USGS
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2016 Minerals Yearbook

CANADA

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

December 2021

The Mineral Industry of Canada

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Canada, a member of the Group of Seven (G7) nations, has one of the largest economies in the world, ranking 10th based on its nominal gross domestic product (GDP). In 2016, the real GDP of Canada was $1.31 trillion,[1] which was a 1% increase compared with that of 2015. Canada was one of the leading mining nations in the world. It produced a wide array of industrial minerals, metals, and mineral fuels and had one of the largest mining supply sectors, with several thousand companies providing services to global mining operations. Vancouver, British Columbia, was the headquarters for the largest concentration of the world's mineral exploration companies, and Toronto, Ontario, was a global hub for mineral industry financing. The Toronto stock exchanges accounted for 57%, or almost $13 billion, of the world's mining equity capital raised in 2016. The Toronto Stock Exchange (TSE) and the TSX Venture Exchange (TSX–V) listed 57% of the world's publicly traded mining companies. Canadian mining companies operated in more than 100 countries, and the value of the country's assets abroad amounted to $123.8 billion. Canadian companies were active in 35 countries in Africa, 21 countries in Asia (including the Middle East), and in every country in Latin America (Mining Association of Canada, 2018, p. 31, 32; Natural Resources Canada, 2018a; Statistics Canada, 2018; World Bank Group, The, 2018).

Canada was the world's leading producer of potash in 2016, accounting for 28% of world production. It was the second-ranked producer of nickel and niobium, accounting for 11% and 10%, respectively, of world production. It was the third-ranked producer of aluminum, cadmium, indium, palladium, and salt, accounting for 5% of the world's production of aluminum and salt and 10% of the world's production of cadmium, indium, and palladium. Canada was the fourth-ranked producer of ilmenite, platinum, sulfur, and cobalt, accounting for 11%, 7%, 6%, and 4%, respectively, of world production. Canada was the fifth-ranked producer of mica and gold, accounting for 7% and 5%, respectively, of world production, and it was the sixth-ranked producer of selenium, accounting for 5% of the world total. As reported by the Kimberley Process Certification Scheme, Canada was the third-ranked diamond producer by value, and the fifth-ranked producer by weight. The average value of Canada's diamond production was $107.18 per carat. According to the World Nuclear Association, Canada was the second-ranked producer of uranium. Canada was also a leading natural gas- and crude petroleum-producing country, and, according to BP p.l.c., the country accounted for about 4% of world production of natural gas and 5% of world production of crude petroleum in 2016 (BP p.l.c., 2017, p. 14, 28; Anderson, 2018a, b; Apodaca, 2018; Bedinger, 2018; Bolen, 2018; Bray, 2018; George, 2018; Jasinski, 2018a, b; Kimberley Process Certification Scheme, 2018; Loferski, 2018; McRae, 2018; Polyak, 2018; Shedd, 2018; Tolcin, 2018; World Nuclear Association, 2018).

[1]Where necessary values have been converted from Canadian dollars (CAD) to U.S. dollars (US$) at an average annual exchange rate of CAD 1.324=US$1.00 for 2016 and CAD 1.278=US$1.00 for 2015.

Minerals in the National Economy

In 2016, the mining (including quarrying), and petroleum and gas extraction sectors contributed $102.6 billion to Canada's real GDP, which was a 2.3% decrease in the contribution to real GDP compared with that of 2015. The decrease was largely attributable to a nearly $1.8 billion decrease in the value added by support activities in the mining and petroleum and gas extraction sectors. Petroleum and gas extraction accounted for $83 billion of the country's real GDP, metal ore mining accounted for $15.6 billion, nonmetallic mineral mining and quarrying accounted for $3.7 billion, and coal mining accounted for $1.2 billion (Statistics Canada, 2018).

The mining industry employed 403,000 people in Canada in 2016. About 193,000 people worked in mineral extraction, including about 40,500 people who worked in metal mining; 25,600, in nonmetallic mineral mining; 5,200, in coal mining; and the remainder, in services. In 2016, primary metal manufacturing accounted for about 64,740 jobs and nonmetallic mineral product manufacturing for another 54,685 jobs. Based on data from two large oil sands mining companies, there were at least 19,000 jobs in oil sands extraction and upgrading, not including indirect employees. More than 3,700 companies supplied goods and services to the mining industry. Support activities employed a reported 24,730 people in Canada in 2016, but this figure reflected only a fraction of those employed by mining support services (Natural Resources Canada, 2017a; Mining Association of Canada, 2018, p. 14, 44).

In 2016, the cost of fuel and electricity consumed by mineral industry activities in Canada decreased by 5.3% compared with that of 2015. The cost of fuel and electricity consumed by nonmetallic mineral mining activity, which included quarrying, decreased by 13.4%; however, 67.3% of the industry's fuel and electricity costs were attributable to metal ore mining activities, including uranium ore mining, which had only a 0.7% decrease in fuel and energy costs. The cost of materials and supplies consumed by mineral industry activities decreased by 0.3%. The cost of materials and supplies for nonmetallic mineral mining activities decreased by 10.9%; however, that for metal ore mining activities, which accounted for 77.4% of the total cost of materials and supplies for the industry, increased by 3.4%. The value of Canada's mineral industry production (excluding petroleum and gas extraction) decreased by 5.7% despite a 3.7% increase in the value of production in metal ore mining activities, owing to a 22.0% decrease in nonmetallic mineral mining activities (Natural Resources Canada, 2018e).

At the Province and Territory level, since 2011, mining (including quarrying), and petroleum and gas extraction accounted for the greatest share of the GDPs of Alberta, Newfoundland and Labrador, the Northwest Territories, Nunavut Territory, Saskatchewan, and Yukon Territory. British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Prince Edward Island,

and Quebec received the least share of their respective GDPs from mining (including quarrying), and petroleum and gas extraction. Additionally, there was a significant gap in value between the high-earning and low-earning Provinces. In terms of the sector's contribution to the GDP by Province, mining (including quarrying), and petroleum and gas extraction in Newfoundland and Labrador contributed the greatest share of the GDP except in 2015, when the value of the sector's production in the Northwest Territories contributed the greatest share of the GDP. The share of mining (including quarrying), and petroleum and gas extraction as a part of the GDP in Newfoundland and Labrador decreased to 22% in 2016 from a high of 42% in 2011. In 2016, mining (including quarrying), and petroleum and gas extraction in the Northwest Territories accounted for 21% of the Provincial GDP; Nunavut Territory, 19%; Alberta, 17%; Saskatchewan, 16%; Yukon Territories, 13%; British Columbia, 3%; Manitoba, 2%; New Brunswick, Nova Scotia, Ontario, Prince Edward Island, and Quebec, 1% each (Statistics Canada, 2018).

Conversely, in 2016, Ontario was the leading Province in terms of exploration and deposit appraisal expenditures ($309 million) followed by Quebec ($233 million), British Columbia ($181 million), Saskatchewan ($179 million), Nunavut ($160 million), Yukon ($71 million), Northwest Territories ($57 million), Manitoba ($37 million), Newfoundland and Labrador ($20 million), Alberta ($13 million), New Brunswick ($11 million), and Nova Scotia ($4 million). Canada was the leading global destination for nonferrous metal exploration spending in 2016, but allocations decreased by 20% compared with that of 2015, making it the fifth consecutive year that Canada's share of international nonferrous metal exploration investment decreased. In 2016, investment in major mining projects saw a large downturn—construction of major mining-related projects during the year accounted for about $70 billion worth of investment in the mineral sector of Canada, which was a 36% decrease compared with the about $110 billion invested in 2015. Contributing factors to the downturn in investment in mining projects included lengthy review processes and a lack of infrastructure in remote regions (Natural Resources Canada, 2017b, 2018d; Mining Association of Canada, 2018, p. 6, 7).

In 2015 (the latest year for which data were available), a reported 1,176 companies held domestic mining assets, and the value of these assets increased by 5% to about $69.6 billion compared with that of 2014. The value of assets of the 190 Canadian companies operating in South America was $41.8 billion in 2015 compared with $41.3 billion in 2014. Canada's second largest mining destination, in terms of the value of mining assets, was Africa, where 111 Canadian companies operated and had assets valued at $24.5 billion in 2015 compared with $21.1 billion in 2014. Canada's mining assets in the United States consisted of 263 companies that had a combined value of $19.4 billion compared with $19.9 billion in 2014. Assets of the 125 Canadian companies operating in Mexico were valued at $15.2 billion compared with $15.1 billion in 2014. The 30 Canadian companies operating in Central America had assets valued at a combined $12.2 billion in 2015 compared with $12.5 billion in 2014, and the 99 companies operating in the Asia and the Pacific region had combined assets valued at $12.1 billion in 2015 compared with $11.2 billion in 2014. In Europe, the 65 Canadian companies had combined assets valued at $8.4 billion in 2015 compared with $9.2 billion in 2014 (Mining Association of Canada, 2018, p. 77).

Government Policies and Programs

The Minerals and Metals Policy of the Government of Canada is the Federal policy that outlines and describes the Federal Government's role, objectives, and strategies for development of the country's mineral resources; the minerals, however, are generally owned and managed by the government of the Province or Territory in which they occur, and each jurisdiction has its own environmental, mining, and occupational health and safety laws. The three territories—Northwest Territories, Nunavut, and Yukon—have responsibilities for environmental assessment, land-use planning, and water resources, and generally operate under a system of co-management boards with representation from First Peoples groups (First Nations, Inuit, and Métis). In general, there are two types of First Peoples claims in Canada that are commonly referred to as land claims, including comprehensive claims and specific claims. Comprehensive claims arise in areas where First Peoples land rights have not been defined by past treaties or through other legal means, whereas specific claims have been covered by past treaties or laws. In these areas, agreements are negotiated between the First Peoples group, the Government of Canada, and the Province or Territory (Wacaster, 2017, p. 5.2; Government of Canada, 2018).

New mines and some mine expansion projects are subject to Federal review and approval, in addition to Provincial or Territorial permitting requirements. Most major (undefined) mining projects in the country are subject to the Canadian Environmental Assessment Act of 2012 and may be subject to approvals under the Fisheries Act and the Navigation Protection Act. A Federal review of the Metal Mining Effluent Regulations was completed in 2015, and proposed amendments were expected in 2018 (Mining Association of Canada, 2018, p. 62–63).

Mineral resources that underlie the continental shelf, Federal lands (including national parks), Indian Reserves, and offshore waters are owned by the Federal Government. Direct Federal regulation of mining operations is limited in scope, but includes those activities associated with the uranium fuel cycle from exploration to disposal of nuclear waste, activities related to Federal Crown corporations, and mining activities on Federal lands and offshore areas. The manufacture, sale, use, storage, and transportation of explosives used in exploration and mining in Canada are regulated under the Federal Explosives Act. The export, import, and transit across Canada of rough diamond are regulated under the Federal Export and Import of Rough Diamonds Act. Any written or oral mining disclosures made available to the public in Canada are governed by National Instrument 43–101 Standards for Disclosure in Mineral Projects (Kazaz and Fipke, 2012, p. 4; Natural Resources Canada, 2017c).

Although a majority of mineral rights in Canada are owned by the Provinces and Territories, mineral rights may also be held by the Federal Government, First Peoples groups, or private entities. The Federal, Provincial, and Territorial governments have shared regulatory responsibilities that are similar across jurisdictions, but each jurisdiction maintains its own distinct regulatory

regime in terms of mineral management. Responsibilities that are generally in the Provincial or Territorial regime include exploration and development of resources; resource ownership and management; land-use decision making; mining royalties and Provincial income taxes; resource exploration and development regulations; operational matters, including licensing, permitting, and monitoring; Provincial statistics; generation and distribution of electricity; and Provincial geoscience data. Mineral processing and further beneficiation are generally subject to the same legislative regimes that apply to mineral exploration and extraction because the same Federal, Provincial, and (or) Territorial statutes regulate all stages of the mining process. Most jurisdictions do not require mineral processing to take place within the Province or Territory of extraction except for New Brunswick, Newfoundland and Labrador, and Nova Scotia. Local or municipal governments administer bylaws dealing with land-use planning and issuance of permits for construction, water supply and distribution, and waste management. First Peoples governments exercise powers over reserve lands and other areas covered by specific agreements negotiated with the Federal and Provincial governments. Such governance on reserves has many of the same powers and responsibilities as local, municipal, or Provincial governments (Lawson Lundell LLP, 2017, p. 68; Natural Resources Canada, 2017c).

More-extensive coverage of Government policies and programs of Canada, including provisions for each Province and Territory, can be found in the 2014 U.S. Geological Survey Minerals Yearbook, volume III, Area Reports—International—Latin America and Canada.

With respect to energy development in Canada, Federal, Provincial, and Territorial governments share responsibility. The Provinces have jurisdiction over the development of crude petroleum within the Province boundaries. The Government of Canada shares responsibility with the Provinces for energy production, environmental protection, and trade. The National Energy Board (NEB) regulates construction, operation, and abandonment of pipelines; construction and operation of international power lines and designated interprovincial power lines; imports of natural gas; exports of crude petroleum, natural gas liquids, natural gas, refined petroleum products, and electricity; and petroleum and gas exploration and production activities in specified areas that are not regulated under joint Federal and Provincial accounts. The NEB's responsibilities are described in the National Energy Board Act, the Canada Oil and Gas Operations Act, and the Canada Petroleum Resources Act. For certain projects, an environmental assessment is required by such Federal laws as the Canadian Environmental Assessment Act, the Inuvialuit Final Agreement or Nunavut Land Claims Agreement, and the Mackenzie Valley Resource Management Act (National Energy Board, 2018b).

Federal and Provincial or Territorial governments in Canada receive direct revenue from energy industries in the form of corporate income taxes; indirect taxes, including sales and payroll taxes; royalties to the Crown; and Crown land sales. Between 2011 and 2015 (the latest year for which data were available), the average revenue received from energy industries included $8.8 billion in royalties, $3.8 billion in income tax, $2 billion in indirect taxes, and $1.8 billion in land sales (Natural Resources Canada, 2018c).

Production

In 2016, the top 10 nonfuel mineral commodities produced in Canada were, by value, gold, copper, potash, iron ore, coal, nickel, sand and gravel, cement, diamond, and stone; they had a combined value of about $27 billion. Production of many reported metals increased by more than 10% in 2016 compared with that of 2015, including aluminum, refined cadmium, mined and primary refined lead, molybdenum, niobium, selenium, tellurium, and mined zinc. For many of these commodities, the increased production was a result of rebounding global prices. Estimated silicon production decreased by about 10%, and cadmium mine production, by 20%. Industrial minerals with increased production greater than 10% included diamond, graphite, peat, sand and gravel, metallurgy sulfur, and talc (including pyrophyllite and soapstone). In 2016, barite, gemstones, and salt were the only industrial minerals for which production decreased by more than 10%. Among the mineral fuels and related materials, production of natural gas liquids, asphalt, and aviation gasoline all increased by more than 10%, whereas production of heavy and light fuel oil decreased by more than 10%. Data on mineral production are in table 1 (table 1; Mining Association of Canada, 2018, p. 26).

Structure of the Mineral Industry

As one of the world's most active mining countries, Canada had numerous mineral exploration, mine development, and mining projects underway. Canada's mineral industry is characterized by free enterprise in which private companies are involved in exploration, mine development, mineral production, mineral processing, and marketing. In 2016, the Mining Association of Canada reported that there were 1,201 operating mines in Canada—1,136 nonmetallic mineral mines and 65 mines that produced metal ores. According to Natural Resources Canada, the country has 7,000 sand and gravel pits and stone quarries. Canada also has about 50 nonferrous metal smelters, refineries, and steel mills. Table 2 is a list of major mineral industry facilities (Natural Resources Canada, 2016, p. 6; Mining Association of Canada, 2018, p. 13).

Mineral Trade

Canada is one of the most open countries in the world in terms of trade and investment in mining, with few barriers to foreign ownership. The Canada-European Union Comprehensive Economic and Trade Agreement (CETA) negotiations concluded in September 2014 and the agreement was submitted to the European Union member countries for approval. Ratification of the treaty would lift nearly all tariffs between the two entities, reducing the costs of goods traded. Once the CETA and the Trans-Pacific Partnership[2]—a trade agreement that was to include 11 other countries and was to reduce tariffs between participating countries—were to come into full force, Canada would have trade agreements with 51 countries. Canada also had foreign investment promotion and protection agreements

[2]On January 23, 2017, the United States formally withdrew participation in the Trans-Pacific Partnership, effectively ending the trade agreement (Mui, 2017).

with 37 countries, the stated objective of which was to maintain transparency in foreign investments (Natural Resources Canada, 2016, p. 7).

In 2016, the value of domestic exports of minerals and mineral products (not including crude petroleum and petroleum products) was about $69 billion, of which metals and metallic minerals accounted for 80%; nonmetallic minerals and industrial materials accounted for 14%; and coal and coke accounted for 5%. The Mining Association of Canada reported that the country's leading trade partner in 2016, in terms of the value of mining exports, was the United States, followed by the countries of the European Union (EU) as an aggregate sum, China, and Japan (Mining Association of Canada, 2018, p. 101–103).

In 2016, the United States received 57% of Canada's metallic mineral exports, by value; 61% of its nonmetallic mineral exports; and 7% of the combined total of coal and coke exports. The combined total of aluminum and iron and steel exports accounted for 50% of the value of metals exported to the United States from Canada. The value of exports to the countries of the EU accounted for 25% of Canada's metals exports, 10% of its nonmetallic mineral exports, and 9% of its coal and coke exports. Gold exports accounted for 65% of the total value of metal exports to the EU from Canada. China received 4% of Canada's metallic mineral exports and nonmetallic mineral exports, by value, and 15% of its coal and coke exports. Copper, iron ore, and nickel accounted for 70% of all Canadian metals exports to China. Japan received 3% of Canada's metallic mineral exports, by value; less than 1% of its nonmetallic mineral exports; and 23% of its coal and coke exports (Mining Association of Canada, 2018, p. 101–103).

Among mineral and mineral-product exports in 2016 (excluding crude petroleum and petroleum products), gold was the leading metallic mineral export, by value, accounting for 26% of the value of metals exports and 21% of the total value of mineral and mineral-product exports. The EU received 62% of Canada's gold exports, by value. Iron and steel combined was the second-ranked metallic mineral export, by value, accounting for 18% of metals exports and 15% of the value of total mineral and mineral-product exports. The United States received 87% of Canada's iron and steel exports, by value. Potash and potassium compounds combined were the leading nonmetallic mineral export, by value, accounting for 37% of nonmetallic mineral exports and 5% of the value of total mineral and mineral-product exports. The United States received 52% of Canada's potash and potassium compound exports, by value. Diamond was the second-ranked nonmetallic mineral export, by value, accounting for 16% of nonmetallic mineral exports and 2% of the value of total mineral and mineral-product exports (Mining Association of Canada, 2018, p. 101–103).

In 2016, the value of imports of minerals and mineral products (not including crude petroleum and petroleum products) was about $58 billion, of which metals and metallic minerals accounted for 82%, nonmetallic minerals and industrial materials accounted for 17%, and coal and coke accounted for 1%. The Mining Association of Canada reported that the country's leading trade partner in 2016, in terms of the value of mining imports, was the United States, followed by China, the countries of the European Union (EU) as an aggregate sum, and Mexico (Mining Association of Canada, 2018, p. 104–106).

In terms of the value of mineral and mineral-product imports in 2016 (excluding crude petroleum and petroleum products), iron and steel was the leading mineral import, accounting for 29% of the total value of mineral and mineral-product imports. The United States supplied 58% of Canada's iron and steel imports, by value. Gold was the second-ranked mineral commodity import, accounting for 12% of the value of total mineral and mineral-product imports. The United States supplied 22% of Canada's gold imports, by value (Mining Association of Canada, 2018, p. 104–106).

Commodity Review

Metals

Aluminum.—The majority of aluminum smelters in Canada were wholly or partially owned by Rio Tinto Alcan Inc., which was headquartered in Montreal. In 2016, aluminum production was 3,208,888 metric tons (t), which was an increase of 11% compared with that of 2015. The total value of aluminum and aluminum-product exports from Canada in 2016 was about $8.4 billion; that of imports was about $4.9 billion. Upon full implementation of the CETA between Canada and the EU (expected in September 2017) tariff rates ranging from 6.3% to 10% for aluminum and aluminum products would be removed on exports to the EU (as would tariffs on most other goods, mineral or otherwise) (tables 1, 2; Mining Association of Canada, 2018, p. 73, 101, 104).

The increase in the production of aluminum was largely attributed to the completion of Rio Tinto's modernization project for its Kitimat smelter in British Columbia in early 2016. Kitimat reached full nameplate capacity in April and produced 408,000 t in 2016 compared with 110,000 t in 2015. The Alouette smelter in Sept-Iles, Quebec, produced 609,000 t of aluminum in 2016, of which 244,000 t was Rio Tinto's share and the remainder was shared among multiple partners. The Arvida smelter in Saguenay, Quebec, produced 172,000 t of aluminum plus another 60,000 t from the facility's AP60 Technology Center. Other aluminum production included 467,000 t from the Alma (Quebec) smelter; 445,000 t from the Becancour (Quebec) smelter, of which 111,000 t was United States based Alcoa Corp.'s share; 227,000 t from the Grande-Baie (Quebec) smelter; and 247,000 t from the Laterrière (Quebec) smelter. The remainder of primary aluminum production in 2015 came from Alcoa's wholly owned Baie Comeau and Deschambault smelters in Quebec Province (Rio Tinto plc, 2017, p. 35, 219).

Bismuth and Cadmium.—In 2016, mine output of bismuth was 2 t. Production of bismuth had decreased every year since 2011, representing a total decrease of 99% between 2011 and 2016. Mine output of cadmium decreased for the seventh consecutive year to 64 t in 2016, which was a 20% decrease compared with that of 2015 and a 97% decrease compared with a high of 2,403 t in 2010. Bismuth and cadmium are primarily obtained as byproducts of the production of concentrates from lead- and zinc-bearing ores. The largest decreases in annual cadmium production (those that were recorded in 2011 and 2012) preceded significant decreases in mine production of both lead and zinc in 2013 and 2014, whereas the largest decrease in bismuth production took place in 2014. Reserves of lead and

zinc in proven and probable minable ores at operating mines had decreased consistently since 1984. The closure of several mines in recent years were contributing factors in the decrease in reserves and production of lead and zinc (table 1; Mining Association of Canada, 2018, p. 32, 94, 97).

Cobalt.—In 2016, Vale S.A. of Brazil's Port Colborne refinery produced 1,851 t of cobalt metal. Cobalt production in 2016 included 887 t from Vale's Voisey's Bay Mine, 882 t from its Ontario Division (Sudbury Mine), and 700 t from its Manitoba Division (Thompson Mine), as well as 1,000 t from Glencore plc of Switzerland's Sudbury operations. The total value of cobalt and cobalt product exports from Canada in 2016 was about $234 million; that of imports was about $43 million (Glencore plc, 2017, p. 63; Vale S.A., 2017a, p. 51; Mining Association of Canada, 2018, p. 101, 104).

Copper.—Production of mined copper decreased by 3% in 2016 compared with that of 2015 to 679,105 t. Since 2011, mined copper production had increased at an average annual rate of 5.5% until the 2016 decrease. Production at three mines accounted for 44% of the copper produced in Canada in 2016. Teck Resources Ltd.'s Highland Valley Mine in British Columbia produced 119,300 t of copper in concentrate compared with 151,400 t in 2015 and 121,500 t in 2014. The variation in year-over-year production was expected to continue as a result of significant fluctuations in ore grades. Vale's Ontario Division accounted for 121,600 t in 2016 compared with 98,000 t in 2015, and Taseko Mines Ltd.'s Gibraltar Mine in British Columbia produced 60,400 t of copper in 2016 compared with 64,000 t in 2015 (Taseko Mines Ltd., 2017, p. 4; Teck Resources Ltd., 2017, p. 17).

The Casino Mine project, located 300 kilometers (km) northwest of Whitehorse, Yukon, was an advanced stage project with an estimated annual production potential of 111,000 t of copper, which would make the mine one of the biggest copper-producing mines in Canada and the largest mining operation in the Yukon Territory. The mine was owned by Casino Mining Corp., which was a wholly owned subsidiary of Western Copper and Gold Corp. A bankable feasibility study of the Casino Mine project was released in January 2013, and in 2016, the project remained economic, despite current copper and gold prices being lower than those assumed in the feasibility study. Following the 2013 feasibility study, Casino went into the permitting phase, which included application and supplemental reports submitted to the Yukon Environmental and Socio-economic Assessment Board (YESAB). In 2016, Western Copper and Gold received the Environmental and Socio-economic Effects (ESE) statement guidelines from the YESAB and began preparing the ESE study. Mine production was expected to commence about 2 years after the permitting was completed and project financing was secured (Western Copper and Gold Corp., 2015; 2017, p. 2–4; Topf, 2016; Casino Mining Corp., 2018).

Gold.—Gold production increased by just 0.5% to 161,494 kilograms (kg) in 2016 from 160,751 in 2015. The value of gold exports in 2016 was about $14.4 billion, and that of gold imports was $7.2 billion. Exploration for precious metals continued to receive the largest share of exploration spending in Canada in 2016, accounting for 60% of the total. Owing to higher precious metal prices in 2016, investment in precious metals increased by 20%, to $726.4 million (table 1; Mining Association of Canada, 2018, p. 33, 101, 104).

In January 2016, Abcourt Mines Inc.'s Elder Mine, located 10 km northeast of Rouyn-Noranda, Quebec, went into commercial production following positive results of a 6-month exploration and valuation program. The program, which ran from July 1, 2015, to December 30, 2015, produced about 260 kg of gold and 35 kg of silver. In its first year of commercial production, the Elder Mine produced 415 kg of gold. In March, Abcourt acquired the Sleeping Giant Mine from Deloite Restructuring Inc. The Sleeping Giant Mine had closed in 2015, and Abcourt was in the process of rehabilitating the mine. Included in the sale of assets was a 250,000-metric-ton-per-year mill. The Sleeping Giant mill had the capacity to process ore from both the Elder Mine and the Sleeping Giant Mine. In August, the mill was overhauled and began to process ore from the Elder Mine (Abcourt Mines Inc., 2016a; 2016b, p. 24–25; 2017, p. 20, 24; 2018).

Construction continued on New Gold Inc.'s, Rainy River project, which is located about 50 km northwest of Fort Frances, Ontario. New Gold's 2017 production guidance for Rainy River suggested an initial production of about 1,500 to 1,900 kg of gold. A 21,000-metric-ton-per-day mill was expected to be completed and operating by mid-2017. The Rainy River Mine was expected to produce about 10,000 kilograms per year (kg/yr) of gold once it achieved commercial production. Rainy River had proven and probable reserves of more than 121,000 kg of gold and 311,000 kg of silver (New Gold Inc., 2017, p. 40).

Construction also continued on Pretivm Resources Inc.'s Brucejack project, which is located about 65 km north of Stewart in northwestern British Columbia. The project was on schedule for commissioning in mid-2017. Brucejack had proven and probable reserves of 271,000 kg of gold with a projected production of 15,700 kg/yr during the first 8 years of production and 12,600 kg/yr during the 18-year life of the mine (Pretivm Resources Inc., 2016, 2018).

Lead and Zinc.—Production of mined lead nearly tripled in 2016 to 12,020 t. The increased production was largely attributed to the July 1 commencement of commercial production at Trevali Mining Corp.'s Caribou Mine located about 50 km west of Bathurst in New Brunswick. The Caribou Mine produced 6,690 t of lead, accounting for more than one-half of Canada's lead production in 2016. Prior to 2015, lead production had been decreasing year-over-year since 2011 owing to a near depletion of lead in minable reserves. After decreasing steadily since 1980, the lead content of proven and probable minable ore at operating mines in Canada reached 83,000 t in 2015 (the latest year for which data were available), which was a 99% decrease compared with that of 1980. The amount of primary refined lead increased by 12% in 2016 from that of 2015 owing to new feedstock from the Caribou Mine. The value of lead exports from Canada in 2016 was $621 million, and the value of lead imports to Canada was $359 million (table 1; Trevali Mining Corp., 2017, p. 9; 2018; Mining Association of Canada; 2018, p. 94, 97, 101, 104).

Production of mined zinc increased to 321,757 t in 2016, or by 11% compared with that of 2015; 2016 was the first

year in which zinc production had increased since 2012. The newly commissioned Caribou Mine contributed to the increase, producing 20,000 t of zinc. As with lead reserves, zinc reserves have been decreasing steadily since 1980. Unlike lead reserves, however, in 2015 (the latest year for which data were available), zinc reserves increased by 37,000 t. The zinc content of proven and probable minable ore at operating mines in Canada was 3,009,000 t in 2015, which represented an 89% decrease compared with that of 1980. The amount of primary refined zinc, however, had remained relatively stable in recent years and increased by about 1% in 2016 compared with that of 2015. The value of zinc exports from Canada in 2016 was $1.4 billion, and the value of zinc imports to Canada was $631 million (table 1; Trevali Mining Corp., 2017, p. 9; Mining Association of Canada, 2018, p. 94, 97, 101, 104).

Nickel.—In 2016, nickel production was 235,707 t compared with 234,936 t in 2015. Vale and Glencore accounted for 95% of the nickel produced in Canada. Vale's operations in Ontario (Sudbury Mine), Manitoba (Thompson Mine), and Labrador (Voisey's Bay Mine) accounted for 68% of total production of mined nickel in 2016. An additional 28% of the total output of mined nickel, 49,100 t, was produced by Glencore's Sudbury operations. The value of nickel exports from Canada in 2016 was $3.3 billion, and the value of nickel imports to Canada was $506 million (Glencore plc, 2017, p. 63; Vale S.A., 2017b, p. 13; Mining Association of Canada, 2018, p. 101, 104).

Platinum-Group Metals.—Production of platinum-group metals (PGMs) as a whole in 2016 decreased by 5% to about 32,400 kg. Vale, North American Palladium Ltd., and Glencore were responsible for most of the palladium produced in Canada in 2016, producing 10,020 kg, 5,380 kg, and 4,920 kg, respectively. The two main producers of platinum were Vale and Glencore, with production of 5,160 kg and 2,800 kg, respectively. The value of PGM exports from Canada in 2016 was $965 million and the value of PGM imports to Canada was $298 million (table 1; Glencore plc, 2017, p. 63; North American Palladium Ltd., 2017; Vale S.A., 2017a, p. 18; Mining Association of Canada; 2018, p. 101, 104).

Silver.—In 2016, silver production was 405 t compared with 384 t in 2015. As with lead and zinc, the silver content of proven and probable minable ore at operating mines in Canada decreased steadily to 5,345 t in 2015 (the latest year for which data were available) from 33,804 t in 1980—an 84% decrease. Fluctuations in reserve estimates since 2009 were related to variations in prices for precious metals (table 1; Mining Association of Canada, 2018, p. 31, 97).

Industrial Minerals

Diamond.—Canada's production of gem diamond increased to 13 million carats, or by 12% compared with that of 2015, of which more than one-half, or 6.7 million carats, was from Rio Tinto's Diavik Mine. Two new diamond mines opened in Canada in 2016 with a combined annual capacity of 6.1 million carats; they were the Gahcho Kué Mine [De Beers Canada Inc. (a wholly owned subsidiary of De Beers Group, S.A.), 51%, and Mountain Province Diamonds Inc., 49%], and the Renard Mine (Stornoway Diamond Corp., 100%). The value of diamond exports from Canada in 2016 was $1.6 billion, and the value of diamond imports to Canada was $411 million (tables 1, 2; Rio Tinto plc, 2017, p. 222; Stornoway Diamond Corp., 2017a; De Beers Group, 2018; Mining Association of Canada, 2018, p. 105).

Mining at Stornoway Diamond's Renard Mine, located about 350 km north of Chibougamau in north-central Quebec, commenced in July, and commercial production was expected to begin at the start of 2017. The Renard Mine had a projected 14-year mine life with projected average annual production of 1.6 million carats. Renard produced about 489,000 carats in 2016. The Gahcho Kué Mine, located about 280 km northeast of Yellowknife in the Northwest Territories, began to ramp up production in August and was officially opened in September 2016. The 4.5-million-carat-per-year open pit mine was expected to commence commercial production in early 2017. In 2016, Gahcho Kué produced about 2 million carats of diamond (Anglo American plc, 2017, p. 191; Stornoway Diamond Corp., 2017a, b; De Beers Group, 2018).

Potash.—In 2016, production of potash decreased by 6% to 10.8 million metric tons (Mt) from 11.5 Mt in 2015. Potash Corp. of Saskatchewan Inc. operated the Allan, the Cory, the Lanigan, the Patience Lake, and the Rocanville potash mines. The total combined production of these mines decreased by 6% to 8.6 Mt, which accounted for 80% of the Canada's potash production. The company attributed the decrease in production to higher inventories and lower prices in the first half of the year. As of yearend 2016, construction at BHP Billiton Group of Australia's wholly owned Jansen potash project, located about 140 km east of Saskatoon, Saskatchewan, was two-thirds complete. Measured resources estimated at Jansen as of June 30, 2016, were 5.3 billion metric tons containing 25.6% potassium oxide (equivalent to 40.5% potassium chloride) and 0.18% magnesium oxide. The project was expected to ramp up to its nameplate capacity of 10 million metric tons per year sometime after 2020 and had a projected mine life of 50 years (table 1; BHP Billiton plc, 2016, p. 60, 264; 2017, p. 9; Potash Corporation of Saskatchewan Inc., 2017, p. 11, 58, 63).

Mineral Fuels

Coal.—Production of all types of coal decreased by 1% in 2016 compared with that of 2015, to 61.3 Mt. Three companies were responsible for most of the coal produced in Canada in 2016. Teck Resources produced coal from six coal operations and was the sole controlling company of four of those operations; the other two operations were joint ventures of Teck Resources and Nittetsu Mining Co. of Japan and (or) POSCO Canada Ltd. (a subsidiary of POSCO of the Republic of Korea). The six operations were the Cardinal River, the Coal Mountain, the Elkview, the Fording River, the Greenhills, and the Line Creek Mines, which together produced 27.6 Mt of metallurgical coal; this output accounted for all Canada's metallurgical coal production and 45% of Canada's total coal production in 2016. Westmoreland Coal Co. of Englewood, Colorado, operated the Prairie operations, which consisted of eight mining complexes in Alberta and Saskatchewan Provinces, including Coal Valley, Boundary Dam, Genesee, Paintearth, Poplar River, and Sheerness. Combined production from Westmoreland's Canadian operations was about 22.9 Mt and accounted for 37% of the country's total production in 2015. Production from TransAlta Utilities Corp.

Highvale Mine was estimated to have accounted for 13% of total production (tables 1, 2; Teck Resources Ltd., 2017, p. 1, 10; Westmoreland Coal Co., 2017, p. 7, 11; TransAlta Utilities Corp., 2018).

Natural Gas.—Natural gas in Canada was primarily sourced from the western Canadian sedimentary basin in Alberta, British Columbia, and Saskatchewan. Natural gas from conventional sources had declined in recent years, whereas unconventional natural gas production using horizontal drilling and hydraulic fracturing had increased. The annual number of completed natural gas wells ranged from 969 to 2,119 between 2012 and 2016 compared with more than 12,326 in 2008, whereas the average annual number of meters (m) drilled steadily increased to 4,693 m in 2016 from 1,500 m in 2009. Canada's technically recoverable resources of natural gas as of 2016 included between 8 and 9.1 trillion cubic meters of gas in conventional resources and between 16.5 and 41.1 trillion cubic meters in unconventional resources, including coal-bed methane, shale gas, and tight gas in other reservoir rocks. Canada's domestic natural gas supply exceeded consumption. Although Canada's natural gas markets were integrated with those in the United States, and Canada exported its surplus to the United States, there were no liquefied natural gas (LNG) production facilities in Canada to facilitate overseas natural gas exports. Canada had several LNG projects, but none were expected to be operational before 2020 (National Energy Board, 2018a; Natural Resources Canada, 2018f).

Petroleum.—In 2016, crude petroleum production was 1.63 billion barrels (Gbbl), which was a 2% increase compared with that of 2015. The country had 171.5 Gbbl of proven crude petroleum reserves, of which 96% consisted of oil sands. In 2016, 99% of Canada's 1.1 Gbbl of crude petroleum exports went to the United States. Canada was the leading foreign supplier of crude petroleum to the United States, accounting for 41% of the crude petroleum imported by the United States and 20% of its refinery crude petroleum intake. About 62% of Canada's petroleum production in 2016 was sourced from oil sands, and the remainder was from conventional, offshore, and tight oil production. Most (91.6%) of Canada's crude petroleum production came from two Provinces—Alberta (79.6%) and Saskatchewan (12.0%)—followed by Newfoundland and Labrador (5.4%), British Columbia (1.6%), Manitoba (1.0%), and others (0.4%) (table 1; Natural Resources Canada, 2018b).

Reserves and Resources

Proven and probable reserves of some metals in Canada had been decreasing for several decades, particularly lead, silver, and zinc, which resulted in decreased production, whereas reserves of gold reached record highs and reserves of copper rebounded. The long-term decrease in reserves of certain mineral commodities was the result of many factors, including trends of international mineral commodity prices and domestic and global economic trends, both of which can have a negative effect on the amount of capital available to junior mining companies that perform early-stage exploration activities and rely on equity financing to do so. The total value of expenditures for exploration and deposit appraisal in Canada has been in decline since 2011. In 2016, the total value of exploration and deposit appraisal was about $1.2 billion, which was a 15% decrease compared with that of 2015. The Federal Government extended the Mineral Exploration Tax Credit and the super flow-through share provision (a financing tool available to Canadian resource companies that allows the companies to issue shares to investors at a higher price than the companies would normally receive) in the 2017 Federal budget. The purpose of these measures was to assist financing and exploration efforts that were needed to address decreasing base-metal reserves. Proven and probable reserve estimates for some mineral commodities are listed in table 3 (Mining Association of Canada, 2018, p. 15, 31, 39).

Outlook

Canada is likely to maintain its position as a leading global mining country, and its mineral industry has the potential for continued expansions based on its mineral resources and its access to international markets. Although prices among metal commodities are expected to rebound, uncertainty in terms of demand related to potentially slower global economic growth; potential excess global supply of certain mineral commodities, such as iron; decreasing proven reserves of certain commodities, such as lead and zinc; and uncertain trade policies with partnering countries are expected to temper the value of mining in the near term. Exploration activity is expected to continue to increase in 2017 as both junior and senior mining exploration companies project increases in exploration spending in the near term. Canada's mineral sector continues to be challenged by globalization of the industry, as many other countries can develop their mineral resources at lower costs than Canada. The governments of Federal, Provincial, and Territorial jurisdictions in Canada, however, are developing and expanding policies related to mining to meet the challenges for the medium- and long-term security of the sector while also addressing environmental and social demands.

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TABLE 1
CANADA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2012	2013	2014	2015	2016
METALS						
Aluminum:						
Alumina, Al_2O_3 equivalent, smelter grade		1,498,605	1,554,604	1,562,559	1,560,932	1,566,467
Aluminum metal, primary		2,780,556	2,967,364	2,858,200	2,880,035	3,208,888
Antimony, mine, Sb content		200 r, e	177	5	1	--
Bismuth:						
Mine, Bi content		110	103	4 r	2	2
Refinery[e]		145	100	100	25 r	25
Cadmium:						
Mine, Cd content		290	188	150	80	64
Refinery, primary, metal		1,286	1,313	1,187	1,159	2,305
Cobalt:						
Mine, Co content[3]		3,698 r	4,005 r	3,907 r	4,339 r	4,245
Refinery, metal		5,775 r	5,602	5,491	6,126 r	6,355
Copper:						
Mine, Cu content[4]						
Concentrates		580,082	652,595	672,729	697,322 r	679,105
Solvent extraction[e]		1,000	--	1,000	1,000	1,000
Total		581,000	653,000	674,000	698,000	680,000
Smelter blister:						
Primary		287,051	254,509	288,699	281,416	304,349
Secondary		23,362	28,743	32,069	28,713	29,165
Total		310,000	283,000	321,000	310,000	334,000
Refinery:[e]						
Primary		252,000 r	292,000 r	293,000 r	301,000 r	284,000
Secondary		24,000 r	29,300 r	32,500 r	29,100 r	30,000
Total		276,000	322,000 r	325,000 r	331,000	314,000
Ferroalloys:[e]						
Ferroniobium:						
Gross weight		7,000 r	8,270	8,300	8,520 r	9,340
Nb content		4,550	5,380	5,390	5,540	6,070
Ferrosilicon	thousand metric tons	32	39	32	38	38
Ferrovanadium	do.	1	1	1	1	1
Gold, mine, Au content	kilograms	106,373 r	131,404 r	151,472	160,751	161,494
Indium, refinery, primary, metal, In content[e]	do.	65,000	70,000 r	67,000 r	70,000	71,000
Iron ore, mine:						
Gross weight	thousand metric tons	38,892 r	42,063 r	43,173 r	46,220	46,731
Fe content[e]	do.	23,000 r	25,000 r	26,000 r	28,000 r	28,000
Iron and steel:						
Direct-reduced iron	do.	842	1,250	1,550	1,502	1,399
Pig iron	do.	7,654	6,100	6,728 r	5,851	6,240
Raw steel	do.	13,507	12,417	12,730	12,473 r	12,646
Lead:						
Mine, Pb content		62,014 r	22,895 r	3,579 r	3,699	12,020
Refinery:						
Primary		133,495	128,706	130,827	127,264	142,076
Secondary		145,655	153,075	150,629	141,600	132,150
Total		279,000	282,000	281,000	269,000	274,000
Magnesite[e]		150,000	150,000	150,000	100,000	100,000
Molybdenum, mine, Mo content		8,936 r	7,956 r	9,358 r	2,505	2,777
Nickel, Ni content:						
Mine, concentrate		211,701	227,743	228,867	234,936 r	235,707
Unspecified, refined,		146,850	152,728	149,486	149,716 r	158,299

See footnotes at end of table.

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

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2012	2013	2014	2015	2016
METALS—Continued						
Niobium, mine, pyrochlore concentrate, Nb content[5]		4,551 r	4,916 r	5,774 r	5,385	6,213
Platinum-group metals, mine, elemental content:[e]						
Iridium, rhodium, and ruthenium	kilograms	800	900 r	1,100 r	1,200 r	1,100
Palladium	do.	13,800 r	15,700 r	19,300 r	20,400 r	20,000
Platinum	do.	7,870 r	8,900 r	11,000 r	11,600 r	11,400
Total	do.	23,400 r	27,600	34,400	34,000 r	32,400
Selenium, Se content	do.	145,000	138,000	142,000	156,000	175,000
Silicon[e]	thousand metric tons	30	12	30	30	27
Silver:						
Mine, Ag content	kilograms	685,255	640,362	495,403	383,807 r	404,666
Refinery, primary	do.	1,675,998	1,745,638	1,525,135	1,891,692	1,877,394
Tantalum, mine, tantalite concentrate, Ta content[6]	do.	-- r	32,800 r	--	--	--
Tellurium, Te content	do.	10,000 r	8,000 r	8,000 r	10,000	18,000
Titanium mineral concentrates, titaniferous slag, sorelslag[e]		900,000	900,000	900,000	700,000	700,000
Tungsten, mine, concentrate, W content[7]		2,194	2,128	2,344	1,600 r	--
Zinc:						
Mine, Zn content		641,134	426,545	352,125	289,584 r	321,757
Smelter, primary		648,619	651,638	649,217	683,118 r	691,389
INDUSTRIAL MINERALS						
Barite[e]		22,000	22,000	35,000	32,000	10,000
Cement and clinker:						
Clinker	thousand metric tons	12,155	10,977	10,910 r	11,514	11,422
Hydraulic cement	do.	12,465	11,611	11,879	12,167 r	11,870
Clay and shale, bentonite		2,015	3,451	2,083	583 e	600 e
Diamond, gem, unspecified	thousand carats	10,451	10,600 r	12,012 r	11,677	13,036
Feldspar, mine, nepheline syenite	thousand metric tons	586 r	646 r	654 r	614	571
Gemstones, amethyst, including jade		178	554	6,919 r	8,233	154
Graphite[e]		24,000	20,000	20,000	22,000	25,000
Gypsum and anhydrite	thousand metric tons	1,832	1,837	1,793 r	1,726	1,679
Lime	do.	1,965 r	1,865 r	1,995 r	1,852	1,807
Mica		NA	NA	NA	NA	20,000 e
Nitrogen, ammonia, N content		4,085,950 r	3,960,150 r	3,842,850 r	4,140,350 r	4,273,800
Peat, horticultural use	thousand metric tons	1,277 r	1,173 r	1,178 r	1,297	1,453
Potash, K_2O content	do.	8,976 r	10,196 r	10,818 r	11,462	10,790
Salt	do.	10,820 r	12,244 r	14,473 r	14,343	10,252
Stone, sand, and gravel:						
Sand and gravel, construction	do.	239,307 r	241,061 r	223,407 r	228,030	280,550
Sand and gravel, industrial, silica	do.	1,517 r	2,331 r	2,011 r	2,053 r	2,256
Stone, size and shape unspecified	do.	152,977 r	147,746 r	147,739 r	158,034	160,016
Sulfur, byproduct, S content:						
Metallurgy	do.	665 r	677 r	590 r	558	635
Natural gas and petroleum	do.	5,594 r	5,624 r	5,252 r	5,187	4,746
Total	do.	6,260 r	6,300 r	5,840 r	5,750	5,380
Talc and related minerals	do.	130	175	90 r	175	199
MINERAL FUELS AND RELATED MATERIALS						
Coal:[e]						
Bituminous	thousand metric tons	4,660	4,820	4,840	4,340 r	4,290
Lignite	do.	8,650 r	8,960 r	8,990 r	8,060 r	7,970
Metallurgical	do.	30,000	31,000	31,100	27,900 r	27,600
Subbituminous	do.	23,300	24,100	24,200	21,700 r	21,500
Total	do.	66,600 r	68,900 r	69,100	62,000 r	61,300
Natural gas liquids, gas plant, gross volume	thousand 42-gallon barrels	300,794 r	313,511 r	314,394 r	317,563 r	363,187
Natural gas, marketable	do.	143,683 r	145,026 r	151,534 r	154,633 r	159,591

See footnotes at end of table.

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

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2012	2013	2014	2015	2016
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	1,365,100	1,460,000 r	1,558,915 r	1,601,985 r	1,627,900
Refinery:						
Asphalt	do.	26,349 r	24,600 r, e	26,600 r, e	24,519 r	27,840
Diesel	do.	216,310 r	211,000 r, e	210,000 r, e	209,477 r	207,940
Fuel oil:						
Heavy	do.	52,875 r	50,600 r, e	45,000 r, e	35,350 r	29,830
Light[8]	do.	62,791 r	63,400 r, e	56,500 r, e	64,900 r, e	56,700 e
Gasoline:						
Aviation[9]	do.	42,284 r	44,400 r, e	46,300 r, e	45,500 r, e	50,800 e
Motor	do.	341,081 r	334,197 r	328,721 r	350,105 r	368,718
Liquefied petroleum gas	do.	33,454 r	33,800 r, e	32,400 r, e	26,900 r, e	25,000 e
Other[10]	do.	109,565 r	111,127 r	88,206 r	92,048 r	94,080
Total	do.	885,000 r	873,000 r	834,000 r	849,000 r	861,000 r
Uranium, mine, uranium oxide, U content		8,998	9,331	9,101	13,324 r	14,037

eEstimated. rRevised. do. Ditto. NA Not available. -- Zero.

[1]Table includes data available through January 2, 2018. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]In addition to the commodities listed, aluminum hydroxide $Al(OH)_3$ (hydrate), aluminum metal (secondary), cesium, ilmenite, ore containing indium, pumice, and zeolites may have been produced in Canada, but available information was inadequate to make reliable estimates of output.

[3]Recoverable metal in ores and concentrates shipped.

[4]Metal content of concentrates produced.

[5]Production includes niobium (columbium) contained in ferroniobium shipped with the value as reported by the shipper.

[6]Tantalum production reported in Ta_2O_5 converted to tantalum content.

[7]Data for 2012 to 2014 based on production reported by North American Tungsten Corp.; datum for 2015 based on half-year production from North American Tungsten Corp. and an estimate for production from July to October 2015.

[8]Includes stove oil, kerosene, and tractor fuel.

[9]Includes aviation gasoline and aviation turbo fuels.

[10]Includes petro-chemical feedstocks, naphtha specialties, petroleum coke, lubricating oils and greases, still gas, and other products.

TABLE 2
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Axens IFP Group Technologies, 100%	Brockville refinery, Brockville, Ontario	18.
Do.	Rio Tinto Group, 100%	Vaudreuil refinery, Jonquiere, Quebec	1,559.
Aluminum	Alcoa Inc., 100%	Smelter in Baie-Comeau, Quebec	280.
Do.	do.	Deschambault smelter in Deschambault, Quebec	280.
Do.	Alcoa Inc., 75%, and Rio Tinto Alcan Inc., 25%	Becancour smelter in Becancour, Quebec	446.
Do.	Rio Tinto Group, 100%	Alma smelter in Alma, Quebec	471.
Do.	do.	Arvida smelter in Arvida, Jonquiere, Quebec	236.
Do.	do.	Grande-Baie smelter in Grande-Baie, Quebec	227.
Do.	do.	Kitimat smelter in Kitimat, British Columbia	420.
Do.	do.	Laterriere smelter in Laterriere, Quebec	247.
Do.	Rio Tinto Alcan Inc., 40%; Aluminium Austria Metall Québec, 20%; Hydro Aluminum, 20%; Marubeni Québec Inc., 13.33%; Société Générale de Financement du Québec, 6.67%	Alouette smelter in Sept-Iles, Quebec	611.
Ammonium sulfate metric tons	Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Barite	Fireside Minerals Ltd.	Fireside Mine, Fireside, British Columbia	NA.
Do.	MarFred Minerals Ltd.	Tracey Lake barite property, North Williams, Ontario	NA.
Cadmium metal	Noranda Income Fund, 100%	Valleyfield refinery, Quebec	NA.
Do.	Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	100.
Cement	Ciment Québec Inc.	Saint-Basile, Quebec	1,571.
Do.	Colacem Canada Inc. (Colacem S.p.A.)	Grenville-sur-la-Rouge, Quebec	300.
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.	Grinding plant, Stoney Creek, 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 Group)	Edmonton, Alberta	1,380.
Do.	do.	Delta, British Columbia	1,356.
Do.	St. Marys Cement (Canada) Inc. (Votorantim Cimentos S.A.)	Bowmanville, Ontario	1,800.
Do.	do.	St. Marys, Ontario	645.
Clay, bentonite	Canadian Clay Products Inc.	Wilcox, Saskatchewan	NA.
Coal	Anglo American plc, 100%	Trend open pit mine, near Tumbler Ridge, British Columbia	2,000.
Do.	Teck Resources Ltd., 100%	Cardinal River operations, near Hinton, Alberta	200.
Do.	do.	Coal Mountain open pit mine at Sparwood, British Columbia	2,700.
Do.	do.	Fording River open pit mine, near Elkford, British Columbia	8,500.
Do.	do.	Line Creek Mine, near Sparwood, British Columbia	3,500.
Do.	Teck Resources Ltd., 95%; Nittetsu Mining Co. Ltd., 2.5%; POSCO Canada Ltd., 2.5%	Elkview open pit mine, near Sparwood, British Columbia	7,000.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Coal—Continued	Teck Resources Ltd., 80%, and POSCO Canada Ltd., 20%	Greenhills open pit mine, near Elkford, British Columbia	5,200.
Do.	TransAlta Utilities Corp., 100%	Highvale open pit mine, near Seba Beach, Alberta	13,000.
Do.	Up Energy Dev. Group Ltd., 85.31%, and Winsway Coking Coal Holdings Ltd., 14.69%	Grande Cache Mine, near Grande Cache, Alberta	3,600.
Do.	Walter Energy, Inc., 100%	Willow Creek Mine, Tumbler Ridge, British Columbia	1,500.
Do.	do.	Brule Mine, Tumbler Ridge, British Columbia	2,000
Do.	do.	Wolverine Mine, Tumbler Ridge, British Columbia	2,000
Do.	Westmoreland Coal Co., 100%	Coal Valley Mine, near Edson, Alberta	5,200.
Do.	do.	Boundary Dam open pit mine, near Estevan, Saskatchewan	6,500.
Do.	do.	Poplar River open pit mine, near Coronach, Saskatchewan	3,600.
Do.	do.	Bienfait open pit mine, near Bienfait, Saskatchewan	2,800.
Do.	do.	Genesee open pit mine, near Warburg, Alberta	5,600.
Do.	do.	Sheerness open pit mine, near Hanna, Alberta	3,000.
Do.	do.	Paintearth open pit mine, near Forestburg, Alberta	3,500.
Cobalt:			
Ore, Co content metric tons	Glencore plc, 100%	Raglan Mine in Ungave, Quebec	700.
Do. do.	Vale S.A., 100%	Voisey's Bay Mines, Newfoundland and Labrador	NA.
Do. do.	do.	Ontario Operations, Ontario	700.
Metal do.	Glencore plc, 100%	Sudbury smelter in Sudbury, Ontario	NA.
Do. do.	KGHM Polska Miedź S.A.	Sudbury Operations, Ontario	NA.
Do. do.	do.	Port Colborne refinery, Ontario	NA.
Do. do.	do.	Voisey's Bay, Newfoundland and Labrador	NA.
Do. do.	Vale S.A., 100%	Copper Cliff refinery and smelter in Sudbury, Ontario	NA.
Do. do.	do.	Long Harbour hydrometallurgy smelter	NA.
Copper:			
Ore, Cu content	Agnico-Eagle Mines Ltd., 100%	LaRonde Mine, about 650 kilometers northwest of Montreal, Quebec	5.
Do.	Capstone Mining Corp., 100%	Minto Mine, Yukon	21.
Do.	Copper Mountain Mining Corp., 75%, and Mitsubishi Materials Corp., 25%	Copper Mountain Mine, British Columbia	48.
Do.	Glencore plc, 100%	Kidd Creek Mine, about 20 kilometers north of Timmins, Ontario	46.
Do.	do.	Nickel Rim South Mine, Sudbury Division, Sudbury, Ontario	18.
Do.	do.	Raglan Mine in Ungave, Quebec	7.
Do.	Imperial Metals Corp., 50%; Mitsubishi Materials Corp., 31.25%; Dowa Metals & Mining Co., Ltd., 6.25%; Furukawa Co., Ltd., 6.25%; Marubeni Corp. 6.25%	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	32.
Do.	Imperial Metals Corp., 100%	Mount Polley Mine at Williams Lake, British Columbia	25.
Do.	KGHM Polska Miedź S.A., 100%	Sudbury operations, Ontario	30.
Do.	North American Palladium Ltd., 100%	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	2.
Do.	Nyrstar N.V., 100%	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	39.
Do.	do.	Myra Falls complex, British Columbia British Columbia	4.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(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—Continued		Taseko Mines Ltd., 75%, Lojitz Corp., 12.5%; Dowa Holdings Col Ltd., 6.25%; Furukawa Co. Ltd., 6.25%	Gibraltar Mine, British Columbia	63.
Do.		Teck Resources Ltd., 100%	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor, Newfoundland and Labrador	19.
Do.		do.	Highland Valley Copper Mine, Kamloops, British Columbia	125.
Do.		Vale S.A., 100%	Ontario Division, Ontario	120.
Do.		do.	Voisey's Bay Mines, Newfoundland and Labrador	55.
Do.		Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	5.
Smelter		Glencore plc, 100%	Horne smelter in Noranda, Quebec	194.
Do.		do.	Sudbury smelter, Ontario	131.
Do.		Vale S.A., 100%	Copper Cliff smelter in Sudbury, Ontario	NA.
Do.		do.	Long Harbour hydrometallurgy smelter	NA.
Refinery		Cobalt Refinery Co. Inc., 100%	Fort Saskatchewan refinery	NA.
Do.		Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	276.
Do.		Government, 100%	Royal Canadian Mint, Ottawa, Ontario	NA.
Do.		Noranda Income Fund, 100%	Valleyfield refinery	NA.
Do.		Taseko Mines Ltd., 75%; Lojitz Corp., 12.5%; Dowa Holdings Col Ltd., 6.25%; Furukawa Co. Ltd., 6.25%	Gibraltar solvent extraction-electrowinning (SX–EW) facility, British Columbia	1.
Do.		Vale S.A., 100%	Copper Cliff refinery in Sudbury, Ontario	NA.
Do.		do.	Voisey's Bay refinery, Newfoundland and Labrador	NA.
Diamond	thousand carats	De Beers Group, 100%	Snap Lake underground mine, 220 kilometers northeast of Yellowknife, Northwest Territories	16,000.[1]
Do.	do.	De Beers Canada Inc., 51%, and Mountain Province Diamonds Inc., 49%	Gahcho Kué open pit mine, 280 kilometers northeast of Yellowknife, Northwest Territories	4,500.
Do.	do.	Dominion Diamond Corp., 88.9%, and unnamed owner, 11.1%	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	5,000.
Do.	do.	do.	Victor open pit mine, 90 kilometers west of Attawapiskat, Ontario	600.
Do.	do.	Rio Tinto plc, 60%, and Dominion Diamond Corp., 40%	Diavik open pit mine (includes the A154 North and the A154 South kimberlite pipes), northeast of Yellowknife, Northwest Territories	10,000.
Do.	do.	Stornoway Diamond Corp., 100%	Renard mine, 350 kilometers north of Chibougamau, Quebec	1,600.
Diatomite		Absorbent Products Ltd.	Red Lake deposit, British Columbia	NA.
Gold:				
Ore, Au content	kilograms	Abcourt Mines Inc.	Elder Mine, Rouyn-Noranda, Quebec	600.
Do.	do.	Agnico-Eagle Mines Ltd.	Goldex Mine, Val-d'Or, Quebec	5,000.
Do.	do.	do.	Lapa Mine, about 60 kilometers west of Val-d'Or, Quebec	4,000.
Do.	do.	do.	LaRonde Mine, about 60 kilometers west of Val-d'Or, Quebec	9,300.
Do.	do.	do.	Meadowbank Mine, about 70 kilometers north of Baker Lake, Nunavut Territory	10,000.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold:—Continued				
Ore, Au content Continued	kilograms	Agnico Eagle Mines Ltd., 50%, and Yamana Gold Inc., 50%	Canadian Malartic Mine, about 20 kilometers west of Val d'Or, Quebec	17,000.
Do.	do.	Anaconda Mining Inc.	Pine Cove Mine, near Baie Verte, Newfoundland and Labrador	500.
Do.	do.	Aurizon Mines Ltd.	Casa Berardi Mine, about 95 kilometers north of La Sarre, Quebec	5,000.
Do.	do.	Aurico Gold Inc.	Young-Davidson Mine, Larder-Cadillac Break, 487 kilometers northwest of Toronto, Ontario	5,400.
Do.	do.	Barkerville Gold Mines Ltd.	QR Mine, British Columbia	400.
Do.	do.	Barrick Gold Inc.	Hemlo operation, includes David Bell underground mine and Williams open pit and underground mine, about 350 kilometers east of Thunder Bay, Ontario	7,100.
Do.	do.	Brigus Gold Corp.	Black Fox Mine, about 75 kilometers east of Timmins, Ontario	2,800.
Do.	do.	Capstone Mining Corp.	Minto Mine, about 240 kilometers northwest of Whitehorse, Yukon Territory	600.
Do.	do.	Claude Resources Inc.	Seabee operations (includes the Seabee Deep and the Santoy 8 Mines), Laonil Lake, Saskatchewan	1,500.
Do.	do.	Detour Gold Corp.	Detour Lake Mine, 208 km northeast of Timmins, Cochrane District, Ontario	20,400.
Do.	do.	Goldcorp Inc.	Hoyle Pond Mine, 20 km northeast of Timmins, Eastern Ontario District, Ontario	2,300.
Do.	do.	do.	Musselwhite Mine, 480 kilometers north of Thunder Bay, Ontario	8,100.
Do.	do.	do.	Porcupine Mine, Timmins, Ontario	10,000.
Do.	do.	do.	Red Lake Mine (includes Red Lake and the Campbell complexes), 180 kilometers	26,000.
Do.	do.	Golden Band Resources Inc.	EP Mine and Roy Lloyd Mine, Saskatchewan	1,500.
Do.	do.	IAMGOLD Corp., 100%	Westwood Mine, 40 kilometers east of Rouyn-Noranda	4,200.
Do.	do.	Imperial Metals Corp., 100%	Mt. Polley Mine, 8 kilometers southwest of Likely, British Columbia	1,200.
Do.	do.	Imperial Metals Corp., 50%; Mitsubishi Materials Corp., 31.25%; Dowa Metals & Mining Co., Ltd., 6.25%; Furukawa Co., Ltd., 6.25%; Marubeni Corp., 6.25%;	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	110.
Do.	do.	KGHM Polska Miedź S.A., 100%	Sudbury operations, Ontario	NA.
Do.	do.	Kirkland Lake Gold Inc., 100%	South Mine complex (Macassa Mine, Ontario)	2,400.
Do.	do.	do.	Holloway Mine, Ontario	700.
Do.	do.	do.	Holt Mine, Ontario	2,700.
Do.	do.	Klondex Mines Ltd., 100%	Rice Lake Mine, Manitoba	2,500.
Do.	do.	Metanor Resources Inc., 100%	Bachelor Lake Mine and mill, about 225 kilometers northeast of Val-d'Or, Quebec	1,200.
Do.	do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	400.
Do.	do.	Nyrstar N.V., 100%	Myra Falls complex, British Columbia	300.
Do.	do.	QMX Gold Corp.	Lac Herbin Mine	1,000.
Do.	do.	Richmont Mines Inc., 100%	Beaufor Mine, about 21 kilometers northeast of Val-d'Or, Quebec	800.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold:—Continued				
Ore, Au content—kilograms Continued		Richmont Mines Inc., 100%	Island Gold Mine, near Dubreuilville, Ontario	1,200.
Do.	do.	Stroud Resources Ltd., 100%	Hislop Mine, Ontario	600.
Do.	do.	Tahoe Resources Inc., 100%	Bell Creek Mine, northeast of Timmins, Ontario, and Timmins West Mine, 18 kilometers west of Timmins, Ontario	1,500.
Do.	do.	Vale S.A., 100%	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	NA.
Do.	do.	do.	Ontario division, Ontario	2,500.
Do.	do.	Wesdome Gold Mines Ltd., 100%	Eagle River Mine, about 50 kilometers west of Wawa, Ontario	1,900.
Do.	do.	do.	Kiena Mine, about 10 kilometers west of Val-d'Or, Quebec	1,300.
Do.	do.	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	628.
Refinery		Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	300.
Do.		Government, 100%	Royal Canadian Mint, Ottawa, Ontario Newfoundland and Labrador	NA.
Do.		Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Graphite		Imerys Graphite and Carbon	Saint Aime du Lac des Iles, Quebec	NA.
Gypsum		CertainTeed Gypsum Canada, Inc.	Amaranth Mine, Harcus, Manitoba	NA.
Do.		CGC Inc.	Hagersville Mine, Hagersville, Ontario	NA.
Do.		Mosher Limestone Co. Ltd.	Upper Musquodoboit	NA.
Do.		National Gypsum (Canada) Ltd.	East Milford quarry, Milford, Nova Scotia	3,100.
Indium	metric tons	QIT Fer Et Titane Inc., 100%	Lac Tio Mine, Havre Saint Pierre,	70.
Iron and steel:				
Iron ore:				
Ore		ArcelorMittal Inc. (ArcelorMittal S.A.), 85%, and POSCO-China Steel Consortium 15%	Fire Lake and Mont-Wright open pit mines, Quebec	24,000.
Do.		Rio Tinto Ltd., 58.72; Mitsubishi Corp., 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%	Carol Lake (IOC) open pit mine, Labrador City, Newfoundland and Labrador	23,000.
Pellets		ArcelorMittal Mines Canada Inc. (ArcelorMittal S.A.)	Pelleting plant, Port Cartier, Quebec	9,000.
Do.		Cliffs Natural Resources Inc.	Pelleting plant, Pointe Noire, Quebec	5,200.
Do.		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. (Arrium Ltd.)	Edmonton, Alberta	320.
Do.		ArcelorMittal Dofasco Inc. (ArcelorMittal S.A.)	Hamilton, Ontario	4,100.
Do.		ArcelorMittal Montreal Inc. (ArcelorMittal S.A.)	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	450.
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 Inc. (United States Steel Corp.)	Lake Erie Works, Nanticoke, Ontario	2,400.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Lead:			
Refinery	Teck Resources Ltd., 100%	Trail Operations, Trail, British Columbia	NA.
Smelter:			
Primary	do.	do.	100.
Secondary, includes alloys	Metalex Products Ltd.	Richmond, British Columbia	8.
Do.	NovaPb Inc. (Newalta Corp.)	Ville Sainte Catherine, Quebec	100.
Do.	Tonolli Canada Ltd.	Mississauga, Ontario	35.
Lime	Brookville Manufacturing Co.	Brookville, Saint John, New Brunswick	NA.
Do.	E.C. King Contracting Ltd	Owen Sound, Ontario	NA.
Do.	Graymont Inc.	Havelock, New Brunswick	110.
Do.	do.	Bedford, Bedford, Quebec	400.
Do.	do.	Faulkner, Manitoba	117.
Magnesite	Baymag Inc.	Mount Brussilof Mine, British Columbia	NA.
Molybdenum metric tons	Imperial Metals Corp., 50%; Mitsubishi Materials Corp., 31.25%; Dowa Metals & Mining Co., Ltd., 6.25%; Furukawa Co., Ltd., 6.25%; Marubeni Corp., 6.25%	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	140.
Do. do.	Taseko Mines Ltd., 75%; Sojitz Corp., 12.5%; Dowa Holdings Co. Ltd., 6.25%; Furukawa Co. Ltd., 6.25%	Gibraltar Mine, British Columbia	1,200.
Do. do.	Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%	Highland Valley copper mine, Kamloops, British Columbia	5,000.
Do. do.	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.
Mica (phlogopite)	Imerys Mica Suzorite, Inc.	Mauricie, Quebec, Canada	NA.
Nepheline syenite	Unimin Canada Ltd.	Blue Mountain quarry, Methuen Township, Ontario	NA.
Do.	do.	Nephton quarry, Methuen Township, Ontario	NA.
Nickel:			
Ore, Ni content	Glencore plc, 100%	Raglan Mine in Ungave, Quebec	29.
Do.	do.	Fraser Mine and Nickel Rim South Mine in the Sudbury district, Ontario	20.
Do.	KGHM Polska Miedź S.A., 100%	Morrison (Levac) Mine, Sudbury, Ontario	6.
Do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	800.
Do.	Vale Canada Ltd. (Vale S.A.)	Ontario Operations, Ontario	85.
Do.	do.	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	45.
Do.	Vale Newfoundland & Labrador Ltd. (Vale S.A.)	Voisey Bay Mines (includes the Ovoid Mine), Newfoundland and Labrador	80.
Smelter	Glencore plc, 100%	Sudbury smelter in Sudbury, Ontario	131 (Cu-Ni matte).
Do.	Vale S.A., 100%	Copper Cliff Smelter in Sudbury, Ontario	NA.
Do.	do.	Smelter in Thompson, Manitoba	82 (Ni anode).
Do.	do.	Long Harbour hydrometallurgy smelter	50.
Refinery	The Cobalt Refinery Company Inc. (General Nickel S.A., 50%, and Sherritt International Corp., 50%)	Fort Saskatchewan refinery, Fort Saskatchewan, Alberta	35 (Ni briquets and powder); 4 (Co briquets and powder).
Do.	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.
Do.	do.	Port Colborne refinery, Ontario	NA.
Do.	Vale S.A., 100%	Copper Cliff refinery in Sudbury, Ontario	NA.
Do.	do.	Thompson refinery in Thompson, Manitoba	NA.
Do.	do.	Voisey Bay refinery, Newfoundland and Labrador	NA.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Palladium:				
Ore, Pd content	kilograms	KGHM Polska Miedź S.A., 100%	Sudbury Operations, Ontario	NA.
Do.	do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	4,800.
Do.	do.	Vale S.A., 100%	Ontario Operations, Ontario	6,000.
Refinery	do.	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.
Do.	do.	Vale S.A., 100%	Port Colborne refinery, Ontario	NA.
Do.	do.	do.	Copper Cliff refinery in Sudbury, Ontario	NA.
Smelter	do.	do.	Copper Cliff smelter in Sudbury, Ontario	NA.
Do.	do.	do.	Copper Cliff refinery in Sudbury, Ontario	NA.
Petroleum, refinery products	barrels 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.	Nova Chemicals Corp.	Corunna petrochemical and refinery complex, Corunna, Ontario	80,000.
Do.	do.	Shell Canada Ltd. (Royal Dutch Shell plc, 100%)	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.	Ultramar Ltd. (Valero Energy Corp., 100%)	Jean Gaulin refinery, Levis, Quebec	265,000.
Perlite		Le Groupe Berger Ltée	Saint-Modeste quarry, Saint-Modeste, Quebec	NA.
Do.		do.	Sarnia refinery, Sarnia, Ontario	85,000.
Platinum:				
Ore, Pt content	kilograms	KGHM Polska Miedź S.A., 100%	Sudbury Operations, Ontario	NA.
Do.	do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	4,800.
Do.	do.	Vale S.A., 100%	Ontario Operations, Ontario	5,000.
Refinery	do.	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.
Do.	do.	Vale S.A., 100%	Copper Cliff refinery in Sudbury, Ontario	NA.
Do.	do.	do.	Port Colborne refinery, Ontario	NA.
Smelter	do.	do.	Copper Cliff smelter in Sudbury, Ontario	NA.
Potash (K_2O equivalent)		Agrium Products Inc.	Vanscoy, Saskatchewan	3,000.
Do.		The Mosaic Co.	Colonsay, Saskatchewan	2,100.
Do.		do.	Esterhazy, southeast Saskatchewan	5,300.
Do.		do.	Belle Plaine, Saskatchewan	2,800.
Do.		Potash Corp. of Saskatchewan Inc. (Potash Corp.)	Lanigan, near Lanigan, Saskatchewan	3,800.
Do.		do.	Rocanville, southeast Saskatchewan	6,000.
Do.		do.	Allan Division, Allan, Saskatchewan	4,000.
Do.		do.	Cory, near Saskatoon, Saskatchewan	3,000.
Do.		do.	Patience Lake, near Saskatoon, Saskatchewan	300.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Salt	Canadian Salt Co. Ltd.	Belle Plaine, Saskatchewan	NA.
Do.	do.	Lindberg, Alberta	NA.
Do.	do.	Pugwash, Nova Scotia	1,400.
Do.	do.	Rock salt mine at Ojibway, Ontario	2,600.
Do.	Dow Chemical Canada Inc.	Fort Saskatchewan, Alberta	NA.
Do.	Junex Solnat (Junex Inc.)	Becancour, Quebec	NA.
Do.	Mosaic Potash Esterhazy Limited Partnership Ltd. [The Mosaic Co., 75%, and Potash Corp. of Saskatchewan Inc. (Potash Corp.), 25%]	Esterhazy, southeast Saskatchewan	NA.
Do.	Nexen Inc. and Albchem Industries Ltd.	Plant near Bruderheim, Alberta	NA.
Do.	NSC Minerals Inc.	Salt recovery from potash tailings at Rocanville and Vanscoy, Saskatchewan	NA.
Do.	Potash Corp. of Saskatchewan Inc. (Potash Corp.)	Sussex, New Brunswick	700.
Do.	Sifco Canada Inc. (Compass Minerals Group Inc.)	Goderich Harbour, Ontario	6,500.
Do.	Seleine Mines Division of Canadian Salt Co. Ltd.	Iles-de-la-Magdalen, Quebec	1,625.
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.
Silicon, metal	Québec Silicon Ltd. (Globe Speciality Metals Inc., 51%, and Dow Corning Corp., 49%)	Plant at Becancour, Quebec	47.
Silver:			
Ore, Ag content kilograms	Agnico Eagle Mines Ltd., 50%, and Yamana Gold Inc., 50%	Canadian Malartic Mine, about 20 kilometers west of Val d'Or, Quebec	18,500.
Do. do.	Capstone Mining Corp., 100%	Minto Mine, about 240 kilometers northwest of Whitehorse, Yukon Territory Newfoundland and Labrador	7,600.
Do. do.	Glencore plc, 100%	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	115,000.
Do. do.	Imperial Metals Corp., 100%	Mount Polley Mine at Williams Lake,	13,000.
Do. do.	KGHM Polska Miedź S.A., 100%	Sudbury Operations	NA.
Do. do.	Nyrstar N.V., 100%	Myra Falls complex, British Columbia	17,000.
Do. do.	do.	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	11,500.
Do. do.	Teck Resources Ltd., 100%	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor,	13,300.
Do. do.	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	153,000.
Refinery	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.
Do.	Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Do.	Government, 100%	Royal Canadian Mint, Ottawa, Ontario	NA.
Smelter	Glencore plc, 100%	Belledune smelter, New Brunswick	NA.
Stone, dolomite and limestone	Antigonish Limestone Ltd.	Southside Antigonish Harbour	NA.
Do.	Atlantic Minerals Ltd. (Newfoundland Cement Co. Ltd., 100%)	Lower Cove, Newfoundland and Labrador	800.
Do.	ESSROC Canada Inc	Picton, Ontario	NA.
Do.	Graymont Inc.	Havelock quarry, Havelock, New Brunswick	NA.
Do.	do.	Faulkner, Manitoba	NA.
Do.	Holcim (Canada) Inc. (Holcim AG)	Joliette, Quebec	NA.
Do.	do.	Ogden Point quarry, Victoria, British Columbia	NA.
Do.	Lafarge Canada Inc.	Brookfield, Brookfield, Nova Scotia	NA.
Do.	do.	Bath, Ontario	NA.
Do.	do.	Woodstock, Ontario	NA.
Do.	Mosher Limestone Co. Ltd.	Upper Musquodoboit	NA.
Do.	Nova Scotia Power Inc.	Glen Morrison quarry, Cape Breton, Nova Scotia	NA.
Do.	St. Marys CBM (Canada) Inc.	Bowmanville, Ontario	NA.
Do.	do.	St. Marys, Ontario	NA.
Talc	IMERYS Talc	Penhorwood Mine, Ontario, Canada	NA.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Titanium, ilmenite	QIT Fer Et Titane Inc., 100%	Lac Tio Mine, Havre Saint Pierre,	600.
Titanium, TiO_2 slag	Fer et Titane, Inc., 100%	Sorel-Tracy, Quebec	1,100 (Sorelslag®); 250 (UGS™ slag); NA (RTCS™ slag).
Tungsten, WO_3 content	North American Tungsten Corporation Ltd., 100%	Cantung Mine, Northwest Territories	3,500.
Uranium:			
Oxide metric tons	Cameco Corp., 69.81%, and Areva S.A., 30.19%	McArthur River Mine, Saskatchewan	9,300.
Dioxide	Cameco Corp., 100%	Port Hope conversion facility	NA.
Trioxide	do.	Blind River refinery, Ontario	NA.
Hexafluoride	do.	Port Hope conversion facility	NA.
Vermiculite	Le Groupe Berger Ltée	Saint-Modeste quarry, Saint-Modeste, Quebec	NA.
Wollastonite	Canadian Wollastonite (2005948 Ontario Ltd.)	St. Lawrence Mine, City of Kingston and the municipality of Leeds and the Thousand Islands, Ontario	NA.
Zeolites	Absorbent Products Ltd.	Red Lake deposit, British Columbia	NA.
Do.	HCA Mountain Minerals (Lethbridge) Ltd. (Heemskirk Canada Ltd.)	Processing plant at Lethbridge, Alberta	NA.
Do.	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.	do.	Processing plant at Ashcroft, British Columbia	NA.
Zinc:			
Lead-zinc ore	Agnico-Eagle Mines Ltd., 100%	LaRonde Mine, 60 kilometers west of Val-d'Or, Quebec	55.
Do.	Trevali Mining Corp., 100%	Caribou Mine, Bathurst, New Brunswick	NA.
Zinc ore	Glencore plc, 100%	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	80.
Do.	Nyrstar N.V., 100%	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	39.
Do.	do.	Myra Falls complex, British Columbia	35.
Do.	Teck Resources Ltd.	Duck Pond Mine, 90 kilometers south of Buchans, Newfoundland and Labrador	34,200.
Refined	Hudson Bay Mining and Smelting Co., Ltd. (HudBay Minerals Inc., 100%)	Zinc plant (pressure leach and electrowinning) at Flin Flon, Manitoba	115.
Do.	Noranda Income Fund, 75%, and Glencore plc, 25%	CEZ refinery, Valleyfield, Quebec	265.
Do.	Teck Resources Ltd.	Trail Operations, Trail, British Columbia	295.

Do., do. Ditto. NA Not available.

[1]Placed on care-and-maintenance status in December 2015.

TABLE 3
CANADA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Coal (anthracite, bituminous, subbituminous, and lignite)	million tons	6,582 [2]
Copper		9,937 [1]
Gold	metric tons	1,984 [1]
Lead		83 [1]
Molybdenum		101 [1]
Natural gas	billion cubic meters	2 [2]
Nickel		2,725 [1]
Petroleum, crude	billion barrels	171.5 [2]
Silver	metric tons	5,345 [1]
Zinc		3,009 [1]

[1]Source: Mining Association of Canada, data as of 2015.
[2]Source: BP p.l.c.