accessed March 25, 2011, at http://www.americanmanganeseinc.com/lonnie-virgil-occurrence-returns-significant-rare-earth-element-niobium-values-from-rock-chip-soil-samples.)
- Apodaca, L.E., 2011, Sulfur: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 158–159.
- Argonaut Exploration Inc., 2011, Management discussion and analysis for the quarter ended December 31, 2010: Calgary, Alberta, Canada, Argonaut Exploration Inc., February 24, 32 p. (Accessed March 16, 2011, at http://www.argonautexploration.com/i/pdf/MDA-2011-Q2.pdf.)
- Avalon Rare Metals Inc., 2010a, Avalon provides progress report on East Kempville tin indium project, Yarmouth County, Nova Scotia: Toronto, Ontario, Canada, Avalon Rare Metals Inc., November 16, 4 p.
- Avalon Rare Metals Inc., 2010b, Management discussion and analysis of financial statements for the period ended November 30, 2010: Avalon Rare Metals Inc., 23 p. (Accessed March 24, 2011, at http://www.avalonraremetals.com/_resources/financials/Avalon_MDA_10_11_30_final.pdf.)
- Avalon Rare Metals Inc., 2011, Avalon reports increase in indicated resources in the Nechalacho rare earth elements deposit, NWT: Toronto, Ontario, Canada, Avalon Rare Metals Inc., January 27, 7 p.
- Avanti Mining Inc., 2010a, Avanti enters into tolling agreement with Molymet: Vancouver, British Columbia, Canada, Avanti Mining Inc., October 12, 1 p.
- Avanti Mining Inc., 2010b, Avanti Mining announces strategic alliance with SeAH Holdings Corp. and private placements for \$15 million: Vancouver, British Columbia, Canada, Avanti Mining Inc., December 22, 2 p.

- Avanti Mining Inc., 2010c, Avanti Mining receives positive feasibility study confirming robust economics for restart of Kitsault molybdenum mine: Vancouver, British Columbia, Canada, Avanti Mining Inc., December 16, 7 p.
- Barkerville Gold Mines Ltd., 2010, Barkerville closes acquisition of QR Mine & Mill—Gold mining operations have commenced: Vancouver, British Columbia, Canada, Barkerville Gold Mines Ltd., February 2, 4 p.
- BHP Billiton, 2010, BHP Billiton announces all-cash offer to acquire PotashCorp: Melbourne, Victoria, Australia; BHP Billiton, August 18, 7 p.
- BHP Billiton Canada Inc., 2010a, Ekati newsbreak—Fall 2010: Yellowknife, Northwest Territories, Canada, BHP Billiton Canada Inc., 8 p.
- BHP Billiton Canada Inc., 2010b, Ekati newsbreak—Summer 2010: Yellowknife, Northwest Territories, Canada, BHP Billiton Canada Inc., 8 p.
- BP p.l.c., 2011, BP statistical review of world energy: London, United Kingdom, BP p.l.c., June, 45 p.
- Bray, E.L., 2011, Aluminum: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 16–17.
- Cabot Corp., 2010, Annual report 2009: Boston, Massachusetts, Cabot Corp., 123 p.
- Callinan Mines Ltd., 2010, Exploration update on Troitsa, Coles Creek and Gossan Hill programs: Vancouver, British Columbia, Canada, Callinan Mines Ltd., December 9, 2 p.
- Cameco Corp., 2011, Management's discussion and analysis: Cameco Corp, February 14, 99 p. (Accessed March 30, 2011, at http://www.cameco.com/ common/pdf/investors/financial_reporting/quarterly_report/2010/q4/ Cameco_-_Q4_2010_MD&A.pdf.)
- Canada Fluorspar Inc., 2011, Canada Fluorspar reports 2010 financial results: Markham, Ontario, Canada, Canada Fluorspar Inc. March 11, 1 p.
- Canada Fluorspar Inc., [undated], Fluorspar project: Markham, Ontario, Canada, Canada Fluorspar Inc. (Accessed April 1, 2011, at http://www.canadafluorspar.com/Projects.html.)
- Canada Lithium Corp., 2010, Canada Lithium announces positive feasibility for Quebec Lithium project—Construction to commence mid-2011—Full production in 2013: Toronto, Ontario, Canada, Canada Lithium Corp., December 17, 8 p.
- Canadian International Minerals Inc., 2010, Canadian International Minerals Inc. announces Carbo rare earth project drilling completed: Vancouver, British Columbia, Canada, Canadian International Minerals Inc., 2 p.
- Canadian International Minerals Inc., [undated], Carbo rare earth project: Canadian International Minerals Inc. (Accessed March 23, 2011, at http://cdintlminerals.com/s/Carbo.asp.)
- Canadian Orebodies Inc., 2010a, Canadian Orebodies assays high grade tantalum on Zigzag property and commences drilling on Falcon property: Toronto, Ontario, Canada, Canadian Orebodies Inc., December 22, 4 p.
- Canadian Orebodies Inc., 2010b, Canadian Orebodies assays up to 4.09% Li₂O and 501 ppm Ta₂O₅ on Zigzag property: Toronto, Ontario, Canada, Canadian Orebodies Inc., December 13, 4 p.
- Canadian Orebodies Inc. 2010c, Orebodies assays high grade lithium and rare metals on Zigzag property: Toronto, Ontario, Canada, Canadian Orebodies Inc., April 22, 4 p.
- Channel Resources Ltd., 2010, Channel Resources reports on interim results from Fox Creek lithium/potash brine project process testing program: Vancouver, British Columbia, Canada, Channel Resources Ltd., November 17, 3 p.
- Commerce Resources Corp., 2011, Management discussion & analysis for the year ended October 31, 2010: Commerce Resources Corp., February 21, 15 p. (Accessed March 23, 2011, at http://www.commerceresources.com/i/pdf/CCEQ4103110MDA.pdf.)
- Connelly, John, 2010, Metal mining modifications: Business Review Canada, May 5. (Accessed April 1, 2011, at http://www.businessreviewecanada.ca/company-report/beaver-brook-antimony-mine-metal-mining-modifications.)
- Consolidated Abaddon Resources Inc., 2010, Consolidated Abaddon drills 9 meters 1.3% lithium at Raleigh Lake lithium and rare earth project: Vancouver, British Columbia, Canada, Consolidated Abaddon Resources Inc., April 14, 3 p.
- Copper Fox Metals Inc., 2011, Copper Fox announces fourth quarter highlights and 2010 year-end financial results: Vancouver, British Columbia, Canada, Copper Fox Metals Inc., February 15, 5 p.
- Crowflight Minerals Inc., 2010, Crowflight to introduce own mining equipment and mining team at Bucko Lake Mine; will temporarily suspend operations to facilitate improvements: Toronto, Ontario, Canada, Crowflight Minerals Inc., October 1, 3 p.
- De Beers Canada Inc., [undated], About the Snap Lake Mine: De Beers Canada Inc. (Accessed March 18, 2011, at http://www.debeerscanada.com/files_3/snap-lake-mine.php.)

- De Beers Group, 2010, Operating & financial review 2009: De Beers Group, 30 p. (Accessed March 30, 2011, at http://www.debeersgroup.com/ofr2009/pdf/De Beers OFR 2009.pdf.)
- De Beers Group, 2011, Operating & financial review 2010: De Beers Group, 34 p. (Accessed March 18, 2011, at http://www.debeersgroup.com/ofr2010/pdf/De Beers OFR 2010.pdf.)
- Denison Mines Corp., 2011, 2010 annual report: Toronto, Ontario, Canada, Denison Mines Corp., 65 p.
- Department of Natural Resources, 2010, 2009–2010 annual report: Fredericton, New Brunswick, Canada, Department of Natural Resources, November, 86 p.
- Eagle Hill Exploration Corp., 2009, Eagle Hill takes steps to ensure focus on Windfall Lake property: Vancouver British Columbia, Canada, Eagle Hill Exploration Corp., August 18, 1 p.
- Fieldex Exploration Inc., 2010a, Fieldex discovers new REE/uranium prospect on its Delbreuil property in Quebec: Rouyn-Noranda, Quebec, Canada, Fieldex Exploration Inc., January 27, 2 p.
- Fieldex Exploration Inc., 2010b, Management's discussion & analysis: Fieldex Exploration Inc., November 26, 14 p. (Accessed March 23, 2011, at http://www.fieldexexploration.com/images/report/FLX_MDA_BILINGUAL_Q3_2010.pdf.)
- Finlay Minerals Ltd., 2010, Announcing the results of the newly discovered porphyry related copper-molybdenum-silver at the Silver Hope project, Central British Columbia: Vancouver, British Columbia, Canada, Finlay Minerals Ltd., December 6, 2 p.
- First Gold Exploration Inc., 2010a, Management discussion and analysis for the six-month period ended February 28, 2010: Laval, Quebec, Canada, First Gold Exploration Inc., 18 p. (Accessed April 5, 2011, at http://www.cecorp.ca/documents/PDF/Investor_state/FIRSTGOLD_MDA_2010_02_28_version_finale.pdf.)
- First Gold Exploration Inc., 2010b, Management discussion and analysis for the three-month period ended November 30, 2010: Laval, Quebec, Canada, First Gold Exploration Inc., 23 p. (Accessed April 5, 2011, at http://www.cecorp.ca/documents/PDF/Investor_state/FIRST_GOLD_ MDA 2010 11 30.pdf.)
- First Metals Inc., [undated], Pamour open pit mine: First Metals Inc. (Accessed June 13, 2011, at http://www.porcupinegoldmines.ca/en/ouroperations/pamour.asp.)
- Freeport Resources Inc., 2010, Management discussion & analysis— October 31—2010: Vancouver, British Columbia, Canada, Freeport Resources Inc., 15 p.
- French, Cameron, 2010, Despite ongoing strike action Vale plans to restart Sudbury operation: Thomson Reuters, February 4. (Accessed February 4, 2010, at http://www.mineweb.com/mineweb/view/mineweb/en/page36?oid=97276&Detail&pid=92730.)
- Geodex Mineral Ltd., 2009, Geodex Minerals updates status of its Mount Pleasant West Project, New Brunswick: Vancouver, British Columbia, Canada, Geodex Mineral Ltd., December 16, 2 p.
- Geodex Mineral Ltd., 2010a, Geodex reports new tungsten discovery on Flume Ridge property, New Brunswick: Vancouver, British Columbia, Canada, Geodex Mineral Ltd., February 10, 3 p.
- Geodex Mineral Ltd., 2010b, Geodex reports new tungsten discovery on Nashwaak property, New Brunswick: Vancouver, British Columbia, Canada, Geodex Mineral Ltd., February 3, 2 p.
- Geodex Mineral Ltd., 2010c, Hunter Dickinson's Northgate outlines \$13.7 million program for Sisson feasibility and permitting studies: Vancouver, British Columbia, Canada, Geodex Mineral Ltd., November 25, 2 p.
- Geodex Mineral Ltd., 2011, Geodex announces 2011 plans: Vancouver, British Columbia, Canada, Geodex Mineral Ltd., February 9, 2 p.
- Giroux and Casselman, 2010, Casino project—2010 mineral resource update: Western Copper Corp., 155 p. (Accessed March 16, 2011, at http://www.westerncoppercorp.com/content/pdfs/technical_reports/FINAL-Casino_Resource_Estimate_Nov2010.pdf.)
- Globe and Mail, 2010, Rankings of Canada's top 1000 public companies by profit: Globe and Mail, June 18. (Accessed January 24, 2011, at http://www.theglobeandmail.com/report-on-business/rob-magazine/top-1000/rankings-of-canadas-top-1000-public-companies-by-profit/article1608779.)
- Globestar Mining Corp., 2010, Management's discussion and analysis for the three months and nine months ended September 30, 2010: Toronto, Ontario, Canada, Globestar Mining Corp. November 12, 23 p.
- Globex Mining Enterprises Inc., 2011, Globex's rare earth property returns high assays: Rouyn-Noranda, Quebec, Canada, Globex Mining Enterprises Inc., January 17, 3 p.

- Government of Saskatchewan, 2010, Diamond royalty system introduced: Government of Saskatchewan. (Accessed March 30, 2011, at http://www.gov.sk.ca/news?newsid=3982b9cb-1ff9-471a-a943-49b77140e23f.)
- Great Western Minerals Group Ltd., 2011, Form 51–102F1—Management's discussion & analysis for the year ended December 31, 2010: Saskatoon, Saskatchewan, Canada, Great Western Minerals Group Ltd., 17 p.
- Greenlight Resources Corp., 2011, Brazil Lake drill program results intersects 11.26 meters of 1.78% Li₂O: Greenlight Resources Inc., February 3. (Accessed March 31, 2011, at http://greenlightresources.ca/2011/02/brazil-lake-drill-program-results-intersects-11-26-meters-of-1-78-li2o-2.)
- Hi Ho Silver Resources Inc., 2010a, Form 7—Monthly progress report: Canadian National Stock Exchange, October 5, 4 p.
- Hi Ho Silver Resources Inc., 2010b, Management discussion and analysis for the year ended July 31, 2010 and for the subsequent period ended November 26, 2010: Vancouver, British Columbia, Canada, Hi Ho Silver Resources Inc., December 24, 9 p.
- HudBay Minerals Inc., 2009, HudBay to re-start Chisel North Mine and Snow Lake concentrator: Toronto, Ontario, Canada, HudBay Minerals Inc., October 30, 2 p.
- IAMGOLD Corp., 2011, IAMGOLD reports record production, record net earnings, record operating cash flow for the fourth quarter: Toronto, Ontario, Canada, IAMGOLD Corp., February 24, 27 p.
- IAMGOLD Corp., [undated], Niobec niobium mine, Quebec: IAMGOLD Corp. (Accessed March 23, 2011, at http://www.iamgold.com/English/Operations/Operating-Mines/Niobec-Niobium-Mine/Mining-Processing/default.aspx.)
- Imperial Metals Corp., 2010a, 2010 annual report: Vancouver, British Columbia, Canada, Imperial Metals Corp., 44 p.
- Imperial Metals Corp., 2010b, 2010 third quarter report: Vancouver, British Columbia, Canada, Imperial Metals Corp., 43 p.
- International Bethlehem Mining Corp., 2010, International Bethlehem's rare earths property ready to drill: West Vancouver, British Columbia, Canada, International Bethlehem Mining Corp., December 16, 2 p.
- International Wayside Gold Mines Ltd., 2009, International Wayside Gold Mines to purchase QR Mine and mill: Vancouver, British Columbia, Canada, International Wayside Gold Mines Ltd., December 17, 1 p.
- Jasinski, S.M., 2011, Potash: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 122–123.
- Kimberley Process Certification Scheme, 2010, Annual global summary—2009 production, imports, exports and KPC counts: Kimberley Process Certification Scheme, July 18, 1 p. (Accessed March 30, 2011, at https://kimberleyprocessstatistics.org/static/pdfs/AnnualTables/2009GlobalSummary.pdf.)
- Kingsman Resources Inc., 2010, Final assays received on Luxor moly property includes 3 meters grading 0.115% molybdenum: West Vancouver, British Columbia, Canada, Kingsman Resources Inc., December 24, 2 p.
- Kobex Minerals Inc., 2010, Kobex terminates Island Copper option: Vancouver, British Columbia, Canada, Kobex Minerals Inc., July 2, 1 p.
- Kuck, P.H., 2011, Nickel: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 108–109.
- Linear Metals Corp., 2010, Additional high grade drill results from Linear Metals' Seymour Lake lithium project: Halifax, Nova Scotia, Canada, Linear Metals Corp. January 6, 7 p.
- Lithium One Inc., 2010, Lithium One reports indicated and inferred Ni 43–101 resource for James Bay Lithium, Quebec: Vancouver, British Columbia, Canada, Lithium One Inc., November 18, 3 p.
- Lithium One Inc., [undated], James Bay project—Current exploration: Lithium One Inc. (Accessed March 31, 2011, at http://www.lithium1.com/jb-explorations.php.)
- Logan Copper Inc., 2010, Logan completes 2010 drilling and extensive field work programs: Vancouver, British Columbia, Canada, Logan Copper Inc., December 7, 2 p.
- Loferski, P.J., 2011, Platinum-group metals: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 120–121.
- Matamec Explorations Inc., 2010, Matamec gets an average 74% heavyREO + Y2O3/TREO—2.8% TREO and 2.1% of $\mathrm{Nb_2O_5}$ on all samples analyzed from the Surprise showing: Montreal, Quebec, Canada, Matamec Explorations Inc., August 26. (Accessed March 23, 2011, at http://www.matamec.com/2010/08/matamec-gets-an-average-of-70-heavyreo-y2o3treo-2-9-treo-and-2-1-of-nb2o5-on-all-samples-analyzed-from-the-surprise-showing.)
- McCutcheon, Bill, 1996, Specialty nonferrous metals—Antimony, in Canadian minerals yearbook—1995 review and outlook: Ottawa, Ontario, Canada, Natural Resources Canada, p. 55.1–55.6.

- McCutcheon, Bill, 2002, Antimony, *in* Canadian minerals yearbook—2001 review and outlook: Ottawa, Ontario, Canada, Natural Resources Canada, p. 10.1–10.6
- MDN Inc., 2010, MDN receives positive economic indicator for the niobium and tantalum (Anita) project—Scoping study completed and proceeding to feasibility study: Montreal, Quebec, Canada, MDN Inc., January 28, 6 p.
- MDN Inc., 2011, MDN confirms that the niobium-tantalum mineralization extends more than 400 m south from the Crevier deposit: Montreal, Quebec, Canada, MDN Inc., February 3, 4 p.
- Metals Economics Group, 2011, World exploration trends 2011: Halifax, Nova Scotia, Canada, Metals Economics Group special report for the PDAC International Convention, 8 p.
- Mountain Lake Resources Inc., 2010, Drill results confirm antimony in two areas of interest at Mountain Lake's Little River property, Newfoundland: Halifax, Nova Scotia, Canada, Mountain Lake Resources Inc., December 21, 3 p.
- Natural Resources Canada, 2010, Mineral production of Canada, by province, 2009: Natural Resources Canada, 6 p. (Accessed March 15, 2011, at http://mmsd.mms.nrcan.gc.ca/stat-stat/prod-prod/PDF/2009_en.pdf.)
- Natural Resources Canada, 2011a, Canada's mining assets abroad information bulletin: Natural Resources Canada, February. (Accessed March 7, 2011, at http://www.nrcan-rncan.gc.ca/mms-smm/pubr-pubr/crsmm-rccmi-eng.htm.)
- Natural Resources Canada, 2011b, Canadian reserves of selected major metal information bulletin: Natural Resources Canada, February. (Accessed March 7, 2011, at http://www.nrcan-rncan.gc.ca/mms-smm/pubr-pubr/ cmaaib-biamce-eng.htm.)
- Natural Resources Canada, 2011c, Preliminary estimate of the mineral production of Canada, by province, 2010p: Natural Resources Canada, 4 p. (Accessed March 15, 2011, at http://mmsd.mms.nrcan.gc.ca/stat-stat/prod-prod/PDF/2010p en.pdf.)
- Nemaska Exploration Inc., 2011, Nemaska Exploration plans the production of 202,000 tonnes/yr of spodumene concentrate from its Whabouchi lithium/ beryllium deposit: Quebec City, Quebec, Canada, Nemaska Exploration Inc., January 19, 3 p.
- North American Tungsten Corporation Ltd., 2009a, North American Tungsten announces Cantung Mine to be placed on care and maintenance: Vancouver, British Columbia, Canada, North American Tungsten Corporation Ltd., 2 p.
- North American Tungsten Corporation Ltd., 2009b, North American Tungsten Corporation Ltd. files the updated technical report on the Cantung Mine-Nwt, Canada on Sedar: Vancouver, British Columbia, Canada, North American Tungsten Corporation Ltd., October 1, 3 p.
- North American Tungsten Corporation Ltd., 2010, North American Tungsten announces extended life of Cantung Mine: Vancouver, British Columbia, Canada, North American Tungsten Corporation Ltd., September 28, 3 p.
- North Arrow Minerals Inc., 2010, North Arrow reports Federal Court decision on Phoenix project land use permit: Vancouver, British Columbia, Canada, North Arrow Minerals Inc. (Accessed March 31, 2011, at http://www.northarrowminerals.com/s/NewsReleases.asp?ReportID=430308&_Type=News-Releases&_Title=North-Arrow-Reports-Federal-Court-Decision-on-Phoenix-Project-Land-Use-Permit.html.)
- Olson, D.W., 2011, Gemstones: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 62–63.
- Paquette, Jacqueline, 2010, Production of Canada's leading minerals: Natural Resources Canada, no. 09–12, 7 p. (Accessed November 24, 2010, at http://mmsd.mms.nrcan.gc.ca/stat-stat/prod-prod/PCLM-PPMC/PDF/09mtly12.pdf.)
- Paquette, Jacqueline, 2011, Production of Canada's leading minerals:
 Natural Resources Canada, no. 10–12, 7 p. (Accessed March 15, 2011, at http://mmsd.mms.nrcan.gc.ca/stat-stat/prod-prod/PCLM-PPMC/PDF/10mtly12.pdf.)
- Pearse, G.H.K., 1979, Fluorspar, in Canadian minerals yearbook—1978 review and outlook: Ottawa, Ontario, Canada, Energy, Mines and Resources Canada, p. 185–190.
- PhosCan Chemical Corp., 2010, PhosCan Chemical to conduct test for the recovery of niobium and rare earths at the Martison property: Toronto, Ontario, Canada, PhosCan Chemical Corp., October 26, 4 p.
- Prospector Consolidated Resources Inc., 2010, Prospector terminates option on Kalzas tungsten property: Vancouver, British Columbia, Canada, Prospector Consolidated Resources Inc., January 15, 1 p.
- Quest Rare Minerals Ltd., 2010, Quest Rare Minerals' files B-zone preliminary economic assessment (PEA) to sedar.com for public consultation: Toronto, Ontario, Canada, Quest Rare Minerals Ltd., September 27, 8 p.

- Rare Earth Metals Inc., 2010, Management's discussion and analysis for the nine months ended December 31, 2010: Rare Earth Metals Inc., 13 p. (Accessed March 24, 2011, at http://www.rareearthmetals.ca/upload/documents/rare-earth-metals-december-31-2010-q3-mda.pdf.)
- Rio Tinto Alcan Inc., 2010a, Rio Tinto Alcan's Laterriere works smelter returns to full production ahead of schedule: Rio Tinto Alcan Inc., September 30. (Accessed March 22, 2011, at http://www.riotintoalcan.com/ ENG/media.media releases 1875.asp.)
- Rio Tinto Alcan Inc., 2010b, Rio Tinto announces modernisation and expansion of Canadian aluminium smelters: Rio Tinto Alcan Inc., December 14. (Accessed March 22, 2011, at http://www.riotintoalcan.com/ ENG/media.media_releases_1930.asp.)
- Rio Tinto Alcan Inc., 2011, AP60—A breakthrough in unsurpassed productivity: Rio Tinto Alcan Inc., 2 p. (Accessed September 2, 2011, at http://www.ap-technology.com/pdf/AP60 v2.pdf.)
- Rio Tinto plc, 2011, 2010 annual report: London, United Kingdom, Rio Tinto plc, 280 p.
- Roca Mines Inc., 2010a, Management's discussion and analysis year ended August 31, 2010: Roca Mines Inc., December 14, 16 p. (Accessed March 1, 2011, at http://www.rocamines.com/i/pdf/Roca-Aug-31-10-MDA.pdf.)
- Roca Mines Inc., 2010b, Roca reports stope stability event at Max Mine: Vancouver, British Columbia, Canada, Roca Mines Inc., September 21, 1 p.
- Roca Mines Inc., 2011, Roca—Max molybdenum mine update: Vancouver, British Columbia, Canada, Roca Mines Inc., February 1, 1 p.
- Rocha, Euan, 2010, Vale prepares to restart Voisey's Bay operations: Thomson Reuters, January 26. (Accessed January 26, 2010, at http://communities.thomsonreuters.com/BaseMetals/pages/print/posts/?bid=a667b488-7644-4d2b-ae1b-881d82f921ee&mode=full.)
- Seabridge Gold Inc., 2010a, Interim report to shareholders and unaudited consolidated financial statements for the three months and nine months ended September 30, 2010: Seabridge Gold Inc., 12 p. (Accessed March 16, 2011, at http://www.seabridgegold.net/2010-Q3-Report.pdf.)
- Seabridge Gold Inc., 2010b, Preliminary feasibility study completed for Seabridge Gold's KSM project: Toronto, Ontario, Canada, Seabridge Gold Inc., March 31, 5 p.
- Serengeti Resources Inc., 2010, Serengeti reports final Kwanika 2010 drilling results—Identifies additional potential on property: Vancouver, British Columbia, Canada, Serengeti Resources Inc., September 9, 3 p.
- Shedd, K.B., 2011, Tungsten: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 176–177.
- Stadnyk, Alexandra, 2009, Safety comes first at this Newfoundland antimony mine with over 970 days: Energydigital, July 8. (Accessed April 1, 2011, at http://www.energydigital.com/Beaver-Brook-Antimony-Mine-Safety-comes-first-Newfoundland-antimony-mine-over-970-days 28701.)
- Statistics Canada, 2011a, Exports of goods on a balance-of-payments basis, by product: Ottawa, Ontario, Canada, Statistics Canada. (Accessed April 5, 2011, at http://www40.statcan.ca/l01/cst01/gblec04-eng.htm.)
- Statistics Canada, 2011b, Gross domestic product at basic prices, manufacturing and construction industries: Ottawa, Ontario, Canada, Statistics Canada. (Accessed April 5, 2011, at http://www40.statcan.ca/l01/cst01/ manuf10-eng.htm.)
- Statistics Canada, 2011c, Gross domestic product at basic prices, primary industries: Ottawa, Ontario, Canada, Statistics Canada. (Accessed April 5, 2011, at http://www40.statcan.ca/l01/cst01/prim03-eng.htm.)
- Statistics Canada, 2011d, Imports of goods on a balance-of-payments basis, by product: Ottawa, Ontario, Canada, Statistics Canada. (Accessed April 5, 2011, at http://www40.statcan.ca/l01/cst01/gblec05-eng.htm.)
- St. Elias Mines Ltd., 2010, Management's discussion and analysis for the year ended May 31, 2010: Vancouver, British Columbia, Canada, St. Elias Mines Ltd., September 28, 14 p.
- St. Elias Mines Ltd., 2011, Management's discussion and analysis for the quarter ended November 30, 2010: Vancouver, British Columbia, Canada, St. Elias Mines Ltd., January 27, 13 p.
- Sultan Minerals Inc., 2009a, Sultan Minerals intersects 0.76% tungsten (WO₃) on its Jersey Emerald property, B.C.: Vancouver, British Columbia, Canada, Sultan Minerals Inc., September 28, 3 p.
- Sultan Minerals Inc., 2009b, Sultan Minerals releases updated NI 43–101 tungsten resource: Vancouver, British Columbia, Canada, Sultan Minerals Inc., January 21, 4 p.
- Sultan Minerals Inc., 2010, Management discussion and analysis for the three and six months ended June 30, 2010: Sultan Minerals Inc., 20 p. (Accessed March 4, 2011, at http://www.sultanminerals.com/i/ pdf/2010-Second-Quarter-Report.pdf.)

- Tahera Diamond Corp., 2008a, Tahera announces approval of the court to cease operations at the Jericho Mine: Tahera Diamond Corp., December 15. (Accessed March 30, 2010, at http://www.newswire.ca/en/releases/archive/December2008/15/c9962.html.)
- Tahera Diamond Corp., 2008b, Tahera announces intent to seek CCAA protection: Tahera Diamond Corp., January 16. (Accessed March 30, 2010, at http://www.newswire.ca/en/releases/archive/January2008/16/c9349.html.)
- Tahera Diamond Corp., 2008c, Tahera announces suspension of mining: Tahera Diamond Corp., January 23. (Accessed March 30, 2010, at http://www.newswire.ca/en/releases/archive/January2008/23/c3652.html.)
- Tahera Diamond Corp., 2010, Tahera Diamond Corporation announces commencement of Jericho diamond mine sale process: Toronto, Ontario, Canada, Tahera Diamond Corp., January 18, 2 p.
- Taseko Mines Ltd., 2010a, Annual information form for the fiscal year ended December 31, 2009: Vancouver, British Columbia, Canada, Taseko Mines Ltd., March 31, 52 p.
- Taseko Mines Ltd., 2010b, Taseko completed Gibraltar Mine joint venture with Japanese consortium: Vancouver, British Columbia, Canada, Taseko Mines Ltd., April 1, 1 p.
- Taseko Mines Ltd., 2011a, Successful drill program at Taseko Mines' Aley property indicates a major niobium deposits with potential to develop a significant operation: Vancouver, British Columbia, Canada, Taseko Mines Ltd., January 10, 3 p.
- Taseko Mines Ltd., 2011b, Taseko announces fourth quarter and year end Gibraltar production and 2011 plans: Vancouver, British Columbia, Canada, Taseko Mines Ltd., January 5, 2 p.
- Teck Resources Ltd., 2010, Teck reports fourth quarter results for 2009: Vancouver, British Columbia, Canada, Teck Resources Ltd., February 8, 36 p.
- Teck Resources Ltd., 2011, Teck reports unaudited results for 2010: Vancouver, British Columbia, Canada, Teck Resources Ltd., February 8, 39 p.
- Thompson Creek Metals Company Ltd., 2011, Form–10–K—2010: U.S. Securities and Exchange Commission, 169 p.
- Thompson Creek Metals Company Ltd., [undated], Endako Mine: Thompson Creek Metals Company Ltd. (Accessed March 14, 2011, at http://www.thompsoncreekmetals.com/s/Endako Mine.asp.)
- Tolcin, A.C., 2011, Indium: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 74–75.
- Tollinsky, Norm, 2009, Full speed ahead at Totten Mine: Sudbury Mining Solutions Journal, September. (Accessed July 28, 2011, at http://www.sudburyminingsolution.com/articles/News/09-09-Full-speed-ahead-at-Totten.asp.)
- Touchdown Capital Inc., 2010, Touchdown Capital/Eagle Plains release analytical results from drill program at Sphinx molybdenum project, Southeast BC: Vancouver, British Columbia, Canada, Touchdown Capital Inc., February 12, 3 p.
- True North Gems Inc., 2009, True North Gems confirms significant rare earth element and niobium mineralization at True Blue gem aquamarine property, Yukon: Vancouver, British Columbia, Canada, True North Gems Inc., November 24, 2 p.
- Tyhee Development Corp., 2008, Tyhee reports 27% increase in the measured and indicated gold resource at Nicholas Lake, Yellowknife gold project, NWT, Canada: Vancouver, British Columbia, Canada, Tyhee Development Corp., April 3, 3 p.
- Tyhee Development Corp., 2010, Technical report on the pre-feasibility study of the Yellowknife gold project Northwest Territories, Canada: Vancouver, British Columbia, Canada, Tyhee Development Corp., July 22, 180 p.
- Vale Canada Ltd., 2010, Vale outlines investment plans for Canadian operations: Toronto, Ontario, Canada, Vale Canada Ltd., November 17, 4 p. (Accessed July 29, 2011, at http://nickel.vale.com/pdf/Press ReleaseCM.pdf.)
- Vale S.A., 2011, Form 20–F—2010: U.S. Securities and Exchange Commission, 162 p.
- Velocity Minerals Ltd., 2010a, Update on activities at Mt Haskin and Cassiar Moly—Moly, silver, lead, zinc copper [sic] and gold were all present in 2009 drill program: Richmond, British Columbia, Canada, Velocity Minerals Ltd., January 28, 3 p.
- Velocity Minerals Ltd., 2010b, Velocity Minerals Ltd. announces initial results of drilling at the Cassiar Moly property: Richmond, British Columbia, Canada, Velocity Minerals Ltd., September 24, 2 p.
- Wardrop Engineering Inc., 2010, Technical report and preliminary assessment of the Snowfield-Brucejack project: Vancouver, British Columbia, Canada, Wardrop Engineering Inc., 357 p. (Accessed March 16, 2011, at http://www.pretivm.com/i/pdf/TechnicalReport.pdf.)

- Western Troy Capital Resources Inc., 2009, Western Troy acquires gold claims in Quebec, delays MacLeod Lake feasibility study: Toronto, Ontario, Canada, Western Troy Capital Resources Inc., January 7, 2 p.
- World Nuclear Association, 2011, Uranium production figures—2000-2010: London, United Kingdom, World Nuclear Association, April, 2 p.
- Xstrata Copper Canada, 2009, Sustainability report 2008: Toronto, Ontario, Canada, Xstrata Copper Canada, 41 p.
- Xstrata Copper Canada, 2010, Sustainability report 2009: Toronto, Ontario, Canada, Xstrata Copper Canada, 41 p.
- Xstrata plc, 2010, Interim management statement and Q3 production report: Zug, Switzerland, Xstrata plc, October 19, 7 p.
- Xstrata plc, 2011, Production report for the 12 months ended 31 December 2010: Zug, Switzerland, Xstrata plc, February 1, 11 p. (Accessed February 2, 2011, at http://www.xstrata.com/media/news/2011/02/01/0800CET/pdf.)
- Yankee Hat Minerals Ltd., 2008, Yankee Hat signs joint exploration agreement with a major Japanese Government agency: Vancouver, British Columbia, Canada, Yankee Hat Minerals Ltd., August 6, 3 p.

- Yankee Hat Minerals Ltd., 2009a, Management discussion and analysis for the year ended July 31, 2009: Vancouver, British Columbia, Canada, Yankee Hat Minerals Ltd., 22 p.
- Yankee Hat Minerals Ltd., 2009b, Yankee Hat to focus on tungsten: Vancouver, British Columbia, Canada, Yankee Hat Minerals Ltd., April 15, 2 p.
- Yankee Hat Minerals Ltd., 2010a, Management discussion and analysis for the three months ended October 31, 2010: Vancouver, British Columbia, Canada, Yankee Hat Minerals Ltd., 14 p. (Accessed March 4, 2011, at http://www.yankeehatminerals.com/_resources/financials/2010-2011_Q1_KHT_MDA_FINAL.pdf.)
- Yankee Hat Minerals Ltd., 2010b, Yankee Hat renegotiates terms of JOGMEC jv agreement and shifts focus to Fran property, British Columbia: Vancouver, British Columbia, Canada, Yankee Hat Minerals Ltd., September 23, 2 p.
- Yukon Geological Survey, 2011, Yukon exploration and geology overview—2010: Whitehorse, Yukon Territory, Canada, Yukon Geological Survey, 104 p.

$\label{eq:table 1} \textbf{TABLE 1}$ CANADA: PRODUCTION OF MINERAL COMMODITIES 1

(Metric tons unless otherwise specified)

Commodity ²	2006	2007	2008	2009	2010 ^p
METALS					
Aluminum:					
Alumina, Aluminum oxide (Al ₂ O ₃), smelter grade	1,280,770	1,280,000 ^e	1,370,000	1,125,000	1,301,000
Metal:					
Primary	3,051,128	3,082,625	3,120,148	3,030,269	2,963,210
Secondary ^e	47,084 ³	50,000	50,000	40,000	40,000
Total ^e	$3,098,212^{-3}$	3,130,000 ^r	3,170,000	3,070,000	3,000,000
Antimony ⁴	269	193	132	64 ^r	1,000
Bismuth:					
Mine output, Bi content ^{4, 5}	177	137	71	86	91
Metal, refined ^e	250	250	150	150	150
Cadmium:					
Mine output, Cd content ⁴	579	342	365	376 ^r	326
Metal, refined	2,094	1,388	1,409	1,299	1,300 e
Cobalt:	_,~.	-,	-,	-,	-,
Mine output, Co content ^{4, 6}	7,114	8,692	8,953	3,919 ^r	4,568
Metal, refined	5,198	5,620	5,637	4,918	4,650 e
Copper:	3,170	3,020	3,037	7,710	4,050
	603,295	596,249	607,957	494,524	525,129
Mine output, Cu content ⁴ Metal:	003,293	390,249	007,937	494,324	323,129
	-				
Smelter:	494 (75	470.712	442.710	216.510	219.006
Primary, blister	484,675	470,713	443,710	316,510	318,006
Secondary	35,826	46,101	41,777	29,733	31,815
Total	520,501	516,814	485,487	346,243	349,821
Refined:	160 262 3	122 152 3	412.000	210.000	200.000
Primary ^e	469,363 ³	423,453 ³	412,000	310,000	290,000
Secondary ^e	31,100	30,000	30,000	25,000 r, e	29,000
Total	500,463	453,453	442,050	335,052 ^r	319,200
Gold, mine output, Au content kilograms	104,448	102,377	96,501	97,367	91,024
Indium, metal ^e do.	51,500	61,000	57,000	50,000	67,000
Iron and steel:					
Iron ore and concentrate:					
Gross weight thousand metric tons	33,543	32,774	32,102	31,704	37,001
Fe content ^e do.	21,341 3	$20,751^{-3}$	20,300	20,000	23,300
Metal:					
Pig iron ⁷ do.	8,305	8,577	9,000	5,000	8,000
Direct-reduced iron ⁷ do.	446	911	690	300	600
Ferroalloys, electric arc furnace: ^e	-	-			
Ferrosilicon do.	56	56	60	50	50
Silicon metal do.	30	30	50	30	30
Ferroniobium do.	6	7	7	7	7
Ferrovanadium do.	1	1	1	1	1
Total do.	90	90	110	90	90
Crude steel do.	15,493 7	15,569 7	15,100 e	9,245 ^r	13,003
Lead:	13,493	13,303	15,100	7,443	13,003
Mine output, Pb content	83,096	75,135	99,810	68,839 r	64,859
Metal, refined:	05,070	13,133	22,010	00,037	04,039
Primary	115 000	05 577	105 526	101 494	105 926
	115,989	95,577	105,526	101,484	105,836
Secondary	134,475	141,111	153,549	157,370	167,042
Total	250,464	236,688	259,075	258,854	272,878
Magnesium, metal, primary ^e	65,000	16,300	2,000		
Molybdenum, mine output, Mo content	7,723	6,681	8,602	8,721 ^r	8,261
Nickel:					
Mine output, Ni content ⁴	232,948	254,915	259,651	135,037 ^r	158,376
Refined ⁸	146,899	153,647	167,732	116,909	105,413

See footnotes at end of table.

TABLE 1—Continued CANADA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²		2006	2007	2008	2009	2010 ^p
METALS—Continued	_					
Niobium (columbium) and tantalum:						
Pyrochlore concentrate:		12.500	12.500	12 200	12 000	12 200
Gross weight ^e Nb content of ferroniobium		12,500 4,177	12,500 4,337	13,200 4,383	12,900 4,330	13,200 4,419
Tantalite concentrate:		4,177	4,337	4,363	4,330	4,419
		249	201	150	110	
Gross weight ^e Ta content (Ta ₂ O ₅)		68	55	49	30	
Nb content		10	9	6 e	5	
Platinum-group metals, mine output:				0		
Palladium ^e	kilograms	14,900 ^r	14,100 ^r	14,700 r	7,000 r	6,200
Platinum ^e	do.	8,500 ^r	8,000 ^r	8,500 r	4,000 r	3,600
Others (iridium/rhodium/ruthenium) ^e	do.	1,000 r	900 ^r	1,000 r	400 r	400
Total	do.	24,389	23,079	24,173	11,376 ^r	10,215
Selenium ⁹	do.	106,000	144,000	156,000	173,000	79,000
Silver:	40.	100,000	1,000	120,000	1,5,000	7,,000
Mine output, Ag content	do.	995,024	860,449	755,103	617,777 ^r	596,061
Refined	do.	1,544,705	1,213,118	1,324,499	1,287,659	1,640,612
Tellurium ^{5, 9}	do.	10,000	14,000	19,000	16,000	8,000
Titanium, Sorelslag® ¹⁰		930,000	960,000	1,000,000	765,000 r, e	1,000,000 e
Tungsten, mine output, W content ⁵		1,983 r	2,305 r	2,277 r	1,964 ^r	420
Zinc:		,	,	,	,	
Mine output, Zn content		637,956	630,485	750,502	699,145 ^r	648,905
Metal, refined, primary		824,464	802,103	764,310	685,504 ^r	691,222
INDUSTRIAL MINERALS						
Asbestos ^e		200,000	180,000	160,000	150,000	100,000
Barite ⁵		20,000	9,000	12,000	15,000	22,000
Cement, hydraulic ⁵	thousand metric tons	14,336	15,078	13,672	10,985	12,431
Clay and clay products ¹¹	value, thousands	\$197,000	\$195,000	\$187,768	\$135,613	\$156,554
Diamond	carats	13,278,000	17,144,000	14,803,000	10,946,000	11,773,000
Diatomite ^e		10,000	10,000	10,000	8,000	8,000
Gemstones, includes amethyst and jade		68	67	67	49	22
Graphite ^e		28,000	28,000	27,000	25,000	25,000
Gypsum and anhydrite ¹²	thousand metric tons	9,036	7,562	5,740	3,540	2,717
Lime ⁵	do.	2,189	2,134	2,069	1,601	1,913
Lithium, spodumene ^e		22,500	23,000	22,000	10,000	
Magnesite, dolomite, brucite ^e		140,000 r, e	140,000 r, s	140,000 r, e	140,000 r, e	150,000 e
Mica, scrap and flake ^e		17,500	18,000	17,000	15,000	15,000
Nepheline syenite		734,000	690,000	734,000	513,000	581,000
Nitrogen, N content of ammonia		4,100,000 e	4,498,000	4,781,000	4,000,000	4,000,000
Peat	thousand metric tons	1,245	1,282	1,151	1,131	1,262
Phosphate rock, P ₂ O ₅ content ^e	do.	165	210	210	200	210
Potash, K ₂ O equivalent	do.	8,518	11,085	10,455	4,318	9,788
Pyrite and pyrrhotite, gross weight ^e		r, e	r, e	r, e	r, e	
Salt	thousand metric tons	14,389	11,862	14,386	14,651	10,537
Sand and gravel	do.	238,515	240,723	239,646	216,170	205,804
Silica, quartz ^{5, 12}	do.	2,146	1,987	1,979	1,296	1,171
Sodium compounds, including sodium sulfate, natural	l ^{e, 13} do.	180	150	200	210	210
Stone 12, 14	do.	153,897	149,982	145,825	135,895	147,643
Sulfur, byproduct:						
Metallurgy	do.	1,176	1,167 ^r	1,148 ^r	890 ^r	900 ^e
Petroleum	do.	7,906	7,622 ^r	7,008 ^r	6,577 ^r	6,355
Total	do.	9,082	8,789 ^r	8,156 ^r	7,467 ^r	7,255 ^e
Talc, pyrophyllite, soapstone ^e	do.	72	79	70	44	96

TABLE 1—Continued CANADA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ² MINERAL FUELS AND RELAT	CED MATERIAL C	2006	2007	2008	2009	2010 ^p
	IED MATERIALS	100.000	105.000	100.000	120 000 1	120.000
Carbon black ^e		180,000	195,000	180,000	120,000 r	130,000
Coal, run of mine:		55.560	50.000	55 000	50 500 f	55 000 f
Bituminous and subbituminous	thousand metric tons	55,562	58,822	57,800	52,500 e	57,000 e
Lignite	do.	10,440	10,541	9,900	10,400 e	11,000 e
Total	do.	66,002	69,363	67,749	62,935 r	67,876
Coke, high-temperature	do.	4,325	4,304	3,040	2,800 e	3,000 e
Natural gas:						
Gross (excluding gas flared or recycled)	million cubic meters	220,432	215,649	208,653	196,168	189,589
Marketed	do.	171,641	167,195	157,949	145,133	144,378
Natural gas liquids:						
Gas plant liquids	thousand 42-gallon barrels	194,000	196,000	182,000	174,000	168,000 e
Pentanes plus	do.	55,000	57,000	55,000	51,900	50,000 e
Condensate	do.	9,800	10,600	11,200	9,500	8,700 e
Total	do.	258,800	263,600	248,200	235,400	230,000 ^e
Petroleum:						
Crude ¹⁵	do.	904,000	941,000	934,000	933,000	990,000 e
Refinery products:						
Propane and butane	do.	20,385	22,019	21,339	20,400	21,600 e
Gasoline:						
Aviation	do.	702	700	700 e	550 r, e	500 e
Motor	do.	293,741	279,200	258,000 e	262,000 e	262,000 e
Petrochemical feedstocks	do.	29,251	35,000	30,000 e	20,000 r, e	34,000 e
Jet fuel	do.	32,983	31,600	32,000 e	30,000 r, e	30,000 e
Kerosene	do.	3,717	11,800	11,000 e	9,900 ^e	5,000 ^e
Diesel and light fuel oil	do.	247,064	228,300	226,000 e	220,000 r, e	225,000 e
Lubricants including grease	do.	8,458	7,500	8,000 e	7,000 r, e	7,200 e
Heavy fuel oil	do.	63,615	55,500	52,000 e	42,000 e	44,000 e
Asphalt	do.	29,254	26,000	26,000 e	25,000 e	27,000 e
Petroleum coke	do.	10,909	10,300	10,000 r, e	9,000 r, e	8,500 e
Other petroleum products	do.	32,119	29,500	30,000 r, e	35,000 r, e	34,000 e
Refinery fuel and losses ¹⁶	do.	37,704	33,000 r, e	33,000 r, e	33,000 r, e	35,000 e
Total	do.	809,902	740,419	711,000 e	712,000 e	730,000 e
Uranium oxide, U content		9,862	9,475	9,001	10,176	9,684 e

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^pPreliminary. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through June 23, 2011.

²In addition to the commodities listed, aluminum hydroxide Al (OH)₃ (hydrate), cesium, ilmenite, ore containing indium, pumice, and zeolite are produced, but available information is inadequate to estimate output.

³Reported.

⁴Metal content of concentrates produced.

⁵Producers' shipments and quantities used by producers.

⁶Cobalt content of all products derived from Canadian ores, which include cobalt oxide shipped to the United Kingdom for further processing and nickel-cobalt matte shipped to Norway for refining.

⁷Source of iron and steel data: World Steel Association (Worldsteel).

⁸Nickel contained in products of smelters and refineries in forms that are ready for use by consumers. Natural Resources Canada has revised all refined nickel figures to conform with International Nickel Study Group (INSG) guidelines.

⁹Includes metal refined from imports and secondary sources. Also includes metal content of exported concentrates.

¹⁰Refined Sorelslag® has been upgraded to 95% titanium oxide.

¹¹Includes bentonite products from common clay, fire clay, stoneware clay, and other clays. Values are in current Canadian dollars. If necessary, values can be converted from Canadian dollars (CAN\$) to U.S. dollars (US\$) at an average rate of CAN\$1.074=US\$1.00.

¹²Shipments; excludes shipments to Canadian cement, clay, and lime plants.

¹³Excludes byproduct production from chemical plants.

¹⁴Crushed, building, ornamental, paving, and similar stone.

¹⁵Includes synthetic crude from oil shale and (or) tar sands.

¹⁶Refinery fuel represents total production of still gas, which includes a small amount sold.

$\label{eq:table 2} \text{Canada: Structure of the mineral industry in 2010}^1$

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina:	and major equity owners	Location of main facilities	Annual capacity
Smelter grade	Rio Tinto Alcan Inc. (Rio Tinto Group, 100%)	Vaudreuil refinery, Jonquiere, Quebec	1,300.
Specialty grade	do.	do.	55.
Do.	Axens Canada Specialty Aluminas Inc. (Axens S.A.,	Alumina plant, Brockville, Ontario	18.
Б0.	100%)	Training plant, Brockvine, Onderso	10.
Muminum	Alcoa Ltd. (Alcoa Inc., 100%)	Smelter in Baie-Comeau, Quebec	385.
Do.	Aluminerie Alouette Inc. (Rio Tinto Alcan Inc., 40%;	Smelter in Sept-Iles, Quebec	572.
	Aluminium Austria Metall Québec, 20%; Hydro		
	Aluminum, 20%; Société générale de financement		
	du Québec, 13.33%; Marubeni Québec Inc., 6.67%)		
Do.	Aluminerie de Bécancour Inc. (Alcoa Inc., 75%, and	Smelter in Beacancour, Quebec	413.
	Rio Tinto Alcan Inc., 25%)		• • • • • • • • • • • • • • • • • • • •
Do.	Aluminerie Lauralco Inc. (Alcoa Inc., 100%)	Smelter in Deschambault, Quebec	260.
Do.	Rio Tinto Alcan Inc. (Rio Tinto Group, 100%)	Smelter in Alma, Quebec	435.
Do.	do.	Smelter in Arvida, Jonquiere, Quebec	172.
Do.	do.	Smelter in Grande-Baie, Quebec	215. 277.
Do. Do.	do. do.	Smelter in Kitimat, British Columbia Smelter in Laterriere, Quebec	235.
Do.	do.	Smelter in Shawinigan, Quebec	100.
antimony ore	Beaver Brook Antimony Mine Inc. (Hunan	Beaver Brook Mine, 43 kilometers southwest	180.
diffinition of C	Nonferrous Metals Corp., 100%)	of Glenwood. Newfoundland	100.
Asbestos, fiber	Jeffrey Mine Inc.	Jeffrey Mine, ² Asbestos, Quebec	NA.
Do.	LAB Chrysotile, Inc.	Lac d'Amiante du Quebec, Ltee, Quebec	160.
dismuth ore	1710 City source, inc.	Euc d'Aimaine du Quebec, Etec, Quebec	100.
Ore	Xstrata Zinc	Brunswick Mine, about 25 kilometers	NA.
	1 Island Zine	southeast of Bathurst, New Brunswick	1112
Metal	do.	Belledune lead smelter, Belledune, New	NA.
		Brunswick	
Do.	Teck Resources Ltd.	Trail smelter and refinery complex, Trail,	300.
		British Columbia	
Cement	Ciment Québec Inc.	Saint-Basile, Quebec	1,571.
Do.	ESSROC Canada Inc. (Italcementi Group)	Picton, Ontario	792.
Do.	Federal White Cement Ltd.	Woodstock, Ontario	544.
Do.	Holcim (Canada) Inc. (Holcim AG)	Joliette, Quebec	1,475.
Do.	do.	Mississauga, Ontario	2,000.
Do.	Lafarge Canada Inc. (Lafarge North America)	Bath, Ontario	1,176.
Do.	do.	Woodstock, Ontario	814.
Do.	do.	Exshaw, Alberta	1,422.
Do.	do.	Kamloops, British Columbia	324.
Do.	do.	Richmond, British Columbia	1,319.
Do.	do.	St. Constant, Quebec	1,157.
Do.	do.	Brookfield, Nova Scotia	621.
Do.	Lehigh Inland Cement Ltd. (HeidelbergCement	Edmonton, Alberta	1,380.
D-	Group) do.	Dalla Daitiah Calambia	1.256
Do.	St. Marys Cement (Canada) Inc. (Votorantim	Delta, British Columbia Bowmanville, Ontario	1,356. 1,377.
Do.	Cimentos S.A.)	Bowinanyme, Ontario	1,5//.
Do.	do.	St. Marys, Ontario	645.
Coal:	uo.	St. Marys, Charle	043.
Bituminous:	<u> </u>		
Coking	Grande Cache Coal Corp.	Grande Cache Mine, near Grande Cache,	2,000.
209	Cianas Caene Cour Corp.	Alberta	<u></u>
Do.	Peace River Coal Inc. (Anglo Coal Canada, 74.51%;	Trend open pit mine, near Tumbler Ridge,	2,000.
_ **	Vitol Anker International B.V., 13.36%;	British Columbia	,
	Northern Energy and Mining Inc., 12.31%)		
Do.	Teck Coal Partnership (Teck Resources Ltd., 100%)	Fording River open pit mine, near Elkford,	8,900.
	r (, 100/0)	British Columbia	7
Do.	do.	Cardinal River open pit mine, near Hinton,	2,200.
D0.			

$\label{eq:table 2-Continued} TABLE\ 2--Continued$ CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010 1

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Logation of main facilities	Annual capacit
Coal—Continued:	and major equity owners	Location of main facilities	Annual capacity
Bituminous—Continued:			
Coking—Continued	Teck Coal Partnership (Teck Resources Ltd., 100%)	Coal Mountain open pit mine at Sparwood, British Columbia	2,700.
Do.	do.	Line Creek Mine, near Sparwood, British Columbia	2,700.
Do.	Teck Coal Partnership (Teck Resources Ltd., 95%)	Elkview open pit mine, near Sparwood, British Columbia	5,500.
Do.	Teck Coal Partnership (Teck Resources Ltd., 80%)	Greenhills open pit mine, near Elkford, British Columbia	5,100.
Do.	Western Canadian Coal Corp.	Wolverine Creek open pit mine, near Tumbler Ridge, British Columbia	3,000.
Do.	do.	Brule Mine, near Chetwynd, British Columbia	2,000.
Do.	do.	Willow Creek Mine, 45 kilometers from Chetwynd, British Columbia	1,700
Steam	NB Power	Minto Mine, near Minto, New Brunswick	NA.
Do.	Pioneer Coal Ltd.	Stellarton Mine, near Stellarton, Nova Scotia	NA.
Do.	Sherritt International Corp.	Coal Valley Mine, near Edson, Alberta	3,600.
Do.	Vitol Anker International B.V.	Quinsam Mine, near Campbell River, British Columbia	500.
Lignite	Prairie Mines & Royalty Ltd. (Sherritt International Corp.)	Boundary Dam open pit mine, near Estevan, Saskatchewan	6,500.
Do.	do.	Poplar River open pit mine, near Coronach, Saskatchewan	4,000.
Do.	do.	Bienfait open pit mine, near Bienfait, Saskatchewan	2,800.
Subbituminous	do.	Highvale open pit mine, near Seba Beach, Alberta	13,000.
Do.	do.	Genesee open pit mine, near Warburg, Alberta	5,600.
Do.	do.	Sheerness open pit mine, near Hanna, Alberta	4,000.
Do.	do.	Paintearth open pit mine, near Forestburg, Alberta	3,500.
Do.	do.	Whitewood open pit mine, near Seba Beach, Alberta	1,400.
opper:		Will IVII C. W. W. I	100
Ore, Cu content	Highland Valley Copper Partnership (Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%)	British Columbia	190.
Do.	Vale Canada Ltd. (Vale S.A.)	Sudbury mines (includes the Coleman, Copper Cliff North, Creighton, Garison,	112.
Do	HydDay Minarala Ina	Gertrude, ² and Stobie Mines), Ontario	57
Do. Do.	HudBay Minerals Inc. Vale Newfoundland & Labrador Ltd. (Vale S.A.)	Trout Lake and 777 Mines, Manitoba Voisey's Bay mines (includes the Ovoid	57. 55.
		Mine), Newfoundland and Labrador	
Do.	Xstrata Nickel (Xstrata plc, 100%)	Kidd Creek Mine, about 20 kilometers north of Timmins, Ontario	50.
Do.	Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and consortium composed of Mitsubishi Materials Corp., Marubeni Corp., Dowa Metals and Mining Company, Ltd., and Furukawa Company, Ltd., 50%)	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	37.
Do.	Northgate Minerals Corp.	Kemess South Mine, British Columbia	37.
Do.	Taseko Mines Ltd.	Gibraltar Mine, British Columbia	31.
Do.	Mount Polley Mining Corp. (Imperial Metals Corp., 100%)	Mount Polley Mine at Williams Lake, British Columbia	31.
Do.	NVI Mining Ltd. (Breakwater Resources Ltd.)	Myra Falls (Battle-Gap and H-W Mines), British Columbia	28.

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Copper—Continued: Ore, Cu content—Conti	inued	Imperial Metals Corp.	Mount Polley Mine, 8 kilometers southwest of Likely, British Columbia	27.
Do.		Sherwood Copper Corp.	Minto Mine, Yukon	23.
Do.		Xstrata Nickel (Xstrata plc, 100%)	Fraser Morgan and Nickel Rim South Mines, Sudbury division, Sudbury, Ontario	23.
Do.		Quadra FNX Mining Ltd.	Podolsky Mine, Ontario	13.
Do.		Teck Resources Ltd.	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor, Newfoundland and Labrador	13.
Do.		Agnico-Eagle Mines Ltd.	LaRonde Mine, about 650 kilometers northwest of Montreal, Quebec	9.
Do.		Inmet Mining Corp.	Troilus Mine, Quebec	7.
Do.		Xstrata Zinc (Xstrata plc, 100%)	Brunswick Mine, 20 kilometers southwest of Bathurst, New Brunswick	7.
Do.		Xstrata Nickel (Xstrata plc, 100%)	Raglan Mine, Quebec	7.
Do.		North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	3.
Do.		Xstrata Nickel (Xstrata plc, 100%)	Montcalm Mine, Ontario	2.
Smelter:				
Anode		Xstrata Copper (Xstrata plc, 100%)	Horne Smelter in Noranda, Quebec	180.
Do.		do.	Smelter at Kidd Creek metallurgical facility, about 20 kilometers northeast of Timmins, Ontario	150.
Do.		Vale Canada Ltd. (Vale S.A.)	Copper Cliff smelter in Sudbury, Ontario	500.
Do.		HudBay Minerals Inc.	Smelter in Flin Flon, Manitoba	90.
Copper-nickel matte		Xstrata Nickel (Xstrata plc, 100%)	Sudbury smelter, Ontario	130.
Refinery (Cu cathode)		Xstrata Copper (Xstrata plc, 100%)	CCR Refinery in Montreal-Est, Quebec	265.
Do.		do.	Kidd Creek refinery, about 20 kilometers northeast of Timmins, Ontario	140.
Diamond	carats	Diavik Diamond Mines Inc. (Rio Tinto plc, 60%, and and Harry Winston Diamond Mines Ltd., 40%)	Diavik open pit mine (includes the A154 North and the A154 South kimberlite pipes), northeast of Yellowknife region, Northwest Territories	11,900,000.
Do.	do.	BHP Billiton Canada Inc. (BHP Billiton Group, 80%)	Ekati Mine (includes the Koala and the Panda underground mines and the Beartooth, Fox, Koala, and Misery open pit mines) in the Lac de Gras region, Northwest Territories	4,600,000.
Do.	do.	De Beers Canada Inc. (De Beers Group)	Snap Lake underground mine, 220 kilometers northeast of Yellowknife, Northwest Territories	1,400,000.
Do.	do.	do.	Victor open pit mine, 90 kilometers west of Attawapiskat, Ontario	600,000.
Do.	do.	Joint venture of Tahera Diamond Corp., 84%, and Teck Resources Ltd., 16%	Jericho Mine, ² 420 kilometers northeast of Yellowknife, Nunavut Territory	500,000.
Gold, Au content of ore	kilograms	Agnico-Eagle Mines Ltd.	Lapa Mine, about 60 kilometers west of Val-d'Or, Quebec	40,000.
Do.	do.	do.	LaRonde Mine, about 60 kilometers west of Val-d'Or, Quebec	5,600.
Do.	do.	do.	Goldex Mine, Val-d'Or, Quebec	5,000.
Do.	do.	Alexis Minerals Corp.	Lac Herbin Mine, about 10 kilometers northeast of Val-d'Or, Quebec	5,000.
		Anaconda Mining Inc.	Pine Cove Mine, near Baie Verte,	400.
Do.	do.	Anaconda Willing Inc.	Newfoundland and Labrador	
Do.	do.	Aurizon Mines Ltd.	Newfoundland and Labrador Casa Berardi Mine, about 95 kilometers north of La Sarre, Quebec	5,000.

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
old, Au content of ore—Continued	kilograms	Barrick Gold Inc.	Hemlo operation, includes David Bell underground mine and Williams open pit and underground mine, about 250 kilometers east of Thunder Bay, Ontario	8,100.
Do.	do.	Brigus Gold Corp.	Black Fox Mine, near Timmins, Ontario	25,000.
Do.	do.	Capstone Mining Corp.	Minto Mine, about 240 kilometers	650.
Б0.	uo.	Capstone Willing Corp.	northwest of Whitehorse, Yukon Territory	
Do.	do.	Century Mining Corp.	Sigma-Lamaque complex (includes the Sigma Mine and the Lamaque Mine), Val-d'Or, Quebec	1,400.
Do.	do.	Claude Resources Inc.	Seabee operations (includes the Seabee and the Santoy 7 Mines), Laonil Lake, Saskatchewan	1,800.
Do.	do.	Goldcorp Inc.	Musselwhite Mine, 480 kilometers north of Thunder Bay, Ontario	7,000.
Do.	do.	do.	Porcupine Mine, Timmins, Ontario	9,100.
Do.	do.	do.	Red Lake Mine (includes Red Lake and the Campbell complexes), 180 kilometers north of Dryden, Ontario	26,000.
Do.	do.	Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and a consortium consisting of Mitsubishi Materials Corp., Marubeni Corp., Dowa Metals & Mining Company, Ltd., and Furukawa Company, Ltd., 50%)	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	95.
Do.	do.	Hudson Bay Mining and Smelting Company Ltd. (HudBay Minerals Inc., 100%)	777 and Trout Lake Mines, Flin Flon, Manitoba	1,400.
Do.	do.	Huakan International Mining Inc.	Greenwood Gold project ² (includes the Lexington-Grenoble Mine), near Greenwood, British Columbia	600.
Do.	do.	IAMGOLD Corp.	Doyon division (includes the Mouska Mine), about 40 kilometers east of Rouyn-Noranda, Quebec	4,100.
Do.	do.	Imperial Metals Corp.	Mount Polley Mine, 8 kilometers southwest of Likely, British Columbia	1,700.
Do.	do.	Inmet Mining Corp.	Trolius Mine, about 175 kilometers north of Chibougamau, Quebec	5,000.
Do.	do.	Kirkland Lake Gold Inc.	South Mine complex (Macassa Mine, Ontario)	1,800.
Do.	do.	Metanor Resources Inc.	Bachelor Lake mill (located about 225 kilometers northeast of Val-d'Or, Quebec) processed preproduction ore from the Barry open pit, which was located about 65 kilometers southeast of the mill	1,000.
Do.	do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	800.
Do.	do.	do.	Sleeping Giant Mine, about 80 kilometers north of Amos, Quebec	2,100.
Do.	do.	Northgate Minerals Corp.	Kemess South Mine, British Columbia	9,700.
Do.	do.	NVI Mining Ltd. (Breakwater Resources Ltd.)	Myra Falls complex (Battle-Gap and H-W Mines), British Columbia	1,000.
Do.	do.	Quadra FNX Mining Ltd.	Levack complex (includes the Levack Mine and the McCreedy West Mine), near Levack, Ontario	125.
Do.	do.	do.	Podolsky Mine, Ontario	170.
Do.	do.	San Gold Corp.	Hinge Mine and Rice Lake Mine, Manitoba	16,000.
Do.	do.	Richmont Mines Inc.	Island Gold Mine, near Dubreuilville, Ontario	1,600.

See footnotes at end of table.

(Thousand metric tons unless otherwise specified)

Commodit	y	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold, Au content of ore—Continued	kilograms	Richmont Mines Inc., 50%, and Louvem Mines Inc., 50%	Beaufor Mine, about 21 kilometers northeast of Val-d'Or, Quebec	1,250.
Do.	do.	Teck Resources Ltd.	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor, Newfoundland and Labrador	125.
Do.	do.	Vale Canada Ltd. (Vale S.A.)	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	NA.
Do.	do.	do.	Ontario division, includes Garson Mine, Garson, Ontario; Coleman/McCreedy East Mine, near Levack, Ontario; and Stobie Mine, north of Sudbury, Ontario	NA.
Do.	do.	Wesdome Gold Mines Ltd.	Eagle River Mine, about 50 kilometers west of Wawa, Ontario	1,600.
Do.	do.	do.	Kiena Mine, about 10 kilometers west of Val-d'Or, Quebec	1,300.
Do.	do.	Xstrata Copper (Xstrata plc, 100%)	CCR Refinery in Montreal-Est, Quebec	NA.
Do.	do.	Xstrata Zinc (Xstrata plc, 100%)	Brunswick Mine, 20 kilometers southwest of Bathurst, New Brunswick	NA.
Indium	metric tons	Teck Resources Ltd.	Trail smelter and refinery complex, British Columbia	70.
Do.	do.	Xstrata plc	Kidd Creek metallurgical complex, Ontario ²	15.
Iron and steel:		•		
Iron ore:				
Ore		ArcelorMittal Mines Canada (ArcelorMittal)	Fire Lake and Mont-Wright open pit mines, Quebec	19,300.
Do.		Iron Ore Company of Canada (Rio Tinto Ltd., 58.72%; Mitsubishi Corp., 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%)	Carol Lake open pit mine, Labrador City, Newfoundland and Labrador	17,000.
Do.		Wabush Mines Ltd. (Cliffs Natural Resources Inc.)	Scully Mine, near Wabush, Newfoundland and Labrador	6,200.
Magnetite for coal	washing	Craigmont Mines Ltd.	Reprocessed tailings near Merritt, British Columbia	NA.
Pellets		Iron Ore Company of Canada (Rio Tinto Ltd., 58.72%; Mitsubishi Corp., 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%)	Pelleting plant, Labrador City, Newfoundland and Labrador	13,000.
Steel, crude		AltaSteel Ltd. (OneSteel Ltd.)	Edmonton, Alberta	320.
Do.		ArcelorMittal Dofasco Inc. (ArcelorMittal)	Hamilton, Ontario	4,100.
Do.		ArcelorMittal Canada Inc. (ArcelorMittal)	Contrecoeur East and Contrecoeur West plants, Quebec	2,500.
Do.		Essar Steel Algoma Inc. (Essar Global Ltd.)	Sault Ste. Marie, Ontario	2,800.
Do.		Gerdau Steel North America Inc. (Gerdau S.A.)	Whitby, Ontario	790.
Do.		do.	Selkirk, Manitoba	430.
Do.		do.	Cambridge, Ontario	380.
Do.		Hamilton Speciality Bar (2007) Inc.	Hamilton, Ontario	360.
Do.		Ivaco Rolling Mills Inc.	L'Orignal, Ontario	380.
Do.		MMFX Steel of Canada Inc. (MMFX Technologies Corp.)	Welland, Ontario	120.
Do.		QIT-Fer et Titane Inc. (Rio Tinto Iron and Titanium Inc.)	Sorel, Quebec	500.
Do.		SSAB Svenskt Stål AB—IPSCO Division	Regina, Saskatchewan	1,500.
Do.		U.S. Steel Canada (United States Steel Corp.)	Lake Erie Works, Naticoke, Ontario	2,400.
Do.		do.	Hamilton Works, ² Hamilton, Ontario	2,300.
Lead: Lead-zinc ore		Xstrata Zinc (Xstrata plc, 100%)	Brunswick Mine in Bathurst, New Brunswick	3,550.

(Thousand metric tons unless otherwise specified)

C J:,		Major operating companies	Landing Service Collection	Ammuol'
Commodity Land Continued:		and major equity owners	Location of main facilities	Annual capacity
Lead—Continued: Lead-zinc ore—Continue	ed:	Maple Minerals Corp.	Caribou underground mine, ² 45 kilometers west of Bathurst, New Brunswick	700.
Do.		NVI Mining Ltd. (Breakwater Resources Ltd.)	Myra Falls complex (Battle-Gap and H-W Mines), British Columbia	800.
Do.		ScoZinc Ltd. (Acadian Mining Corp.)	Scotia open pit mine, ² Gays River, Nova Scotia	600.
Refined:				
Primary		Teck Resources Ltd.	Trail smelter and refinery complex, Trail, British Columbia	100.
Do.		Xstrata Zinc (Xstrata plc, 100%)	Belledune smelter and refinery, 35 kilometers north of Bathurst, New Brunswick	74.
Secondary, includes lea	d alloys	NovaPb Inc. (Newalta Corp.)	Ville Sainte Catherine, Quebec	100.
Do.		Tonolli Canada Ltd.	Mississauga, Ontario	35.
Do.		Metalex Products Ltd.	Richmond, British Columbia	8.
Molybdenum, ore, m Mo content	netric tons	Highland Valley Copper Partnership (Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%)	Highland Valley Copper Mine, Kamloops, British Columbia	1,900.
Do.	do.	Huckleberry Mines Ltd. (Imperial Metals Corp., 50%, and a consortium composed of Mitsubishi Materials Corp., Marubeni Corp., Dowa Metals and Mining Co., Ltd., and Furukawa Co., Ltd., 50%)	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	85.
Do.	do.	FortyTwo Metals Inc. (Roca Mines Inc., 100%)	Max Mine, about 60 kilometers southeast of Revelstoke, British Columbia	1,800.
Do.	do.	Joint venture of Thompson Creek Metals Company Inc. (75%) and Sojitz Moly Resources, Inc. (25%)	Endako Mine, near Fraser Lake, about 160 kilometers northwest of Prince George, British Columbia	5,200.
Nickel:			3.,	
Ore, Ni content		Crowflight Minerals Inc.	Bucko Lake Mine, near Wabowden, Manitoba	2.
Do.		First Nickel Inc.	Lockerby Mine, ² Sudbury district, Ontario	2.
Do.		Liberty Mines Inc.	McWatters Mine, about 30 kilometers	3.
		•	southeast of Timmins, Ontario, and the Redstone Mine, about 25 kilometers southeast of Timmins, Ontario	
Do.		Quadra FNX Mining Ltd.	Levack complex ² (includes the Levack Mine and the McCreedy West Mine), near Levack, Ontario	5.
Do.		do.	Podolsky Mine, Ontario	1.
Do.		Ursa Major Minerals Inc.	Shakespeare Mine. Sudbury, Ontario	1.
Do.		Vale Canada Ltd. (Vale S.A.)	Sudbury mines (includes the Coleman, Copper Cliff North, Copper Cliff South, Creighton, Garson, Gertrude, Mines), Ontario	106.
Do.		do.	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	45.
Do.		Vale Newfoundland & Labrador Ltd. (Vale S.A.)	Voisey's Bay Mines (includes the Ovoid Mine), Newfoundland and Labrador	60.
Do.		Xstrata Nickel (Xstrata plc, 100%)	Raglan Mine in Ungave, Quebec	27.
Do.		do.	Fraser Morgan and Nickel Rim South Mines in the Sudbury district, Ontario	NA.
Smelter		Vale Canada Ltd. (Vale S.A.)	Smelter in Sudbury, Ontario	110 (Ni oxide).
Do.		do.	Smelter in Thompson, Manitoba	82 (Ni anode).
Do.		Xstrata Nickel (Xstrata plc, 100%)	Sudbury smelter in Sudbury, Ontario	130 (Cu-Ni matte).
See footnotes at and of table				

See footnotes at end of table.

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nickel—Continued: Refinery		The Cobalt Refinery Company Inc. (Moa joint venture of General Nickel S.A., 50%, and Sherritt International Corp., 50%)	Refinery in Fort Saskatchewan, Alberta	33 (Ni briquets and powder), 4 (Co briquets and powder).
Do.		Vale Canada Ltd. (Vale S.A.)	Refinery in Sudbury, Ontario	57 (Ni pellets and powder).
Do.		do.	Refinery in Thompson, Manitoba	NA.
Niobium (columbium) me	tric tons	IAMGOLD Corp.	Niobec Mine, Chicoutimi, Quebec	3,450 (Nb content).
Petroleum, barrels refinery products	per day	Chevron Canada Ltd. (Chevron Corp., 100%)	Burnaby refinery, Burnaby, British Columbia	55,000.
Do.	do.	Consumers' Co-operative Refineries Ltd. (Federated Co-operatives Ltd., 100%)	Regina, Saskatchewan	100,000.
Do.	do.	Husky Energy Inc.	Prince George refinery, Prince George, British Columbia	10,000.
Do.	do.	do.	Lloydminster asphalt refinery, Lloydminster, Alberta	25,000.
Do.	do.	Imperial Oil Ltd. (Exxon Mobil Corp., 69.6%)	Dartmouth refinery, Halifax Nova Scotia	82,000.
Do.	do.	do.	Nanticoke refinery, 40 kilometers southwest of Hamilton, Ontario	112,000.
Do.	do.	do.	Sarnia refinery, Sarnia, Ontario	121,000.
Do.	do.	do.	Strathcona refinery, Edmonton, Alberta	187,000.
Do.	do.	Irving Oil Ltd.	Irving refinery, Saint John, New Brunswick	250,000.
Do.	do.	Moose Jaw Refinery (Gibson Energy ULC)	Moose Jaw asphalt refinery, Moose Jaw, Saskatchewan	4,100.
Do.	do.	North Atlantic Refining Ltd. (Harvest Operations Corp.)	North Atlantic refinery, Come by Chance, Newfoundland and Labrador	115,000.
Do.	do.	Shell Canada Ltd. (Royal Dutch Shell plc, 100%)	Montreal East refinery, ² Montreal East, Quebec	130,000.
Do.	do.	do.	Scotford refinery, 40 kilometers northeast of Edmonton, Alberta	100,000.
Do.	do.	do.	Sarnia manufacturing center (Corunna refinery), Sarnia, Ontario	72,000.
Do.	do.	Suncor Energy Inc.	Edmonton refinery, Edmonton, Alberta	135,000.
Do.	do.	do.	Montreal refinery, Montreal East, Quebec	129,800.
Do.	do.	do.	Sarnia refinery, Sarnia, Ontario	85,000.
Do.	do.	Ultramar Ltd. (Valero Energy Corp., 100%)	Jean Gaulin refinery, Levis, Quebec	265,000.
Potash (K ₂ O equivalent)		Agrium Products Inc.	Vanscoy, Saskatchewan	1,750.
Do.		Mosaic Potash Colonsay ULC (The Mosaic Co., 100%)	Colonsay, Saskatchewan	1,800.
Do.		Mosaic Potash Esterhazy Limited Partnership Ltd. [The Mosaic Co., 75%, and Potash Corp. of Saskatchewan Inc. (PotashCorp.), 25%]	Esterhazy, southeast Saskatchewan	5,300.
Do.		The Mosaic Co.	Belle Plaine, Saskatchewan	2,800.
Do.		Potash Corp. of Saskatchewan Inc. (PotashCorp)	Lanigan, near Lanigan, Saskatchewan	3,828.
Do.		do.	Rocanville, southeast Saskatchewan	3,044.
Do.		do.	Allan division, Allan, Saskatchewan	1,885.
Do.		do.	Cory, near Saskatoon, Saskatchewan	1,361.
Do.		do.	Patience, near Saskatoon, Saskatchewan	1,033.
Do.	-	do.	Sussex, New Brunswick	785.
Salt: Rock salt and brine operation	ions	The Canadian Salt Co. Ltd.	Rock salt mine at Ojibway, Ontario, and brine wells near Windsor, Ontario	2,600.
Do.		do.	Pugwash, Nova Scotia	1,400.
Do.		Potash Corp. of Saskatchewan Inc. (PotashCorp)	Sussex, New Brunswick	700.
Rock salt		Sifco Canada Inc. (Compass Minerals Group Inc.)	Goderich Harbour, Ontario	6,500.
		Seleine Mines Division of The Canadian Salt Co.	Iles-de-la-Magdalen, Quebec	1,625.

$\label{eq:table 2-Continued} TABLE\ 2--Continued$ CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010 1

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Salt—Continued:	and major equity owners	Location of main facilities	Aimuai capacity
Rock salt—Continued:	Mosaic Potash Esterhazy Limited Partnership Ltd. [The Mosaic Co., 75%, and Potash Corp. of Saskatchewan Inc. (PotashCorp.), 25%]	Esterhazy, southeast Saskatchewan	NA.
Do.	NSC Minerals Inc.	Salt recovery from potash tailings at Rocanville and Vanscoy, Saskatchewan	NA.
Brine	Nexen Inc. and Albchem Industries Ltd.	Plant near Bruderheim, Alberta	NA.
Do.	Dow Chemical Canada Inc.	Fort Saskatchewan, Alberta	NA.
Do.	Junex Solnat (Junex Inc.)	Becancour, Quebec	NA.
Do.	Saskatoon Chemicals Holdings, Inc.	Plant near Saskatoon, Saskatchewan	NA.
Do.	Sifco Canada Inc. (Compass Minerals Group Inc.)	Amherst, Nova Scotia	NA.
Do.	do.	Plant near Unity, Saskatchewan	NA.
Do.	The Canadian Salt Co. Ltd.	Belle Plaine, Saskatchewan	NA.
Do.	do.	Lindberg, Alberta	NA.
Tantalum, Ta ₂ O ₅ content metric tons	Cabot Corp.	Tanco Mine, Bernic Lake, Manitoba ²	80.
Titanium, TiO ₂ slag	QIT-Fer et Titane, Inc. (Rio Tinto Group, 100%)	Sorel-Tracy, Quebec	1,100 (Sorelslag®); 250 (UGS TM slag); NA (RTCS TM slag)
Tungsten, WO ₃ content	North American Tungsten Corporation Ltd.	Cantung Mine, Northwest Territories	3,500.
Uranium, oxide metric tons	Joint venture of Cameco Corp., 70%, and AREVA Resources Canada Inc., 30%	McArthur River Mine, Saskatchewan	8,000.
Do. do.	Joint venture of Cameco Corp., 83%, and AREVA Resources Canada Inc., 17%	Key Lake mill, Saskatchewan	(3)
Do. do.	Cameco Corp.	Rabbit Lake operations, includes Eagle Point underground mine and Rabbit Lake mill, Saskatchewan	5,500.
Do. do.	Joint venture of AREVA Resources Canada Inc., 70%; Denison Mines Inc., 22.5%; OURD Canada Company Ltd., 7.5%	McClean Lake Mine, ^{2, 4} Saskatchewan	NA.
Zeolite	Heemskirk Canada Ltd. (Heemskirk Consolidated Ltd.)	Bromley Creek (Princeton) Mine, near Copper Mountain, British Columbia	NA.
Do.	do.	Z1 (Ranchlands) quarry, near Cache Creek, British Columbia	NA.
Do.	Industrial Mineral Processors Ltd.	Z2 quarry, near Cache Creek, British Columbia	NA.
Do.	HCA Mountain Minerals (Lethbridge) Ltd. (Heemskirk Canada Ltd.)	Processing plant at Lethbridge, Alberta	NA.
Zine:			
Lead-zinc ore	Maple Minerals Corp.	Caribou underground mine, ² 45 kilometers west of Bathurst, New Brunswick	700.
Do.	NVI Mining Ltd. (Breakwater Resources Ltd.)	Myra Falls complex (Battle-Gap and H-W Mines), British Columbia	800.
Do.	ScoZinc Ltd. (Acadian Mining Corp.)	Scotia open pit mine, ² Gays River, Nova Scotia	600.
Do.	Xstrata Zinc (Xstrata plc, 100%)	Brunswick Mine in Bathurst, New Brunswick	3,550.
Zinc ore	Agnico-Eagle Mines Ltd.	LaRonde Mine, 60 kilometers west of Val-d'Or, Quebec	NA.
Do.	Breakwater Resources Ltd.	Langlois Mine, ² 213 kilometers northeast of Val-d'Or, Quebec	NA.
Do.	Hudson Bay Mining and Smelting Co., Ltd. (HudBay Minerals Inc., 100%)	777 and Trout Lake Mines, Flin Flon, Manitoba	2,300.
Do.	do.	Chisel North Mine, Snow Lake, Manitoba	330.
Do.	Teck Resources Ltd.	Duck Pond mine, 90 kilometers south of Buchans, Newfoundland and Labrador	500.
Do.	Xstrata Copper (Xstrata plc, 100%)	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	2,350.

TABLE 2—Continued CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010¹

(Thousand metric tons unless otherwise specified)

	Major operating companies		
Commodity	and major equity owners	Location of main facilities	Annual capacity
Zinc—Continued:			
Refined	Canadian Electrolytic Zinc Ltd. (CEZinc) (Noranda	Hydrometallurgical plant at	280.
	Income Fund)	Salaberry-de-Valleyfield, Quebec	
Do.	Hudson Bay Mining and Smelting Co., Ltd.	Smelter at Flin Flon, Manitoba	118.
	(HudBay Minerals Inc., 100%)		
Do.	Teck Resources Ltd.	Trail smelter and refinery complex,	295.
		Trail, British Columbia	
Do.	Xstrata Zinc (Xstrata plc, 100%)	Zinc hydrometallurgical plant at Hoyle,	150.
		Ontario	

Do., do., Ditto. NA Not available.

 $\label{eq:table 3} \text{CANADA: RESERVES OF MAJOR MINERALS IN 2010}^1$

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Coal (anthracite, bituminous, and lignite)		6,578,000
Copper		7,290
Gold	metric tons	918 ²
Lead		451
Molybdenum		215
Natural gas	billion cubic meters	1,750
Nickel		3,301
Petroleum, crude	million barrels	33,200
Silver	metric tons	6,254
Uranium, U ₃ O ₈		428 3
Zinc		4,250

As of December 31, 2009. Sources: Canadian Reserves of selected major metal information bulletin, February 2011, Natural Resources Canada; BP Statistical Review of World Energy, June 2010.

¹Abbreviations used in this table for commodities include the following: Au—gold; Co—cobalt; Cu—copper; K₂O—potassium oxide; Mo—molybdenum;

Nb—niobium; Ni—nickel, and TiO₂—titanium dioxide.

²Mine or facility closed or operations suspended (mine may be on care-and-maintenance status).

³Processes ore from McArthur River Mine.

⁴Sue B and Sue E pits were mined out in 2008. McClean Lake mill processing stockpiled ore.

²Excludes metal in placer deposits.

³Recoverable resources as of January 1, 2010.