



2014 Minerals Yearbook

CANADA

THE MINERAL INDUSTRY OF CANADA

By Susan Wacaster

Canada is one of the leading mining nations in the world. It produces a wide array of industrial minerals, metals, and mineral fuels and has one of the largest mining supply sectors, with several thousand companies providing services to global mining operations. Vancouver, British Columbia, is the headquarters for the largest concentration of the world's mineral exploration companies, and Toronto, Ontario, is a global hub for mineral industry financing. The Toronto stock exchanges accounted for 62%, or about \$8.8 billion, of the world's mining equity capital in 2014. The Toronto Stock Exchange (TSE) and TSX Venture Exchange (TSXV) listed between 50% and 60% of the world's publicly traded mining companies. Canadian mining companies operate in more than 100 countries, and the value of the country's assets abroad amounted to \$134 billion in 2013 (the most recent year for which data were available). Canadian companies were active in 33 nations in Africa and in every country in Latin America (Mining Association of Canada, 2015, p. 74, 82; Natural Resources Canada, 2016c, p. 6).

According to U.S. Geological Survey data, Canada was the world's leading producer of potash in 2014, accounting for 28% of the total. It was the third-ranked producer of aluminum, accounting for 6% of the world total after China (48%) and Russia (7%), and of cobalt, accounting for 5% of the world total after the Democratic Republic of the Congo (51%) and China (6%). Canada was the fourth-ranked producer of indium, accounting for 8% of the world total after China (55%), the Republic of Korea (18%), and Japan (9%); nickel, accounting for 10% of the world total after the Philippines (21%), and Australia and Russia (about 10% each); and platinum, accounting for 6% of the world total after South Africa (64%), Russia (16%), and Zimbabwe (9%). Canada was the fifth-ranked producer of cadmium, accounting for 6% of the world total after China (31%), the Republic of Korea (18%), Japan (8%), and Mexico (6%). According to Natural Resources Canada, the country was the world's second-ranked producer of niobium and uranium in 2014, the third-ranked producer of rough diamond, and the fourth-ranked producer of salt and elemental sulfur. Canada is also a leading natural gas- and crude petroleum-producing country, and, according to BP p.l.c., the country accounted for about 5% of the world total of both commodities in 2014 (BP p.l.c., 2015, p. 8, 22; Natural Resources Canada, 2016c, p. 6; U.S. Geological Survey, 2016, p. 23, 43, 53, 69, 81, 115, 127, 129).

Minerals in the National Economy

The nominal gross domestic product (GDP) of Canada in 2014 was \$1.79 trillion following a record high in 2013 of \$1.84 trillion. The record high GDP in 2013 was attributable in large part to relatively high international prices for some mineral commodities. The real GDP of Canada increased by 2.4% in 2014 compared with that of 2013 to \$1.4 trillion. In 2014, the natural resource sectors of Canada (including agriculture,

forestry, fishing and hunting, mining, quarrying, and oil and gas extraction) accounted for about 20% of the nominal GDP and the mineral sector accounted for about 4%. In terms of the value contributed to the GDP, the percent share of goods-producing industries accounted for by mining, quarrying, and oil and natural gas extraction activities decreased steadily to 12.2% in 2014 from 13.7% in 2000 (Natural Resources Canada, 2016e; Statistics Canada, 2016d; United Nations Statistics Division, 2016a, b).

From 2009 through 2013 (the latest year for which data were available), the cost of fuel and electricity consumed by mineral industry activities in Canada increased by an average annual rate of 13%; the cost of materials and supplies consumed by mineral industry activities increased by 10%; and the cost of wages increased by 19%. During the same time, the value of Canada's mineral industry production increased by an average annual percentage rate of 12%, and the number of mineral industry establishments and workers increased by an average annual rate of 6% each. In 2014, international mineral commodity prices decreased steeply, and a projected trend of decreasing commodity prices was expected to force a national economic adjustment towards growth in nonmineral sectors in Canada (Chamagne and others, 2016, p. 1; Natural Resources Canada, 2016f).

The value contributed to the GDP by the construction, durable manufacturing, energy, industrial production, mineral extraction, and utilities sectors decreased by between 1% and 7% in Canada from 2010 through 2014. The greatest decrease was in the construction sector, followed by the mineral extraction and energy sectors. Preliminary data indicated that the value of those sectors would continue to decrease in 2015. The value of industries in the business; finance and insurance; nondurable manufacturing; natural resources (including only agriculture, forestry, and fishing and hunting); general services; and professional, scientific, and technical services sectors, however, increased annually since 2010, and preliminary data indicated continued increases in those industries in 2015 (Statistics Canada, 2016d).

At the Province and Territory level, since 2010, mining, quarrying, and oil and gas extraction accounted for the greatest share of the GDP's of Newfoundland and Labrador, the Northwest Territories, Nunavut, Saskatchewan, and Yukon, whereas British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, and Quebec received the least share of their respective GDP's from the mining, quarrying, and oil and gas extraction. Additionally, there was a significant gap in value between the high-earning and low-earning Provinces. Although mining, quarrying, and oil and gas extraction contributed the greatest amount to the GDP of Newfoundland and Labrador, that share decreased to 31% in 2014 from a high of 42% in 2011. In 2014, mining, quarrying, and oil and gas extraction accounted for 26% of the Provincial GDP of Saskatchewan;

in the Northwest Territories it accounted for 25%; Nunavut, 19%; Yukon, 13%; British Columbia, 5%; Manitoba, 4%; Nova Scotia, 2%; New Brunswick, 2%; Quebec, 2%; and Ontario, 1% (Statistics Canada, 2016e).

Conversely, Ontario lead all Provinces and Territories in terms of exploration and deposit appraisal expenditures (\$407 million¹) followed by British Columbia (\$391 million), Quebec (\$276 million), Saskatchewan (\$213 million), Nunavut (\$138 million), Yukon (\$93.2 million), Northwest Territories (\$89 million), Newfoundland and Labrador (\$70 million), New Brunswick (\$25 million), and Manitoba (\$24 million). Canada was the leading global destination for nonferrous metal exploration spending in 2014, but allocations decreased by 22% compared with that of 2013, marking the third consecutive year that Canada's share of international nonferrous metal exploration investment decreased. In 2014, about \$26 billion worth of investment in the mineral sector of Canada was accounted for by current construction of major (undefined) projects. Another \$95 billion worth of mineral sector investments was accounted for by projects that were in the planning stage (Mining Association of Canada, 2015, p. 6; Natural Resources Canada, 2016d, e).

The value of Canada's domestic mining assets, which reportedly included 1,324 companies, increased by 6% in 2013 (the latest year for which data were available) to about \$75 billion compared with that of 2012. In 2013, Canada's mining assets in the United States consisted of 288 companies that together were valued at \$18 billion compared with \$17 billion in 2012. Assets of 163 Canadian companies operating in Mexico were valued at \$18 billion in 2013 compared with \$19 billion in 2012. Led by Argentina and Chile, the value of assets of the 235 Canadian companies operating in South America was \$48 billion in 2013 compared with \$47 billion in 2012. In Central America, Canadian mining assets consisted of 35 companies valued at a combined \$13 billion in 2013 compared with \$10 billion in 2012, and the value of assets of 81 companies in Europe was a combined \$10 billion in 2013 compared with \$9 billion in 2012. Canada's mining assets in Africa, Asia, and Oceania consisted of 264 companies valued at a combined \$36 billion in 2013 compared with \$32 billion in 2012 (Mining Association of Canada, 2015, p. 82).

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 2008 and 2012, revenue received from energy industries included \$10.9 billion in royalties, \$5.4 billion in income tax, \$3.5 billion in land sales, and \$2.1 billion in indirect taxes (Natural Resources Canada, 2014, p. 7).

Government Policies and Programs

The Minerals and Metals Policy of the Government of Canada is the Federal policy that outlines and describes the Federal

¹Where necessary values have been converted from Canadian dollars (CAD) to U.S. dollars (US\$) at an annual average exchange rate of CAD 1.149=US\$1.00 for 2014, CAD 1.071=US\$1.00 for 2013, and CAD 1.072=US\$1.00 for 2012.

Government's role, objectives, and strategies for development of the country's mineral resources, but minerals are generally owned and managed by the Provincial or Territorial government in which they are found, and each jurisdiction has its own mining, environmental, and occupational health and safety legislation. 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 always involve land. These claims arise in areas where First Peoples land rights have not been defined by past treaties or through other legal means. In these areas, agreements are negotiated between the First Peoples group, the Government of Canada, and the Province or Territory (Government of Canada, 2016a).

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) projects in the country are subject to the Canadian Environmental Assessment Act of 2012 (of which the Regulations Designating Physical Activities were amended in 2013) and may be subject to approvals under the Fisheries Act and the Navigation Protection Act (amendments to the Navigable Waters Protection Act changed its name to the Navigation Protection Act), all of which were amended in 2012. The amendments to the Fisheries Act came into force in 2013. The Navigation Protection Act came into force in 2014. A Federal review of the Metal Mining Effluent Regulations was expected in to be concluded in 2015 (Mining Association of Canada, 2015, p. 7–8).

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, 2016g, p. 3).

Although the Provinces and Territories own the majority of the mineral rights in Canada, 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 decisionmaking; 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, as the same Provincial, Territorial, or Federal statutes regulate all stages of the mining process. Most jurisdictions do not require mineral processing to occur within the Province or Territory of extraction with the exception of 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 territories 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, 2016, p. 68; Natural Resources Canada, 2016g, p. 9–10).

In Alberta, the Coal and Mineral Development Unit of the Department of Energy administers prospecting licenses, mining leases, and freehold lands (private ownership as opposed to leasehold). The rights to minerals are classified as mineral rights and surface rights. The owner of the surface rights owns the surface and the materials defined as surface substances that can be excavated, including clay, marl, peat, and sand and gravel, but not materials classified as minerals on or under the surface. The owner of the mineral rights owns all mineral substances found on and under the subject land. Mineral rights to land may cover one specific mineral, several specific minerals, or all minerals except gold and silver, which, with few exceptions, are the property of the Crown. The mineral right owner has the right to explore for and recover minerals. The Crown-owned mineral rights cover about 80% of the land area of Alberta, and the remainder consists of freehold mineral rights owned by private individuals and companies or minerals owned by the Federal Government, including national parks and Indian Reserves (Energy Alberta, 2016a, b).

To stake a mineral claim in Alberta, a permit must be obtained. Prospecting on Crown-owned public land is governed by the Mining and Minerals Act of Alberta and related regulations. To obtain the mineral exploration rights in a specified area where the Crown owns the mineral rights, a prospector must first obtain a Metallic and Industrial Minerals Permit, which is issued for a period of 14 years with 2-year assessment periods. The permit allows the holder to conduct limited exploration work. A permit holder may apply for a Metallic Mining Lease or an Industrial Mining Lease if prescribed conditions have been met. A mining lease must be obtained in order to proceed with more extensive exploration (typically that which utilizes mechanical equipment) or to proceed to the production phase. Alberta is one of three Provinces with a Crown discretion system that allows the

Province to refuse an application for a mining lease or to defer acceptance of an application when it is determined that the application is not in the best interest of the Province (Norton Rose Fulbright LLC, 2013, p. 2).

Mining leases issued by the government of Alberta grant the lessee the right to enter the subject land and to search for and extract minerals contingent upon the lessee obtaining required permits and maintaining compliance with applicable regulations. Mining leases are issued for 15-year terms, which may be renewed if conditions are met. An owner of freehold land maintains a fee simple real property interest. The holder of a mineral permit on freeholder land who wants to produce minerals applies for a mining patent, which may include surface and mining rights or solely mining rights (Norton Rose Fulbright LLC, 2013, p. 2).

In British Columbia, the Ministry of Energy, Mines, and Natural Gas administers the legislation governing the acquisition, exploration, and development of mineral, placer mineral, and coal rights. The Mineral Titles Branch maintains the coal and mineral titles registries as dictated by the Mineral Tenure Act, the Coal Act, and regulations under these Acts. Under the British Columbia Land Tenure System, mineral and surface rights consist of freehold and Crown-granted mineral claims and leases. Crown-owned minerals are administered under the Mineral Tenure Act. Freehold mineral rights make up a small share of the mineral rights in British Columbia and originate from grants that were issued under historical legislation. The originating legislation pertaining to these private mineral titles may cover a different suite of minerals than Crown-owned mineral titles, which do not include coal, marl, natural gas, peat, crude petroleum, or sand and gravel. Private mineral titles are subject to permitting requirements under the Mines Act and Provincial environmental legislation (Kazaz and Fipke, 2012, p. 23–33).

Mineral claims in British Columbia may be registered, and doing so provides rights over the minerals and mineral placers within the claim but not to the surface of the land. A Free Miner Certificate, which allows for surface examinations and subsurface measurements, must be acquired prior to exploration or development activities. A work permit must be obtained for more extensive exploration work involving machinery. Annual fees and work reports must be submitted to the Ministry of Energy, Mines, and Natural Gas. A mining lease must be obtained to proceed to the production phase. Mining leases are issued for periods up to 30 years, with 15-year renewal periods. Freehold land owners maintain a fee simple real property interest that is subject to annual mining taxes pursuant to the Mineral Land Tax Act of British Columbia. The Crown Surface and Quarry Licenses under the British Columbia Land Act apply to surface areas not covered by mineral or coal tenures (Norton Rose Fulbright LLC, 2013, p. 1–2).

The Mines and Minerals Act of Manitoba, which is administered by the Mineral Resources branch of the Provincial government of Manitoba, regulates mining titles and conveyance thereof. Mineral tenures in Manitoba consist primarily of unpatented mineral claims, mining leases, and freehold lands, including patented mineral claims. Provincial exploration and mining rights to Crown lands are acquired by

way of mineral claims and mineral exploration licenses. Claims may be staked only by licensed prospectors. Holders of recorded mineral claims have the right to explore for and develop Crown minerals found on, in, or under the lands covered by the claim, and claim holders may enter, use, and occupy the surface of the land to the extent necessary for these purposes, provided that arrangements for surface exploration and mining activities are acquired from the owners of private surface rights. Once a claim is recorded, it is valid for 2 years and may be renewed annually for an indefinite period. The claim holder is required to complete annual assessment work as prescribed under the Mines and Minerals Act (Norton Rose Fulbright LLC, 2013, p. 3; Government of Manitoba, 2016).

To carry out such regional explorations as airborne surveys, reconnaissance ground surveys, and preliminary sampling in Manitoba, additional permits and permissions are required, including blasting certificates, forest travel permits, and work permits. Mineral exploration licenses are issued as either Zone-A or Zone-B licenses, depending on the location of the subject land, and the zones have different terms and conditions. Zone-A licenses are for parcels that cover between 5,000 and 50,000 hectares (ha). They have 5-year terms and are renewable for another 5-year term provided that the annual work and reporting requirements are met. Zone-B licenses are issued for parcels between 5,000 and 100,000 ha. They have 5-year terms and the same renewal requirements as Zone-A licenses (Norton Rose Fulbright LLC, 2013, p. 3; Government of Manitoba, 2016).

Additional requirements for construction and development in Manitoba include acquisition of an Environment Act License and completion of an Environmental Impact Statement. Application must be made for a Crown land permit or lease, which is issued by the Lands and Geomatics Branch of the Province's Conservation Department, and a water rights license from the Manitoba Water Stewardship. Mining Leases grant mineral and mineral access rights, including extraction rights; the right to open and work a shaft or mine within the limits of the mining lease; and the right to erect buildings or structures on Crown land. Surface leases define the rights of a lessee to use the surface for mining operations. Mining leases may cover contiguous claims up to 800 ha, are granted for a term of 21 years, and are renewable indefinitely where production requirements are met. Patented mining claims may include surface and mining rights or solely mining rights. The holder of a mining patent has a freehold interest in the subject lands. No consent is required, therefore, for the transfer or mortgage of such lands (Norton Rose Fulbright LLC, 2013, p. 3; Government of Manitoba, 2016).

New Brunswick's mineral tenure system consists of mineral claims and mining leases granted by the Crown, which retains ownership of most minerals in the Province. Mineral claims and mining leases are administered by the Department of Natural Resources of New Brunswick under the Mining Act of New Brunswick. Newfoundland and Labrador mineral tenures also consist primarily of mineral licenses and mining leases. In Newfoundland and Labrador, mineral claims and mining leases are administered by the Minister of Natural Resources under the Mineral Act of Newfoundland and Labrador. The mineral tenure systems of Nova Scotia and Prince Edward Island take the form of mineral rights granted by the Crown as mineral exploration

licenses and mining leases subject to the Crown discretion program under the Mineral Resources Act of Nova Scotia and the Mineral Resources Act of Prince Edward Island (Norton Rose Fulbright LLC, 2013, p. 5–7).

In New Brunswick, mineral claims are valid for a term of 1 year and are renewable for three 1-year terms. A mining claim holder may apply to the Ministry of Natural Resources to obtain a mining lease. Mining lease holders must obtain other required permits and comply with regulations prescribed by the Ministry of Natural Resources; the Ministry of Agriculture, Fisheries and Aquaculture; the Ministry of the Environment, and the local government. Mining leases are granted for 20 years and may be renewed for three additional terms of 20 years. Acquisition of mineral rights in Newfoundland and Labrador proceed by way of online map staking. Mineral rights are issued for public lands held by the Crown. Mineral exploration licenses are issued for 5 years and may be renewed and held for a maximum of 20 years, provided that the annual assessment work is completed, reported, and accepted by the Province's Department of Natural Resources. Mining leases are typically granted for 25 years and may be renewed for up to 10 years. Mining lease holders must comply with the Province's Environmental Protection Act and other applicable regulations (Norton Rose Fulbright LLC, 2013, p. 5, 7).

All minerals in Nova Scotia are reserved to the Crown. Crown-owned minerals are available for exploration and extraction, whether such minerals are on privately owned or Crown-owned lands. Mineral rights in Nova Scotia are acquired and referenced by means of a map-based staking system. Mineral exploration licenses are valid for 1 year and are renewable, provided that the minimum requirements for exploration or prospecting work are met. Mining leases are granted for 20 years and may be renewed any number of coterminous terms. In Prince Edward Island, Crown-owned minerals are available for exploration and extraction whether such minerals are on Crown-owned or privately owned lands. Mineral exploration licenses are valid for 1 year and are renewable for four 1-year terms. Mining leases are granted for 20 years and may be renewed for a period of 20 years (Norton Rose Fulbright LLC, 2013, p. 5–7).

In the Northwest Territories and Nunavut, mineral tenures consist primarily of prospecting licenses, mineral claims, and mining leases administered by the Mining Recorder's Office of the Department of Aboriginal Affairs and Northern Development. Until 2014, these tenures were subject to the Northwest Territories and Nunavut Mining Regulations. The Northwest Territories and Nunavut Mining Regulations, however, was repealed and replaced by two separate regulations, the Northwest Territories Mining Regulations and the Nunavut Mining Regulations, both of which entered into force on March 31, 2014. The repeal and the implementation of new regulations were completed in order to modernize mineral tenure provisions to better meet current administrative, industry, and legal standards; to support implementation of a new claims map system in Nunavut; and to coincide with the devolution of lands and resources management to the government of

the Northwest Territories, which took place on April 1, 2014 (Norton Rose Fulbright LLC, 2013, p. 8).

The transfer of responsibilities for managing public land, water, and resources from the Federal Government to the Territory was the last major transfer of power from the Federal Government to the Territorial government of Northwest Territories in a process that began in the 1970s with the devolution of education, health, and social services. The Nunavut Mining Regulations apply to Crown lands in Nunavut, including lands under the administration and control of the Commissioner of Nunavut. The Northwest Territories Mining Regulations apply to Crown-owned lands in the Northwest Territories but exclude lands under the administration and control of the Commissioner of Northwest Territories (Norton Rose Fulbright LLC, 2013, p. 8; CBC News, 2014).

In the Northwest Territories and Nunavut, exploration licenses are issued to individuals or to a company that is incorporated or registered under the Business Corporations Act. The prospecting license, which must be renewed annually, allows the holder to prospect for the purpose of staking a claim or to stake a claim. A prospecting permit is required in prospect permit zones. A prospecting license is required to obtain a prospecting permit. The prospecting permit allows the holder the right to locate mineral claims, but does not confer mineral or surface rights. Mineral claims allow the holder the right to prospect for minerals and to develop a mine within the boundaries of the claim, but minerals may not be extracted from the subject lands without a mining lease or a freehold interest in the land except for assay and testing. The holder of a claim is required to complete and file an annual work assessment. To proceed with more extensive exploration or to mineral production, a mining lease must be obtained. The lease application must be secured within 10 years of registering the claim. Mining leases allow the holder to enter upon, search for, and extract minerals from the subject land provided that other required permits have been acquired and that the holder has complied with applicable regulations and land-claim agreements (Norton Rose Fulbright LLC, 2013, p. 19).

In the Northwest Territories, categories of land ownership include Commissioner's Lands, Crown Lands, and Settlement Lands. Where the subsurface is held by a First Peoples group, subsurface tenures are obtained through application to the group in accordance with the procedures of the group's relevant settlement agreement. Where the surface is held by a First Peoples group, surface tenures are obtained from their land administration department in accordance with the procedures of the relevant settlement agreement. Permits are issued for exploration and for development and construction. Exploration permits are not generally subject to additional licensing, but exploration activities must comply with applicable health, safety, and environmental legislation. Development and construction activities require a water license and other Territorial and Federal permits (Kazaz and Fipke, 2012, p. 39–42).

Under the Nunavut Land Claims Agreement of 1993, Inuit-owned lands are vested in Inuit organizations. The Kitikmeot Inuit Association, the Qikiqtani Inuit Association, and the Kivalliq Inuit Association are the regional Inuit associations in which surface title to Inuit-owned lands are vested. Subsurface

title to Inuit-owned land is vested in Nunavut Tunngavik Inc. Inuit-owned lands are held in trust by Nunavut Tunngavik and the regional Inuit associations. Other land-management groups include the Nunavut Impact Review Board, the Nunavut Planning Commission, the Nunavut Wildlife Management Board, the Nunavut Surface Rights Tribunal, and the Nunavut Water Board (Kazaz and Fipke 2012, p. 43–48).

Categories of ownership of land and minerals in Nunavut include Inuit-owned lands. Where the subsurface is held by Nunavut Tunngavik, subsurface rights are subject to negotiation and settlement of an exploration agreement and production lease with Nunavut Tunngavik instead of with the Crown, unless the claims and leases existed prior to the land becoming Inuit-owned land. Where the surface is held by a regional Inuit association, surface rights are obtained from the applicable association. Permits are issued for exploration, development, and construction. Exploration permits are generally not subject to additional licensing, but exploration activities must be in compliance with applicable health, safety, and environmental laws and regulations. Development and construction permits are subject to the terms of the Inuit Impact Benefit Agreement, the Water Compensation Agreement, the Water License, the NIRB approval, and other Territorial and Federal permits (Kazaz and Fipke, 2012, p. 43–48).

The Mining Act of Ontario, which is administered by the Ministry of Northern Development and Mines, regulates mining titles and the conveyance thereof. Under Ontario's land tenure system, mineral rights are issued as patented (equivalent to a freehold interest) or unpatented mining claims and mining leases for surface substances or minerals. In Ontario, a licensed prospector may prospect and stake a claim on surveyed or unsurveyed Crown lands and on lands where the mines, minerals, or mining rights have been reserved by the Crown. Claims may be made only by ground staking, except on subdivided territory in southern Ontario, where map staking is allowed. A claim confers the right to perform prescribed assessment work or to obtain a lease from the Crown, but it confers no right to take, remove, or dispose of any minerals found in, upon, or under the mining claim. Bulk sampling is permitted after permission is granted. Assessment work as prescribed by Assessment Work Regulations is required for the claim, as are exploration plans and exploration permits. Mining leases apply to mining rights only, have 21-year terms that are renewable for 21 years, and require a Mining Purpose Statement for renewal. Mining leases grant the lessee the right to enter upon, search for, and extract minerals from the land subject to the lessee obtaining other required permits and being in compliance with applicable regulations (Kazaz and Fipke, 2012, p. 16–22; Norton Rose Fulbright LLC, 2013, p. 3–4).

In Quebec, laws related to the issuance of mining titles and conveyance of titles includes the Mining Act, which is administered by the Minister of Natural Resources, and the Quebec Civil Code. (Quebec has a civil law system that contains some differences in granting mining titles compared with other Provinces.) The type of title that is granted varies depending on whether the government of the Province is granting a title for mineral substances or for surface mineral substances. The Province owns the rights to mineral substances, except for

mining concessions issued prior to July 1911 and certain lands granted before July 1880. Surface minerals belong to surface owners if the land is not approved for mining purposes (Kazaz and Fipke, 2012, p. 16–22).

Mining claims in Quebec grant the right to explore for mineral substances, are valid for a 2-year period and renewable for 2-year periods, and are acquired by ground-staking or map designation. Mining concessions grant title to land and minerals for the purpose of mining, and mining leases grant rights to mine mineral substances. Mining leases have 20-year terms that can be renewed for three 10-year periods and require mining to be commenced within 4 years of the date of issuance of the mining lease (Kazaz and Fipke, 2012, p. 5–15; Norton Rose Fulbright, 2013, p. 2–3).

Mineral tenures in Saskatchewan consist primarily of mineral claims and mining leases, both of which are available for public lands held by the Crown that are open for exploration; governed by the Energy and Mines Act of Saskatchewan; and administered by the Saskatchewan Ministry of Energy and Resources. Anyone may prospect or stake claims in Saskatchewan and no license is required. A claim holder has the right to prospect and explore for minerals in the claim area, but must acquire permission from the surface owner to enter upon or use the surface of the lands whether the owner of the subject lands is the Crown or a private owner. A claim may be held for 2 years and may be renewed annually provided that required exploration expenditures are made. Claims are generally acquired by map staking in surveyed areas or by ground staking in unsurveyed areas. A mining lease must be obtained to work a claim or to mine, recover, procure, and carry away the minerals within the lease area. Leases are issued for terms of less than 10 years and are renewable for additional 10-year terms subject to compliance with regulatory and annual lease requirements (Norton Rose Fulbright LLC, 2013, p. 4).

The Government of Canada, through the Department of Aboriginal Affairs and Northern Development, governed most natural resources in Yukon until 2003, when Yukon became the first Territory to take over land- and resource-management responsibilities as part of the Territory's devolution process. In 2012, amendments were made to resource-revenue-sharing arrangements under the Yukon Northern Affairs Program Devolution Transfer Agreement and the 1993 Canada-Yukon Oil and Gas Accord in order to make a greater portion of revenues from mineral industry activities available for use in the Territory (Government of Canada, 2016b).

Categories of ownership of land and minerals in Yukon Territory include Commissioner's Land (formerly Crown Lands), Category A Settlement Lands (surface and subsurface), Category B Settlement Lands (surface only), and Fee Simple Settlement Lands (primarily residential and surface only areas). Permits are issued for exploration, development, and construction, and First Nations notification is required. Exploration permits are classified into four classes under the Quartz Mining Land Use Regulation and the Placer Mining Land Use Regulation. No approval is required for Class 1 exploration programs; notification and environmental and socioeconomic assessments are required for Class 2 programs; and approval, detailed operating plans, and environmental and

socioeconomic assessments are required for Class 3 and Class 4 exploration programs. Many additional permits and regulatory approvals are required for project development and construction (Kazaz and Fipke, 2012, p. 36–37).

With respect to energy development in Canada, Federal and Provincial governments share responsibility. The Provinces have jurisdiction over the development of crude oil within the Provincial 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 and exports of crude oil, natural gas liquids, natural gas, refined petroleum products, and electricity; and oil 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 Mackenzie Valley Resource Management Act, and the Inuvialuit Final Agreement or Nunavut Land Claims Agreement (National Energy Board, 2016c).

Production

The top 10 nonfuel mineral commodities produced in Canada in 2014 were, by value, gold, potash, copper, iron ore, nickel, coal, diamond, sand and gravel, cement, and stone; they had a combined value of about \$33 billion. Production of many reported metals decreased by greater than 10% in 2014 compared with that of 2013, including antimony, mined bismuth, mined cadmium and cadmium metal, pig iron, mined lead, mined silver and refined silver, tellurium, and mined zinc. Production of some commodities, including bismuth, cadmium, cobalt, silver, and zinc, had decreased for 2 or more consecutive years. Production of other metals increased significantly, including mined copper and copper metal, mined gold, direct-reduced iron, molybdenum, refined nickel, platinum, and tungsten (table 1; Mining Association of Canada, 2015, p. 28).

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 2014, the Mining Association of Canada reported that there were 1,209 operating mines in Canada consisting of 1,132 nonmetal mines and 77 mines producing metallic commodities. According to Natural Resources Canada, the country has 7,000 sand and gravel pits and stone quarries. Canada also has about 50 nonferrous smelters, refineries, and steel mills. Table 2 lists some of Canada's mineral industry operations (table 2; Mining Association of Canada, 2015, p. 13; Natural Resources Canada, 2016c, p. 6).

The mining industry employed 376,455 people in Canada in 2014. Primary metal manufacturing accounted for about 70,000 jobs, and nonmetallic mineral product manufacturing for another 53,000 jobs. In 2013 (the latest year for which data were available), 16% of the people who were directly employed in mining were involved in Stage 1, or mineral extraction, activities, including about 35,900 people in metal mining, 19,400 in nonmetal mining, and 8,000 in coal mining. The number of people involved in Stage 1 activities increased by 22% between 2007 and 2014. During the same period of time, the number of Stage 2, or smelting and refining, jobs decreased by 15%. Employment in Stage 2 activities decreased in 2009 and 2010 but rebounded in 2011 and 2012 before tapering off again. There were an estimated 22,000 jobs in oil-sands extraction and upgrading in 2013, not including indirect employees. More than 3,700 companies supplied goods and services to the mining industry. Support activities employed a reported 27,700 people in Canada in 2014, but this figure reflected only a fraction of those employed by mining support services (Mining Association of Canada, 2015, p. 24, 45–46).

Mineral Trade

Canada is one of the most open countries in the world in terms of trade and investment in mining and has few barriers to foreign ownership. The Canada-European Union Comprehensive Economic and Trade Agreement was concluded in September 2014. By 2016, Canada expected to have trade agreements with 51 countries. Canada also had Foreign Investment Promotion and Protection agreements with 37 countries, the stated objective of which was to maintain transparency in foreign investments (Natural Resources Canada, 2016c, p. 7).

In 2014, the value of domestic exports of minerals and mineral products (not including crude petroleum and petroleum products) was about \$78 billion, of which metals and metallic minerals accounted for 80%; nonmetallic minerals and industrial materials accounted for 15%; and coal and coke accounted for 5%. The Mining Association of Canada reported that the country's leading trade partner, in terms of value of mining exports, in 2014 was the United States followed by the countries of the European Union (EU) as an aggregate sum, China, and Japan (Mining Association of Canada, 2015, p. 105–106).

In 2014, the United States accounted for 54% of the value of Canada's metallic mineral exports; 56% of nonmetal mineral exports; and 10% of the combined total of coal and coke exports. The combined total of aluminum and iron and steel exports accounted for 52% of the value of metals exported to the United States from Canada. The value of exports to the countries of the EU accounted for 22% of Canada's metals exports, 13% of nonmetal mineral exports, and 10% of coal and coke exports. The combined total of gold, iron ore, and nickel exports accounted for 78% of the metals exports to the EU from Canada. China accounted for 5% of Canada's metals mineral exports, 4% of nonmetal mineral exports, and 20% of coal and coke exports. Copper and iron ore accounted for 63% of metals exports to China. Japan accounted for 3% of Canada's metallic mineral exports; less than 1% of nonmetal mineral exports; and 24% of coal and coke exports. Copper, gold, and iron ore

accounted for 75% of the total metals exports to Japan (Mining Association of Canada, 2015, p. 105–106).

Among mineral and mineral-product exports in 2014 (excluding crude petroleum and petroleum products), gold was the leading metallic mineral export, by value, accounting for 25% of the value of metals exports and 20% of the total value of mineral and mineral-product exports. The EU accounted for 49% of the value of gold exports. Iron and steel combined was the second-ranked metallic mineral export, by value, accounting for 19% of metals exports and 15% of the value of total mineral and mineral-product exports. The United States accounted for 87% of the value of iron and steel exports from Canada. Potash and potassium compounds combined were the leading nonmetal mineral export, by value, accounting for 40% of nonmetal exports and 6% of the value of total mineral and mineral product exports. The United States accounted for 54% of the value of potash and potassium compound exports from Canada. Diamond was the second-ranked nonmetal mineral export, by value, accounting for 19% of nonmetal exports and 3% of the value of total mineral and mineral product exports from Canada in 2014 (Mining Association of Canada, 2015, p. 105–106).

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 2009 through 2014, the year-on-year percent change in the production of primary refined aluminum varied by less than 7% and the average annual percent change for the period was -1.4%, indicating that there were no major capacity expansions. During the same time, the average annual percent change in the price per pound of aluminum was 1%, but the year-on-year percent change in price varied by as much as 37%, and the fluctuations in production totals displayed a negative correlation with the price per pound each year. Variations in production totals, therefore, appeared to be a function of the variation in aluminum prices. Upon full implementation of the Comprehensive Economic and Trade Agreement between Canada and the EU, tariffs rates ranging from 6.3% to 10% for aluminum and aluminum products would be removed (as would tariffs on most other goods, mineral or otherwise) on exports to the EU. The total value of aluminum and aluminum-product exports from Canada in 2014 was about \$8.5 billion; that of imports was about \$5 billion (Mining Association of Canada, 2015, p. 32, 76, 105, 107; InfoMine.com, 2016).

In 2014, the Alma smelter produced 455,000 metric tons (t) of primary aluminum. Rio Tinto planned to increase production and reduce operating costs at the Alma facility by converting the company's proprietary AP30 series smelting technology to its AP44 series. The conversion results in increased amperage to aluminum reduction cells during electrolysis. The \$10 million project was expected to be completed in the second half of 2016. The Alouette smelter produced 583,000 t of aluminum in 2014, of which 233,000 t was Rio Tinto's share and the remainder was shared among multiple partners. The Arvida smelter produced 173,000 t of aluminum plus another 59,000 t from the facility's

AP60 Technology Center, which produced 40% more aluminum per cell than its previous generation (presumably some form of the AP40 series). Other aluminum production included 446,000 t from the Becancour smelter, of which 334,500 t was Alcoa's share; 222,000 t from the Grande-Baie smelter; 125,000 t from the Kitimat smelter; and 244,000 t from the Laterrière smelter. The remainder of primary aluminum production in 2014 came from Alcoa's wholly owned Baie Comeau smelter (CNW Group Ltd., 2015; Rio Tinto plc, 2016a, b).

Antimony.—Just 5 t of antimony was produced in Canada in 2014, which was antimony contained in concentrate, not primary antimony. There had not been a primary antimony source in Canada since VVC Exploration Corp. of Ontario suspended operations at its Beaver Brook Mine in Newfoundland and Labrador in 2012. In 2014, Geodex Minerals Ltd. of Toronto's wholly owned West Gore project was an exploration antimony and gold project near Halifax. In June, Geodex acquired 100% interest in the project from Elk Exploration Ltd. of Nova Scotia. West Gore was a producing mine from the 1880s until the early- to mid-1900s. Mineralization at West Gore consisted of native antimony, arsenopyrite, gold, pyrite, and stibnite. The main vein of the mineralized area was traced for 600 meters (m) and the Main Vein shaft was reported to extend to a depth of 260 m through mineralized ore. Assays completed in 2014 returned 27.1% antimony and 72.5 grams per metric ton (g/t) gold in grab samples (Geodex Minerals Ltd., 2014a, b).

Bismuth and Cadmium.—Mine output of bismuth decreased for the fourth straight year to just 3 t in 2014, which was a 97% decrease compared with that of 2013. Mine output of cadmium decreased for the fifth straight year to 123 t in 2014, which was a 23% decrease compared with that of 2013 and a 95% 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 and are minor components of these 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 occurred in 2014. A combination of factors, including the closure of several mines and the Belledune smelter in recent years were not only the reasons for the decreased production, but also the result of decreased reserves of lead and zinc in proven and probable minable ores at operating mines, which had decreased continually since 1984 with little or no new additions each year. Annual production of cadmium metal, however, varied by 10% or less since 2010. The value of cadmium exports and imports in 2014 was about \$3 million and \$34 million, respectively, compared with about \$8.8 million and \$1.2 million in 2010, indicating that Canada was increasingly relying on imports of cadmium-containing materials (including chemical compounds and scrap metal) to maintain the production volume of refined cadmium. A similar inference may be made for bismuth metal, as the value of bismuth imports in 2014 was about \$3.4 billion compared with \$2.1 million in 2010 (table 1; Mining Association of Canada, 2011, p. 112, 115; 2015, p. 32, 105, 107; Natural Resources Canada, 2016a).

Cobalt.—Since 2008, the average annual percent change in production of cobalt metal was 4.9%, but year-on-year

production varied by as much as 28%. Cobalt production in 2014 included 952 t from Vale S.A.'s Voisey's Bay Mine, 833 t from its Ontario Division (Sudbury) Mine, and 489 t from its Manitoba Division (Thompson) Mine, as well as 800 t from Glencore's Sudbury operations. The total value of cobalt and cobalt product exports from Canada in 2014 was about \$266 million; that of imports was about \$43 million (reported as \$49 million) (Mining Association of Canada, 2015, p. 32, 105, 107; Vale S.A., 2015, p. 12).

The Werner Lake mineral belt is a 60-kilometer (km) stretch of highly mineralized land with two past-producing deposits and five other historic deposits where rare primary cobalt occurs, along with copper, nickel, and platinum-group metals. The Werner Lake mineral belt is in the Kenora mining district and is defined by a deep-seated fault, which is reported to have ruptured the Archean Superior geologic province in Ontario. The fault zone is up to 500 m wide and has been termed the copper–nickel–platinum-group element zone. The Werner Lake Mine previously produced 66 t of cobalt between 1940 and 1944, and the Werner Lake West Mine produced 10,000 t of ore between 1996 and 1997. Global Cobalt Corp. of Vancouver, British Columbia, owned the reserves-development-stage project in 2014. Historic noncompliant NI 43–101 reserve and resource estimates include 1.1 million metric tons (Mt) of ore grading 0.31% cobalt, 0.29% copper, and 0.38 g/t gold (Global Cobalt Corp., 2016).

Copper.—Production of mined copper increased by 10% in 2014 compared with that of 2013 to 684,003 t following a year-on-year increase of 11% in 2013. Production at three mines accounted for 41% of the copper produced in Canada in 2014. Teck Resources Ltd.'s Highland Valley Mine, which was the primary source of the country's overall production increase, produced 121,500 t of copper compared with 113,200 t in 2013; Vale's Ontario Division accounted for 98,000 t in 2014 compared with 103,000 t in 2013; and Taseko Mines Ltd.'s Gibraltar Mine produced 61,915 t of copper in 2014 compared with 55,066 t in 2013 (Taseko Mines Ltd., 2014, p. 21; 2015; Teck Resources Ltd., 2014, p. 43; 2015, p. 32; Vale S.A., 2014, p. 11; 2015, p. 10).

In 2009 through 2011, the average price per pound of copper increased after having plummeted in 2008. Copper contained in proven and probable minable ore at operating mines in Canada decreased steadily between 1980 and 2004, but began increasing in 2005. In response to increased copper prices, proven and probable copper reserves had increased by 47% in 2010 to 10.7 Mt compared with that of 2009 and remained within 2% of that value through 2012 (the latest year for which data were available). Subsequently, annual production of mined copper increased in 2010 through 2014, and that of refined copper increased in 2012 through 2014. Refined metal production increased by 1% in 2014 to about 325,000 t following a year-on-year increase of 16% in 2013 (table 1; Mining Association of Canada, 2015, p. 39).

Gold.—Gold production increased by 15% to about 151 t in 2014 compared with that of 2013, and by 24% in 2013 compared with that of 2012. Several gold-mining operations started up since 2013, including Metanor Resources Inc.'s Bachelor Lake Mine; Detour Gold Corp.'s Detour Lake Mine;

Barkerville Gold Mines Ltd.'s QR Mine; and IAMGOLD Corp.'s Westwood Mine, which accounted for the increased production totals. Exploration for precious metals continued to receive the largest share of exploration spending in Canada in 2014, accounting for 42% of the total. Investment in precious metal exploration, however, decreased in the previous 2 years owing in part to fluctuations in the price of gold, which decreased by 19% in 2014 compared with that of 2011. The value of gold exports in 2014 was about \$15.6 billion compared with \$16.6 billion in 2013, and that of gold imports was \$8.7 billion in 2014 compared with \$10 billion in 2013 (tables 1 and 2; Mining Association of Canada, 2014, p. 105, 107; 2015, p. 39, 105, 107).

Fortune Minerals Ltd.'s wholly owned NICO project in the Northwest Territories is an iron oxide hosted deposit that, along with the Sue-Dianne deposit, are part of the Great Bear magmatic zone within the Proterozoic Bear structural province of the Canadian Shield. This class of deposit, often referred to as iron oxide-copper-gold (IOCG) deposits, have a wide variety of characteristics; debate exists regarding the classification of IOCGs, but they often are enriched in a variety of economic minerals, and relatively numerous deposits similar to this type are found in Canada compared with other areas of the world. IOCGs have greater than 20% iron oxides and otherwise encompass a wide spectrum of magnetite and or hematite ore bodies of hydrothermal origin with polymetallic mineralization that may contain bismuth, cobalt, copper, gold, niobium, rare-earth elements, silver, tantalum, and uranium; are genetically associated with large-scale continental magmatism, carbonatite stocks, crustal-scale fault zones, and characteristic regional alteration; are found in shallow to midcrustal levels in such extensional continental settings as rifts, magmatic arcs, and backarc basins; represent ore bodies that may greatly exceed 2 billion metric tons (Gt); and may be Proterozoic in age. Geologic mapping of the NICO deposit led to the identification of bismuth, cobalt, copper, and gold mineralization in amphibole-biotite-magnetite-sulfide-rich ironstone and schist. The nearby Sue-Dianne deposit is a hematite-magnetite-iron-silicate-cemented diatreme complex enriched in copper, gold, silver, and uranium within a broad zone of epidote, iron, potassium, and quartz metasomatism (Goard and others, 2000; Corriveau, 2007).

Once operational, concentrates from NICO were to be transported to a proposed Saskatchewan metals-processing plant. Cobalt chemicals, including cobalt sulfate heptahydrate (used in the manufacturing of lithium ion and nickel-metal-hydride rechargeable batteries) were planned to be the high-value chemicals processed at the plant. In addition to proven and probable reserves of about 37,000 t of cobalt, the company also planned to rely on reserves of about 46,000 t of bismuth, 13,000 t of copper, and 34,000 kilograms (kg) of gold to hedge against losses from potential price volatility among the various commodities. In June 2014, Fortune announced that it had received its final land-use permit and water license approvals for construction and operation of the NICO Mine. The permits were issued following review and input from the Tlicho Government, Aboriginal Affairs and Northern Development Canada,

Environment Canada, and the Government of the Northwest Territories (Fortune Minerals Ltd., 2014a–c).

Lead and Zinc.—Production of mined lead decreased by 84% in 2014 to 3,714 t compared with that of 2013. The decrease in production was 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 126,000 t in 2012, which was a 99% decrease compared with that of 1980. Meanwhile, the amount of primary refined lead remained relatively stable and increased by 2% in 2014 compared with that of 2013, presumably owing to a continued reliance on imported lead-containing materials. The value of lead imports to Canada had increased during the past 5 years to \$660 million in 2014 from \$436 million in 2010 (table 1; Mining Association of Canada, 2011, p. 105; 2015, p. 39, 107).

Production of mined zinc decreased by 17% in 2014 to 352,700 t compared with that of 2013. The decrease in production was also attributable to a decrease of zinc in minable reserves. After decreasing steadily since 1980, the zinc content of proven and probable minable ore at operating mines in Canada reached 4,163 t in 2012, which was an 85% decrease compared with that of 1980. The amount of primary refined zinc, however, remained relatively stable in recent years and decreased by less than 1% in 2014 compared with that of 2013 owing to a continued reliance on imported zinc-containing materials. The value of zinc imports to Canada had increased during the past 5 years to \$656 million in 2014 from \$359 million in 2010 (table 1; Mining Association of Canada, 2011, p. 106; 2015, p. 39, 107).

In 2014, MMG Ltd. of Melbourne, Victoria, Australia, held a 100% equity interest in the Izok Lake zinc project in Nunavut. Feasibility studies had been undertaken at the location since the late 1980s. As of the mid-2000s, Izok Lake was considered by some analysts to be one of the largest undeveloped zinc deposits in the world. Izok Lake is a greenstone-hosted volcanic massive sulfide deposit in the Slave geologic province in Nunavut, the associated mineralogy of which includes chalcopyrite, galena, magnetite, pyrite, pyrrhotite, silver, and sphalerite. The two main lenses of the deposit, however, are located under Lake Izok. MMG's 2012 preliminary project proposal provided details on draining the lake and diverting water; extensive regulatory requirements; construction of mine sites as well as a 325-km access road and a deep-water port facility; and the handling and storage of mine waste. The project is located in an area of Nunavut, which, as of 2012, had no approved Land Use Plan, although a North Baffin Land Use Plan overlapped a portion of a proposed transportation corridor. As of 2014, total measured and indicated resources at Izok Lake included 14.6 Mt of ore containing about 1.9 Mt of zinc, 365,000 t of copper, 190,000 t of lead, 1,000 t of silver, and 3 t of gold. The company's nearby High Lake deposit contained another 14 Mt of measured and indicated resources containing 532,000 t of zinc, 350,000 t of copper, 56,000 t of lead, 2,000 t of silver, and 18 t of gold (Morrison, 2004, p. 32–33; Minerals and Metals Group, 2012, p. 6).

Nickel.—The nickel content of proven and probable minable ore at operating mines in Canada fluctuated, but generally

decreased overall by 69% to 2.6 Mt in 2012 (the latest year for which data were available) from 8.3 Mt in 1980. Production of mined nickel from two mines accounted for 49% of the total in 2014. Vale's Ontario Division accounted for 64,300 t of nickel, and Glencore's Sudbury Operations accounted for 51,900 t (Mining Association of Canada, 2015, p. 39; Vale S.A., 2015, p. 8).

Platinum-Group Metals.—Production of platinum-group metals (PGMs) as a whole increased by 2.5% in 2014 to about 25 t compared with that of 2013. Production at Vale's Ontario Division (Sudbury operations) resulted in a 26% increase in platinum compared with that of 2013 to 5,660 kg, and a 13% increase in palladium, to 12,378 kg (table 1; Vale S.A., 2015, p. 12).

Silver.—The silver content of proven and probable minable ore at operating mines in Canada decreased steadily to 5,598 t in 2012 (the latest year for which data were available) from 33,804 t in 1980. There were minor increases in production and reserve estimates in 2010 and 2011 that were related to targeted exploration for silver as a result of slightly increased prices for precious metals. Depletion of reserves was a concern in Canada in the last few years as some commodity prices appeared to again be in decline and junior exploration companies faced difficulty raising capital to finance their work (table 1; Mining Association of Canada, 2015, p. 33, 39).

Industrial Minerals

Diamond.—Canada's diamond production in 2014 increased by 16% compared with that of 2013 to 12.3 million carats, of which 59% was accounted for by production from Rio Tinto's Diavik Mine. There were hundreds of known diamond deposits in Canada, most of which were not actively mined in 2014 owing to decreased exploration spending in recent years. Stornoway Diamond Corp. of Montreal, however, began construction at its Renard project in Quebec in 2014. As of July 2013, the total reserves and resource estimate at Renard was 43.9 million carats of rough diamond. Commercial production from the Renard Mine was to begin in 2016; production capacity was expected to reach 1.7 million carats by 2017, with a projected mine life of 24 years (Mining Association of Canada, 2015, p. 38, 43; Rio Tinto plc, 2016b, p. 24; Stornoway Diamond Corp., 2016a; 2016b, p. 252).

Potash.—In 2014, production of potash increased for the second year to 11.3 t from 10.2 t in 2013 and 9 Mt in 2012. Potash Corporation of Saskatchewan Inc. operated the Allan, Cory, Lanigan, Patience Lake, and Rocanville potash mines, the total combined production of which increased by 12% to 8.73 Mt, which accounted for 77% of the country's production in 2014. As of yearend 2014, construction at BHP Billiton Group of Australia's wholly owned Jansen potash project was 39% complete. Total reserve and resource estimates at Jansen in 2014 included 6.62 Gt grading 25.6% potassium oxide (25.6% potassium oxide is equivalent to 40.5% potassium chloride) and 0.29% magnesium oxide. BHP Billiton held exploration permits and mining leases covering more than 14,000 square kilometers (km²) of mineral rights in Saskatchewan. The company was converting its exploration permits to long-term leases to allow for further evaluation and had secured 4,400 km²

under long-term leases by yearend. The project was expected to ramp up to its nameplate capacity of 10 million metric tons per year (Mt/yr) of agricultural-grade potassium chloride sometime after 2020 and had an expected mine life of 50 years. In 2014, BHP's potash division recorded operating losses of \$583 million, including a \$68 million impairment associated with an exclusivity agreement for potash exports from Terminal 5 of the Port of Vancouver, Washington, which the company let lapse (BHP Billiton plc, 2015a, p. 37, 63, 132; 2015b, p. 5; Potash Corporation of Saskatchewan Inc., 2015, p. 4).

Mineral Fuels and Related Materials

Coal.—Production of coal in Canada has changed little since 2010. Production of all types of coal decreased by less than 4% in 2014, compared with that of 2013, to about 66 Mt. The components of total coal production included that of bituminous (metallurgical and thermal), subbituminous (thermal), and lignite (thermal). Since 2008, bituminous (metallurgical) coal accounted for an average of 43% of total coal production, excluding 2014, when none was reported; subbituminous (thermal) coal accounted for an average of 35% of total production; bituminous (thermal) coal accounted for an average of 7% of total production; and lignite (thermal) accounted for an average of 14% of total production (table 1; Statistics Canada, 2016a).

Three companies were responsible for the majority of the coal production in Canada in 2014. Teck Resources Ltd. produced coal from six coal operations, four of which Teck was the sole controlling company and two of which were joint ventures with Nittetsu Mining Co. of Japan and (or) POSCO Canada Ltd. (a subsidiary of POSCO of the Republic of Korea). These operations, including the Cardinal River, Coal Mountain, Elkview, Fording River, Greenhills, and Line Creek Mines, accounted for an estimated 40% of Canada's coal production in 2014. Westmoreland Coal Co. of Englewood, Colorado, operated the Prairie operations, which consisted of eight mining complexes in Alberta and Saskatchewan, including Bienfait, Boundary Dam, Coal Valley, Genesee, Obed Mountain, Paintearth, Poplar River, and Sheerness. Combined production from Westmoreland's Canadian operations was estimated to have accounted for 30% of the country's total production in 2014. Production from TransAlta Utilities Corp. of Alberta's Highvale Mine was estimated to have accounted for 15% of total production (table 2).

In 2014, the supply of coal to coke plants (the sum of coal stock at the beginning of the year, plus coal received in 2014 and inventory adjustments, minus coal stock at the end of 2014) decreased by 8% to 3.4 Mt. Coal charged to ovens decreased by 25% compared with the amount charged in 2013 to 2.6 Mt. Coal coke production decreased by 30% compared with that of 2013 to 1.7 Mt (Statistics Canada, 2016a).

Natural Gas.—Natural gas in Canada is primarily sourced from the Western Canadian sedimentary basin in Alberta, British Columbia, and Saskatchewan. Natural gas from conventional sources has declined in recent years, whereas unconventional natural gas production using horizontal drilling and hydraulic fracturing have increased. The annual number of completed natural gas wells decreased to not quite 2,000 wells

in 2013 from nearly 16,000 in 2004, whereas the average annual number of meters drilled steadily increased to about 3,500 m from not quite 1,500 m during the same timeframe. Canada's technically recoverable resources of natural gas as of 2012 included between 10 trillion cubic meters and 12 trillion cubic meters of gas in conventional resources and between 15 trillion cubic meters and 32 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 the country to facilitate overseas natural gas exports. There are several LNG projects in the country, but none are expected to be operational before 2020 (Natural Resources Canada, 2014, p. 39, 41; National Energy Board, 2016a).

The Liard basin is a region that extends across the borders of British Columbia, the Northwest Territories, and the Yukon Territory, and it is part of the western Canada sedimentary basin. Conventional gas had been produced from the Liard basin since the late 1960s and the Exshaw and Patry shales of this region could contain 6 trillion cubic meters of marketable natural gas (that is, gas that is recoverable using existing technology and is in a condition to be used by the market, but not yet subjected to an economic assessment) in unconventional reservoirs. Gas pipelines exist in the British Columbia, Northwest Territories, and Yukon jurisdictions, but despite the large size of the deposit, a variety of factors, including changing market conditions, regulatory processes, and opposition from First Nations and environmental organization, may preclude development of these resources (Cattaneo, 2016; National Energy Board, 2016b).

Petroleum.—Crude petroleum production reached record high levels in 2014 of greater than 3.8 million barrels per day. The country had 171 billion barrels of proven crude petroleum reserves, of which 94% consisted of oil sands. In 2014, 97% of Canada's crude oil exports went to the United States, and the remainder went to Asia and Europe. Canada was the leading foreign supplier of crude oil to the United States, accounting for 39% of crude oil imports to the United States and 18% of its refinery crude oil intake. About 58% of Canada's oil production in 2014 was sourced from oil sands, and the remainder was from conventional, offshore, and tight oil production. About 91.1% of Canada's crude oil production came from two provinces—Alberta (77.4%) and Saskatchewan (13.7%)—followed by Newfoundland and Labrador (5.7%), British Columbia (1.3%), Manitoba (1.2%), and others (0.6%). Oil sands reserves are located in distinct areas of northern Alberta that cover 140,200 km², including the Athabasca deposits, which are the country's largest oil sands reserves, the Cold Lake deposit, and the Peace River deposit. The ultimate potential of oil sands in Alberta (that is, the amount estimated to be recoverable as technology improves) is estimated to be 315 billion barrels (including cumulative production to date (Natural Resources Canada, 2014, p. 19; 2016b; Statistics Canada, 2016b, c).

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 had rebounded. The long-term decrease in reserves of certain 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 in 2014 was about \$1.8 billion dollars, which was a 52% decrease compared with that of 2011. 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 allow the companies to issue shares to investors at a higher price than it would normally receive) in the 2015 Federal budget in order 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.

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 resource base and its access to international markets. The expectation for decreased prices among metal commodities; uncertainty in terms of demand related to potentially slower global economic growth; potential excess global supply of certain mineral commodities; and decreasing proven reserves of certain commodities, however, are expected to temper the value of mining in 2015 and potentially beyond in the near term. Exploration activity is expected to continue to decrease into 2016 as both junior and senior mining exploration companies project decreases in exploration spending in the near term. Canada's mineral sector continues to be challenged by globalization of the industry, as many other countries are able to develop their mineral resources at lower costs than Canada, but the governments of Federal, Provincial, and Territorial jurisdictions in Canada were 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 COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014 ^P
METALS					
Aluminum:					
Alumina	1,301,000	1,363,000	1,397,000	1,333,000	1,562,600
Metal:					
Primary	2,963,210	2,987,964	2,780,556	2,969,364	2,858,200
Secondary ^c	40,000	50,000	40,000	40,000	40,000
Total ^c	3,000,000	3,040,000	2,820,000	3,010,000	2,900,000
Antimony	--	--	--	76 ^r	5
Bismuth:					
Mine output, Bi content	91	136 ^r	110 ^r	103 ^r	3
Metal, refined ^c	150	150	145	100	100
Cadmium:					
Mine output, Cd content	2,403 ^r	1,516 ^r	247 ^r	160 ^r	123
Metal, refined	1,357	1,240	1,286	1,313	1,187
Cobalt:					
Mine output, Co content	4,636	6,836	6,676	7,168 ^r	6,574
Metal, refined	4,711	6,038	5,994 ^r	4,789	4,800 ^c
Copper:					
Mine output, Cu content	507,883 ^r	553,725 ^r	560,476 ^r	620,989 ^r	684,003
Metal:					
Smelter:					
Primary, blister	318,006	304,724	287,051	254,509	289,000 ^c
Secondary	31,815	25,214	23,362	28,743	32,000 ^c
Total	349,821	329,938	310,413	283,252	321,000 ^c
Refined:					
Primary ^c	290,000	244,000	246,000	286,000	295,000
Secondary ^c	30,000	30,000	30,000	35,000	30,000
Total ^c	320,000	274,000	276,000	321,000	325,000 ^c
Gold, mine output, Au content	102,147 ^r	101,975 ^r	106,373 ^r	131,404 ^r	150,852
Indium, metal ^c	67,000	64,000	65,000	64,000	65,000
Iron and steel:					
Iron ore and concentrate:					
Gross weight	37,001	33,573	39,457	41,841	44,196
Fe content ^c	23,300	21,000	25,000	26,000	27,000
Metal:					
Pig iron	7,666	7,323	7,654	6,100	5,116
Direct-reduced iron	600	702	842	1,250	1,550
Ferroalloys, electric arc furnace: ^c					
Ferrosilicon	37	31	32	32	30
Silicon metal	30	30	30	30	30
Ferroniobium	7	7 ^r	7 ^r	8	8
Ferrovanadium	1	1	1	1	1
Total ^c	75	70	70	71	70 ^c
Crude steel	13,003	12,891	13,507	12,415	12,730
Lead:					
Mine output, Pb content	62,397 ^r	62,548 ^r	62,014 ^r	22,895 ^r	3,714
Metal, refined:					
Primary	105,836	112,531	133,495	128,706	131,000
Secondary	167,101	170,059	144,570 ^r	159,595	151,000
Total	272,937	282,590	278,065 ^r	288,301	282,000
Molybdenum, mine output, Mo content	8,648	8,674	8,954	7,955	9,116
Nickel:					
Mine output, Ni content	160,063	219,025	211,701	223,395	234,951
Refined	105,413	142,445	139,800	137,410	150,900

See footnotes at end of table.

TABLE 1—Continued
CANADA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014 ^P
METALS—Continued					
Niobium (columbium) and tantalum:					
Pyrochlore concentrate:					
Gross weight ^c	13,200	13,800	14,000	16,000	16,000
Nb content of ferroniobium	4,313 ^r	4,632	4,707	5,236 ^r	5,600
Tantalite concentrate:					
Gross weight ^c	--	40	80	20 ^r	--
Ta content (Ta ₂ O ₅) kilograms	--	--	37,000 ^r	9,000 ^r	--
Nb content do.	--	1,000 ^r	2,500 ^r	500 ^r	--
Platinum-group metals, mine output:					
Palladium ^c do.	11,000 ^r	17,400 ^r	17,300 ^r	16,500 ^r	16,200
Platinum ^c do.	3,500	8,000	7,500 ^r	6,800 ^r	7,700
Others (iridium, rhodium, ruthenium) do.	400	800	800 ^r	1,100	1,100
Total do.	14,900	26,200	25,600	24,400	25,000
Silver:					
Mine output, Ag content do.	591,482	661,089	685,253	645,976	472,000 ^c
Refined do.	1,640,612	1,555,855	1,675,998	1,745,638	1,180,000
Tellurium ^{3,4} do.	8,000	6,000	11,000 ^r	12,000 ^r	10,000
Titanium, Sorelslag ^{c,5}	1,090,000	878,000	900,000	900,000	900,000
Tungsten, mine output, W content ³	420	1,966 ^r	2,194	2,128	2,344
Zinc:					
Mine output, Zn content	649,065	622,600	641,134	426,089	352,700
Metal, refined, primary	690,152	662,151	648,614	651,634	649,200
INDUSTRIAL MINERALS					
Cement thousand metric tons	12,431	12,001	12,465	11,611 ^r	11,879
Clinker do.	10,251	11,100	12,155	10,977	10,930
Diamond thousand carats	11,773	10,795	10,451	10,560	12,276
Gemstones, includes amethyst and jade	35 ^r	42	178 ^r	554 ^r	6,382
Gypsum and anhydrite thousand metric tons	3,046 ^r	2,449 ^r	1,832	1,837 ^r	1,811
Lime ³ do.	1,913	1,959	1,964	1,856	1,945
Nepheline syenite do.	581	610	592 ^c	674	670
Nitrogen, N content of ammonia	3,620,000	3,946,000	3,942,000	3,942,000	4,000,000
Peat thousand metric tons	1,262	1,122	973	1,295	1,153
Potash, K ₂ O equivalent do.	9,788	11,055	8,984	10,211	11,345
Salt do.	10,537	12,625	10,845	12,210	13,876
Sand and gravel:					
Construction do.	205,804	206,974	225,208	225,208	227,611
Industrial (silica, quartz) do.	1,171	1,431	1,593	1,593	103,157
Stone do.	147,643	167,716	151,838	152,512	146,566
Sulfur, byproduct:					
Metallurgy do.	900 ^c	609	638	699	649
Petroleum do.	6,355	5,914	5,545	5,666	5,265
Total do.	7,255	6,523	6,183	6,365	5,914
Talc, pyrophyllite, soapstone ^c do.	100 ^r	116 ^r	130 ^r	175	81
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Bituminous and subbituminous ^c thousand metric tons	57,000	57,100	57,000	59,000	59,100
Lignite ^c do.	11,000	10,000	10,000	10,000	7,100
Total ^c do.	68,000	67,000	67,000	69,000	66,000
Coke do.	2,720	2,804	2,949	2,479	1,744
Natural gas:					
Gross million cubic meters	189,589	188,849	185,000	185,000	225,000 ^c
Marketed do.	144,378	145,285	141,274	141,396	162,000 ^c
Natural gas liquids:					
Gas plant production thousand 42-gallon barrels	85,949	169,837	337,282	350,000 ^c	350,000 ^c
Refinery production do.	8,221	16,240	32,325	35,000 ^c	35,000 ^c
Total do.	94,170	186,077	369,607	385,000 ^c	385,000 ^c

See footnotes at end of table.

TABLE 1—Continued
CANADA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014 ^P
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum:					
Crude thousand 42-gallon barrels	1,216,180 ^r	1,282,975 ^r	1,365,100 ^r	1,451,605 ^r	1,566,580
Refinery products:					
Liquefied petroleum gases do.	5,128 ^r	10,257 ^r	20,514 ^r	40,502 ^r	80,408
Gasoline:					
Aviation do.	18,604 ^r	36,351 ^r	71,897 ^r	142,933 ^r	284,841
Motor do.	136,461 ^r	266,968 ^r	528,601 ^r	1,051,286 ^r	2,096,272
Diesel fuel oil do.	98,332 ^r	191,885 ^r	379,510 ^r	754,795 ^r	1,504,924
Heavy fuel oil do.	18,600 ^r	37,200 ^r	73,488 ^r	145,997 ^r	290,994
Light fuel oil do.	20,199 ^r	39,501 ^r	78,143 ^r	155,166 ^r	310,332
Asphalt do.	9,700 ^r	19,999 ^r	38,799 ^r	77,006 ^r	154,012
Other petroleum products do.	55,971 ^r	109,652 ^r	216,600 ^r	429,958 ^r	856,899
Total do.	357,867 ^r	701,555 ^r	1,387,037 ^r	2,757,141 ^r	5,498,274
Uranium oxide, U content	9,518	9,145	8,985	7,889	8,729

^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 November 2, 2015.

²In addition to the commodities listed, asbestos, barite, brucite, cesium, carbon black, diatomite, dolomite, graphite, ilmenite, indium, magnesite, mica, phosphate rock, pumice, selenium, silicon metal, sodium sulfate, spodumene, and zeolites were produced, but available information was inadequate to estimate output.

³Producers' shipments and quantities used by producers.

⁴Includes metal refined from imports and secondary sources. Also includes metal content of exported concentrates.

⁵Refined Sorelslag® has been upgraded to 95% titanium oxide.

TABLE 2
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Alumina	Rio Tinto Group, 100%	Vaudreuil refinery, Jonquiere, Quebec	1,500.	
Do.	Axens IFP Group Technologies, 100%	Brockville refinery, Brockville, Ontario	18.	
Aluminum	Alcoa Inc., 100%	Smelter in Baie-Comeau, Quebec	385.	
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	595.	
Do.	Alcoa Inc., 75%, and Rio Tinto Alcan Inc., 25%	Becancour smelter in Becancour, Quebec	415.	
Do.	Alcoa Inc., 100%	Deschambault smelter in Deschambault, Quebec	260.	
Do.	Rio Tinto Group, 100%	Alma smelter in Alma, Quebec	438.	
Do.	do.	Arvida smelter in Arvida, Jonquiere, Quebec	236.	
Do.	do.	Grande-Baie smelter in Grande-Baie, Quebec	224.	
Do.	do.	Kitimat smelter in Kitimat, British Columbia	400.	
Do.	do.	Laterrière smelter in Laterrière, Quebec	244.	
Ammonium sulfate	metric tons	Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Barite	MarFred Minerals Ltd.	Tracey Lake barite property, North Williams, Ontario	NA.	
Do.	Fireside Minerals Ltd.	Fireside Mine, Fireside, British Columbia	NA.	
Bentonite	Canadian Clay Products Inc.	Wilcox, Saskatchewan	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.	
Coal	Anglo American plc, 100%	Trend open pit mine, near Tumbler Ridge, British Columbia	2,000.	
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.	Teck Resources Ltd., 100%	Fording River open pit mine, near Elkford, British Columbia	8,500.	
Do.	do.	Cardinal River operations, near Hinton, Alberta	200.	
Do.	do.	Coal Mountain open pit mine at Sparwood, British Columbia	2,700.	
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 2014

(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.	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.	Obed Mountain Mine, 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	metric tons Glencore plc, 100%	Raglan Mine in Ungave, Quebec	700.
Do.	do. Vale S.A., 100%	Ontario Operations, Ontario	700.
Do.	do. KGHM Polska Miedź S.A.	Sudbury Operations, Ontario	NA.
Do.	do. Vale S.A., 100%	Copper Cliff refinery and smelter in Sudbury, Ontario	NA.
Do.	do. do.	Port Colborne refinery, Ontario	NA.
Do.	do. do.	Voisey's Bay, Newfoundland and Labrador	NA.
Do.	do. Glencore plc, 100%	Sudbury smelter in Sudbury, Ontario	NA.
Do.	do. Vale S.A., 100%	Long Harbour hydrometallurgy smelter	NA.
Do.	do. Sherritt International Corp., 100%	Fort Saskatchewan, Alberta	4,000.
Copper:			
Ore, Cu content	Agnico-Eagle Mines Ltd., 100%	LaRonde Mine, about 650 kilometers northwest of Montreal, Quebec	5.
Do.	Copper Mountain Mining Corp., 75%, and Mitsubishi Materials Corp., 25%	Copper Mountain Mine, British Columbia	48.
Do.	Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%	Highland Valley Copper Mine, Kamloops, British Columbia	125.
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.	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	4.
Do.	KGHM Polska Miedź S.A., 100%	Sudbury Operations, Ontario	30.
Do.	Capstone Mining Corp., 100%	Minto Mine, Yukon	21.
Do.	Taseko Mines Ltd., 75%; Lojitz Corp., 12.5%; Dowa Holdings Co. 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.	Vale S.A., 100%	Ontario Division, Ontario	110.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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	Vale S.A., 100%		Voisey's Bay Mine, Newfoundland and Labrador	55.
Do.	First Nickel Inc., 100%		Lockerby Mine, Sudbury district, Ontario	3.
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.	Yukon Zinc Corp., 100%		Wolverine Mine, Yukon	5.
Smelter	Glencore plc, 100%		Horne smelter in Noranda, Quebec	194.
Do.	Vale S.A., 100%		Copper Cliff smelter in Sudbury, Ontario	NA.
Do.	Glencore plc, 100%		Sudbury smelter, Ontario	131.
Do.	Vale S.A., 100%		Long Harbour hydrometallurgy smelter	NA.
Refinery	Glencore plc, 100%		CCR refinery in Montreal-Est, Quebec	276.
Do.	Taseko Mines Ltd., 75%; Lojitz Corp., 12.5%; Dowa Holdings Co. 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.	Cobalt Refinery Co. Inc., 100%		Fort Saskatchewan refinery	NA.
Do.	Noranda Income Fund, 100%		Valleyfield refinery	NA.
Do.	Vale S.A., 100%		Voisey Bay refinery, Newfoundland and Labrador	NA.
Do.	Government, 100%		Royal Canadian Mint, Ottawa, Ontario	NA.
Diamond	thousand carats	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 region, Northwest Territories	10,000.
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.	De Beers Group, 100%	Snap Lake underground mine, 220 kilometers northeast of Yellowknife, Northwest Territories	16,000.
Do.	do.	do.	Victor open pit mine, 90 kilometers west of Attawapiskat, Ontario	600.
Diatomite	Absorbent Products Ltd.		Red Lake deposit, British Columbia	NA.
Dolomite and limestone	Atlantic Minerals Ltd. (Newfoundland Cement Co. Ltd., 100%)		Lower Cove, Newfoundland and Labrador	800.
Do.	Nova Scotia Power Inc.		Glen Morrison quarry, Cape Breton, Nova Scotia	NA.
Do.	Antigonish Limestone Ltd.		Southside Antigonish Harbour	NA.
Do.	Mosher limestone Co. Ltd.		Upper Musquodoboit	NA.
Do.	Lafarge Canada Inc.		Brookfield, Nova Scotia	NA.
Do.	do.		Bath, Ontario	NA.
Do.	do.		Woodstock, 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.	ESSROC Canada Inc		Picton, Ontario	NA.
Do.	St. Marys CBM (Canada) Inc.		Bowmanville, Ontario	NA.
Do.	do.		St. Marys, Ontario	NA.
Gold				
Ore, Au content	kilograms	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.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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	kilo- grams	Agnico-Eagle Mines Ltd.	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.
Do.	do.	QMX Gold Corp.	Lac Herbin Mine	1,000.
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 kilometers northeast of Timmins, Cochrane District, Ontario	20,400.
Do.	do.	Goldcorp Inc.	Hoyle Pond Mine, 20 kilometers 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.	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.	IAMGOLD Corp., 100%	Westwood Mine, 40 kilometers east of Rouyn-Noranda	4,200.
Do.	do.	Kirkland Lake Gold Inc., 100%	South Mine complex (Macassa Mine, Ontario)	2,400.
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.	Metanor Resources Inc., 100%	Bachelor Lake Mine and mill, about 225 kilometers northeast of Val-d'Or, Quebec	1,200.
Do.	do.	Imperial Metals Corp., 100%	Mt. Polley Mine, 8 kilometers southwest of Likely, British Columbia	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.	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.	KGHM Polska Miedz S.A. GK, 100%	Sudbury operations, Ontario	NA.
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 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
<u>Gold—Continued:</u>				
Ore, Au content—kilograms	Richmont Mines Inc., 100%		Island Gold Mine, near Dubreuilville, Ontario	1,200.
Continued				
Do.	do.	Klondex Mines Ltd., 100%	Rice Lake Mine, Manitoba	2,500.
Do.	do.	Stroud Resources Ltd., 100%	Hislop Mine, Ontario	600.
Do.	do.	Kirkland Lake Gold Inc., 100%	Holloway Mine, Ontario	700.
Do.	do.	do.	Holt Mine, Ontario	2,700.
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	do.	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	300.
Do.		Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Do.		Government, 100%	Royal Canadian Mint, Ottawa, Ontario	NA.
Graphite		Imerys Graphite and Carbon	Saint Aime du Lac des Iles, Quebec	NA.
Gypsum		Mosher Limestone Co. Ltd.	Upper Musquodoboit	NA.
Do.		National Gypsum (Canada) Ltd.	East Milford quarry, Milford, Nova Scotia	3,100.
Do.		CertainTeed Gypsum Canada, Inc.	Amaranth Mine, Harcus, Manitoba	NA.
Do.		CGC Inc.	Hagersville Mine, Hagersville, Ontario	NA.
Ilmenite (titanium production)		QIT Fer et Titane Inc., 100%	Lac Tio Mine, Havre-Saint-Pierre, Quebec	600.
Indium	metric tons	do.	do.	70.
<u>Iron and steel:</u>				
<u>Iron ore:</u>				
Ore		ArcelorMittal Inc., 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)	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 SA)	Hamilton, Ontario	4,100.
Do.		ArcelorMittal Montreal Inc. (ArcelorMittal SA)	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 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Lead:				
Ore, Pb content	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	6.	
Refinery	Teck Resources Ltd., 100%	Trail Operations, Trail, British Columbia	NA.	
Smelter:				
Primary	do.	do.	100.	
Secondary, includes 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.	
Lime	Graymont Inc.	Havelock, New Brunswick	110.	
Do.	do.	Bedford, Bedford, Quebec	400.	
Do.	do.	Faulkner, Manitoba	117.	
Do.	Brookville Manufacturing Co.	Brookville, Saint John, New Brunswick	NA.	
Do.	E.C. King Contracting Ltd.	Owen Sound, Ontario	NA.	
Magnesite	Baymag Inc.	Mount Brussilof Mine, British Columbia	NA.	
Molybdenum	metric tons	Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%	Highland Valley copper mine, Kamloops, British Columbia	5,000.
Do.	do.	Imperial Metals Corp., 50%; and consortium composed of Mitsubishi Materials Corp., Dowa Metals & Mining Co., Ltd., and Furukawa Co., Ltd., 50%	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.	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	First Nickel Inc., 100%	Lockerby Mine, Sudbury district, Ontario	5.	
Do.	KGHM Polska Miedz S.A., 100%	Sudbury Operations, Ontario	6.	
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.	
Do.	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.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	800.	
Smelter	Vale S.A., 100%	Copper Cliff Smelter in Sudbury, Ontario	NA.	
Do.	do.	Smelter in Thompson, Manitoba	82 (Ni anode).	
Do.	Glencore plc, 100%	Sudbury smelter in Sudbury, Ontario	131 (Cu-Ni matte).	
Do.	Vale S.A., 100%	Long Harbour hydrometallurgy smelter	50.	
Refinery	The Cobalt Refinery Company Inc. (joint venture of General Nickel Company 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.	Vale S.A., 100%	Copper Cliff refinery in Sudbury, Ontario	NA.	
Do.	do.	Thompson refinery in Thompson, Manitoba	NA.	
Do.	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.	
Do.	do.	Port Colborne refinery, Ontario	NA.	
Do.	Vale S.A., 100%	Voisey Bay refinery, Newfoundland and Labrador	NA.	

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	4,800.
Do.	do.	KGHM Polska Miedz S.A., 100%	Sudbury Operations, Ontario	NA.
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.
Perlite		Le Groupe Berger Ltée	Saint-Modeste quarry, Saint-Modeste, Quebec	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.
Platinum:				
Ore, Pt content	kilograms	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.
Do.	do.	KGHM Polska Miedz S.A., 100%	Sudbury Operations, Ontario	NA.
Smelter	do.	Vale S.A., 100%	Copper Cliff smelter in Sudbury, Ontario	NA.
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.
Potash (K ₂ O 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	3,000.
Do.		do.	Allan Division, Allan, Saskatchewan	4,000.
Do.		do.	Cory, near Saskatoon, Saskatchewan	3,000.
Do.		do.	New Brunswick, Saskatchewan	300.
Do.		do.	Patience Lake, near Saskatoon, Saskatchewan	NA.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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.	Rock salt mine at Ojibway, Ontario	2,600.	
Do.	do.	Pugwash, Nova Scotia	1,400.	
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.	Mosaic Potash Esterhazy Limited Partnership Ltd. [The Mosaic Co., 75%, and Potash Corp. of Saskatchewan Inc. (Potash Corp.), 25%]	Esterhazy, southeast Saskatchewan	NA.	
Do.	NSC Minerals Inc.	Salt recovery from potash tailings at Rocanville and Vanscoy, Saskatchewan	NA.	
Do.	Nexen Inc. and Alchem 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.	Canadian Salt Co. Ltd.	Belle Plaine, Saskatchewan	NA.	
Do.	do.	Lindberg, Alberta	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	Imperial Metals Corp., 100%	Mount Polley Mine at Williams Lake	13,000.
Do.	do.	Glencore plc, 100%	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	115,000.
Do.	do.	Teck Resources Ltd., 100%	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor	13,300.
Do.	do.	Capstone Mining Corp., 100%	Minto Mine, about 240 kilometers northwest of Whitehorse, Yukon Territory	7,600.
Do.	do.	KGHM Polska Miedz 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.	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.	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.	
Talc	IMERYYS Talc	Penhorwood Mine, Ontario, Canada	NA.	
Titanium, TiO ₂ slag	Fer et Titane, Inc., 100%	Sorel-Tracy, Quebec	1,100 (Sorelslag [®]); 250 (UGS [™] slag); NA (RTCST [™] 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.

See footnotes at end of table.

TABLE 2—Continued
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Zeolites	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.
Do.	Absorbent Products Ltd.	Red Lake deposit, British Columbia	NA.
Zinc:			
Lead-zinc ore	Agnico-Eagle Mines Ltd., 100%	LaRonde Mine, 60 kilometers west of Val-d'Or, Quebec	55.
Do.	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	53.
Zinc ore	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.
Do.	Glencore plc, 100%	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	80.
Refined	Noranda Income Fund, 100%	Valleyfield refinery, Quebec	290.
Do.	Hudson Bay Mining and Smelting Co., Ltd. (HudBay Minerals Inc., 100%)	Zinc plant (pressure leach and electrowinning) at Flin Flon, Manitoba	115.
Do.	Teck Resources Ltd.	Trail Operations, Trail, British Columbia	295.
Do.	do.	CEZ refinery, Quebec	NA.

Do., do. Ditto. NA Not available.

TABLE 3
CANADA: RESERVES OF MAJOR MINERALS IN 2014

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Coal (anthracite, bituminous, subbituminous, and lignite)	million tons	237,295 ¹
Copper		10,364 ²
Gold	metric tons	2,148 ²
Lead		126,000 ²
Molybdenum		256 ²
Natural gas	billion cubic meters	2,000 ¹
Nickel		2,617 ²
Petroleum, crude	million barrels	171,000 ¹
Silver	metric tons	5,598 ²
Zinc		4,163 ²

¹Source: BP p.l.c.

²Source: Mining Association of Canada