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The Mineral Industries of Latin America and Canada

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The Latin America and Canada region reported upon in this volume is composed of about 50 countries and dependencies. These countries and dependencies have a combined population of approximately 624 million people and a land area of 30.5 million square kilometers. The Netherlands Antilles, which had been an autonomous country of the Kingdom of the Netherlands composed of Bonaire, Curacao, Sint Maarten, Saba, and Sint Eustatius, was dissolved in 2010 (Aruba had seceded from the Netherlands Antilles in 1986). As a result of the dissolution of the Netherlands Antilles, Curacao and Sint Maarten joined Aruba and the Netherlands as autonomous countries within the Kingdom of the Netherlands and Bonaire, Saba, and Sint Eustatius became special municipalities of the Netherlands (table 2).

In 2010, Brazil, Canada, and Chile maintained their positions as leaders in the global mineral industry. Brazil was the world's leading producer of niobium and tantalum, the third ranked producer of iron ore (gross weight), and the regional leader in the production of bauxite and crude steel. Canada was the world's leading producer of potash, the second ranked producer of niobium, and the regional leader in the production of aluminum, palladium, platinum, and tellurium. Chile was the world's leading producer of copper (mine output and refined metal), iodine, and lithium; the second ranked producer of arsenic; and the third ranked producer of boron. Argentina, Bolivia, Mexico, and Peru were also among the world's leading producers of base and precious metals and industrial minerals. Argentina was the world's second ranked producer of boron, and Bolivia was the second ranked producer of antimony. Mexico was the second ranked producer of fluorspar and the fifth ranked producer of lead. Peru was the world's leading producer of silver, the second ranked producer of bismuth and copper, the fourth ranked producer of lead, and the region's leading producer of tin (mine and metal production) (tables 4–6, 8–14, 16, 18; Angulo, 2011a, b; Brooks, 2011a, b; Carlin, 2011a, b; Edelstein, 2011; Jaskula, 2011b; Jorgenson, 2011; Miller, 2011; Papp, 2011).

In the Caribbean area, Aruba was not a mining nation, but the Aruba oil refinery (owned by Valero Energy Corp. of Texas), which had been a regional supplier of petroleum derivatives, restarted operations in January 2011 after being idled in 2009. Jamaica was estimated to be the world's sixth ranked producer of bauxite. The Republic of Trinidad and Tobago was a crude oil and natural gas producer, and its economy was dependent upon the hydrocarbon sector. The Dominican Republic's nickel production, which was usually ranked about 11th globally, was insignificant in 2010 because of a shutdown between August 2008 and October 2010 at Xstrata Nickel of the United Kingdom's Falconbridge Dominicana C. por A. (Falcondo) operation in Bonao. The company had halted operations at the facility because of a combination of high energy costs and diminished market conditions.

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General Economic Conditions

Canada's economy, expressed in terms of the real gross domestic product (GDP), was estimated to have grown by 3.2% in 2010 compared with a 2.8% decrease in 2009. The country withstood the global economic crisis of 2008-9 relatively well despite a high degree of exposure to the United States' sluggish

post-recession economy, Canada's troubled automobile and housing sectors, and declining prices for mineral commodities worldwide. The Organisation for Economic Co-operation and Development (OECD) attributed Canada's economic resilience to a relatively sound banking system, a less-leveraged corporate sector (industrial companies with more than one-third of their capitalization in the form of debt, as opposed to equity, are generally considered highly leveraged), and a relatively strong fiscal position with respect to that of the United States (table 2; Organization for Economic Co-operation and Development, 2012, p. 8, 20).

A 2011 sovereign fiscal responsibility index ranked Canada 11 out of 34 emerging and advanced countries based on fiscal space (amount of debt, as a percentage of the GDP, that a country could issue before reaching fiscal crisis), fiscal path (projection of the country's future level of debt), and fiscal governance (value based on a country's fiscal rules, transparency, and enforceability) (Comeback America Initiative, The, 2011).

The Government of Canada kept domestic demand high by implementing a stimulus program equal to 2% of the GDP per year in 2009–10, which was targeted at the credit, housing, and labor markets. Despite a slowdown in the third quarter of 2010, economic growth increased during the final months of the year owing partially to an increase in exports, which was attributed in part to recovery in the U.S. economy (International Monetary Fund, 2011, p. 11–12).

According to the Economic Commission for Latin America and the Caribbean, the GDP of the region increased by about 6% in 2010, which continued a trend of economic recovery that began in many of the region's countries in the second half of 2009. The GDP decreased by at least 5.4% in Haiti as a result of the January 2010 earthquake and by about 1.5% in Venezuela owing to decreased domestic demand, decreased oil exports, and electricity rationing during a drought in the first half of the year (table 2; Economic Commission for Latin America and the Caribbean, 2011, p. 41).

The Latin America and the Caribbean region's growth was attributed to increased private consumption, expanded private sector credit, low interest rates, increased real wages (with the exception of Venezuela), and domestic production levels that were quickly increased because of the large amount of idle installed capacity that had been easily brought back into production. Consumption also increased in countries that relied upon emigrant remittances as a source of financing for domestic demand (table 2; Economic Commission for Latin America and the Caribbean, 2011, p. 41–42).

According to the International Monetary Fund, emerging economies, including those in Latin America, generally grew faster than advanced economies in 2010 as the global economy continued to expand (albeit unevenly within regions). Latin America's relatively rapid rebound was attributed in part to China's influence on international business cycles. A 2011 global macroeconomic modeling study by the Inter-American Development Bank reported that China's share of trade with the Latin American countries investigated (Argentina, Brazil, Chile, Mexico, and Peru) had increased by nearly threefold since about 1995 and that China's growth affected Latin America's business cycle mostly through China's demand for mineral commodities (Economic Commission for Latin America and the Caribbean, 2011, p. 9; International Monetary Fund, 2011, p. vii, 3).

The study indicated that a decade-long commodity price boom (prior to 2008) might have inflated bilateral trade shares between China and Latin American countries and that China's exchange rate regime might have played a role in directing more Chinese business to Latin America. The conclusion, however, was that the long-run effect of a potential reduction in the GDP of China on the economies of Latin American countries had also increased by threefold since the mid-1990s whereas the long-run effect on Latin America of a reduction in the GDP of the United States had decreased by one-half during the same period (Economic Commission for Latin America and the Caribbean, 2011, p. 41–42).

The study further concluded that the effect on other countries of a reduction of GDP originating in Latin America (or the rest of emerging Asia, excluding China and India) had not changed during the same period and that the effect of a reduction of China's GDP on Latin America would owe as much to indirect effects associated with stronger trade linkages between China and Latin America's leading trade partners (the United States and the euro area) as to direct effects that stemmed from tighter trade linkages between China and Latin America (Cesa–Bianchi and others, 2011, p. 1–6, 18–22).

In most Latin American countries, the highest rates of year-on-year GDP growth were in the first half of 2010. In most countries, excluding Chile and Venezuela, economies continued to grow during the second half of 2010 but at a slower rate. In Chile, slower growth in the first half of the year was primarily owing to the economic effect of the February 2010 earthquake that paralyzed many industries in the affected area and resulted in a decrease in the volume of exported goods. Chile's economy picked up during the second half of the year as some of the affected industries rebuilt and resumed activity, and the improvement was expected to continue into 2011. In Venezuela, the rate of economic growth increased in the second half of the year as the average price for the country's crude oil rose, which increased Government revenue and fiscal spending, and as the supply of electricity returned to normal (Economic Commission for Latin America and the Caribbean, 2011, p. 41–42).

Investment Data and Political Risk

From the start of 2010, the countries external to the region of Latin America and the Caribbean generally had increased liquidity compared with that of 2009. This widespread increase in liquidity was attributable in part to the programs in the United States to expand its liquidity during the second half of the year. That fact, combined with decreased risk levels (measured in terms of the premiums on 5-year credit-default swap contracts) of selected Latin American countries, including Brazil, Chile, Colombia, Mexico, Panama, and Peru, enhanced the attraction to the region as an investment destination. The region received somewhat increased net inflows of external financing, which included both foreign direct investment (FDI) and portfolio investment inflows (plus growth in the external resources raised by private-sector corporations), from 1.6% of

the regional GDP in 2009 to 1.8% of the regional GDP in 2010. Most of the increased inflow of investment in the region went to countries that were more integrated into external financial markets and were bond issuers, including Brazil, Chile, Mexico, Peru and, to a lesser extent, Colombia. The external account balances of some Central American and Caribbean countries, which had used FDI as a primary source for persistent current account deficit financing, revealed the continued economic fragility of certain countries owing to both external factors and domestic difficulties (Economic Commission for Latin America and the Caribbean, 2011, p. 56).

In Latin America, gross fixed capital investment increased by 9.9% in 2010 compared with that of 2009 owing to increased investment in machinery and equipment (primarily imported), national currency appreciation, widely available credit, and higher capacity utilization rates along with greatly increasing demand. Gross fixed capital as a percentage of the GDP increased in 2010 compared with that of 2009 in Argentina, Bolivia, Brazil, Chile, the Dominican Republic, Ecuador, Haiti, Honduras, Panama, Paraguay, Peru, and Uruguay. The investment rate in some of the countries of Latin America exceeded 25%, but that of the majority of countries was between about 15% and 25%.

The Chilean Copper Study Center (CESCO) projected that investments in the Latin American mineral industry will total $327 billion in the period between 2011 and 2020. Investment values (including all investments in mining, but excluding investments in energy and exploration) were estimated to be distributed as $75 billion in Chile, $58 billion in Brazil, $56 billion in Peru, $22 billion in Colombia, $13 billion in Mexico, $10 billion in Argentina, $7 billion in Ecuador, and $4 billion in Panama, with the remainder presumably distributed among other nations of Latin America. The outlook was attributed in part to the rise of the emerging countries' share of the world GDP, which had risen from about 20% in 2003 to about 30% in 2010 and was projected to reach about 40% by 2016 (Centro de Estudios del Cobre y la Mineria, 2011, p. 5; Henriquez, 2011).

As a result of increased domestic demand, the import volume of goods and services increased by about 21% for the region, but the volume of net exports decreased. Exports had increased in terms of value in the region's mineral exporting countries (and some hydrocarbon-exporting countries), but this was primarily owing to higher export prices rather than export volumes. Exports from Brazil, however, rose because of an increase in the export volume of commodities in general and manufactured goods. The export volume decreased in Venezuela because of declining oil production (Economic Commission for Latin America and the Caribbean, 2011, p. 43).

Rising international prices for raw materials led to a significant increase in national revenue for net mineral commodity exporting countries compared with revenue in 2009, but that worsened the terms of trade for the countries that were net importers of fuel, such as some Central American countries. Emigrant remittances were recovering in several countries and increased in the Dominican Republic and El Salvador compared with those of 2009.

Chinese investment in Latin America increased in 2010 as Chinese companies secured interests in some large late-stage mineral projects. China was the third ranked investor in Latin America in 2010 and invested greater than $15 billion (or about 9% of China's total FDI) in the region, more than 90% of which was directed to the extractive industries. More than one-half of China's investment in natural resources had been directed to Latin America and was concentrated on more than 30 projects, primarily in South America. For the period 2003–11, Brazil (24%) and Peru (10%) were the first and fourth ranked global destinations for Chinese investment, respectively (of those countries for which data were available). In terms of the value of China's investment in the mineral industries of the countries of Latin America, Brazil was by far the leading recipient with about $11.5 billion, followed by Peru ($4.9 billion), Guyana ($1 billion), Argentina ($47 million), Venezuela ($15 million), Colombia ($10 million), and Bolivia ($2 million). For that same period, 59% of Chinese FDI in South America was accounted for by metals and 4% was accounted for by coal, crude oil, and natural gas combined (Kotschwar and others, 2012, p. 22).

The Government of China had loaned greater than $32 billion to the Government of Venezuela since 2007 for infrastructure and oil projects in the Orinoco tar sand; Venezuela planned to pay off its debt in oil at cut-rate prices. The Orinoco tar sand was estimated to contain greater than 500 billion barrels of recoverable heavy crude and could represent the world's largest oil petroleum reserve. It was reported that Venezuela sent about 460,000 barrels per day (about 20% of its oil exports) to China in recent years and that there were concerns that the arrangement could drive Venezuela into bankruptcy. The loans (some $23 million of which had gone unaccounted for) were criticized by some as reflecting poor management, and the legality of the loans had been brought into question. In 2010, the Chinese Government along with the China Development Bank (CDB) loaned $1 billion to the Ecuadorian Government in exchange for petroleum deliveries just 2 months after the Ecuadorian Government and the Export Import Bank of China signed a $1.7 billion deal to finance a hydroelectric project in Ecuador. Because of previous defaults on international debt by Ecuador and Venezuela, gaining access to such large amounts of capital would have been extremely difficult had they not been able to obtain financing from China, because virtually no lending opportunities would have been available elsewhere (Jacob, 2010; Hearn, 2012; Kotschwar and others, 2012, p. 3, 21).

The International Monetary Fund outlook for 2011 predicted that the Canadian economy would grow by 2.8%, but risks to that growth included the increase in domestic household debt (much of which had been incurred during the stimulus period) and a slow recovery of the U.S. economy. The risk of higher international prices for crude oil in 2011 was a concern globally but was expected to be potentially beneficial for Canada in the short term because the country was a net oil exporter; the short-term benefit could be offset by the negative effect of higher oil prices on global economic growth and, therefore, the Canadian dollar. Concern regarding the possibility of a worsening European sovereign debt crisis, which began to unfold in 2009 and intensified in 2010, was also seen as a potential source of weakened external demand that could slow economic growth in Canada in 2011 (International Monetary Fund, 2011, p. vii, 3, 11–12).

The deteriorating sovereign debt situation in Europe had not been a significant problem for Latin America through 2010. It was thought, however, that if the situation continued to devolve in 2011, that lending from banks in the euro area, which accounted, on average, for one-quarter of the banking assets in the larger Latin American countries, could be diminished and trigger a credit crunch in Latin America (Eyzaguirre, 2012).

High inflation rates and excess production capacity were risks in some emerging economies owing to favorable external financial conditions, macroeconomic stimulus policies in some countries that had not been normalized after the economic crisis of 2008–9 and were thus still in effect, and improving terms of trade for some countries. Global economic growth risks that were a concern for 2011 in Latin America included uncertainty in petroleum supply and high petroleum prices that could force prices for other mineral commodities exported from Latin America to decline (Economic Commission for Latin America and the Caribbean, 2011, p. 9; International Monetary Fund, 2011, p. vii, 3).

Legislation

Argentine lawmakers approved a law in 2010 that restricts mining and industrial activity on Andean glacial fields. A similar law was approved in 2008 but was vetoed by the President, who had indicated she would not veto the 2010 legislation. Barrick Gold Corp. of Canada, which was developing the Pascua Lama gold-silver-copper project at an elevation above 3,800 meters in the Andes Mountains between Argentina and Chile, indicated that the legislation would not affect development of the project (Hill, 2010).

Both houses of the Chilean legislature had approved a bill to increase the mining royalty rates from the current rate of 4% to 5% of product revenue. The bill initially set a royalty of between 4% and 9% of product revenue on a sliding scale through 2012, returning to the current rate of 4% to 5% from 2013 through 2017, and then moving to a sliding scale of 5% to 14% from 2018 through 2023. The bill needed to be signed into law before the legislation could become effective (Russo, 2010).

In 2010, much of Canada's legislation was aimed at stimulating the country's economy. The 2010 Federal budget extended the temporary 15% Mineral Exploration Tax Credit for another year to March 2011 as a means of maintaining revenues generated by the high level of mineral exploration investment in the country. The program applied to preliminary exploration activities conducted at or above the ground surface. The Canadian Government allocated about $12 million during a 2-year period to renew the Targeted Geoscience Initiative, with a focus on developing new methods for exploring deep mineral deposits. The budget provided about $11 million to streamline the review process for resource projects and decrease the regulatory burden (Kosich, 2010b).

At the Provincial level in Canada, the government of British Columbia announced a ban on mining and development activities in the Flathead Valley. In February 2010, the governor of Montana and the premier of British Columbia signed a memorandum of understanding (MOU) prohibiting future development of coal, gold, and oil and gas in southeastern British Columbia, north of Glacier National Park. The MOU also halted ongoing exploration in the area by several mining companies. Tax revenue-sharing agreements were signed during 2010 between the Provincial government and First Nations entities. The Quebec government implemented changes to the Province's mining tax. The new tax plan as reported in the 2010 Provincial budget in March increased the tax rate from 12% to 14% for the remainder of 2010, 15% for 2011, and 16% for 2012. For tax purposes, mine operators are now required to compute annual profit separately for each mine (Kosich, 2010a; Suarez, 2010; Testa, 2010).

Several Central American countries were restricting new mining projects. Costa Rican lawmakers voted in November 2010 to ban all new open pit mining projects. The Costa Rican President was expected to sign the bill into law, as she had previously placed a moratorium on mining after taking office in May 2010. The President of El Salvador had not approved new mining permits since 2008, and expressed interest in banning precious metal mining. Guatemala and Honduras were temporarily restricting new exploration and mining permits until new mining legislation has been passed (Josephs, 2010; Thomson Reuters, 2010).

Exploration

The estimated exploration budget for Latin America in 2010 [as determined by the Metals Economics Group (MEG) of Canada for nonferrous and nonfuel minerals, and excluding most industrial minerals] was about $2.9 billion (based on data from 2,213 companies), which accounted for about 27% of the estimated total world exploration budget. Recent discoveries in Argentina and Chile had directed exploration into areas where exploration costs are relatively high because of the remoteness of the area. Argentina, Brazil, Chile, Mexico, and Peru were included on the MEG's list of top 10 countries for anticipated exploration spending in 2010. On the basis of data compiled for this report, Latin American countries with the greatest exploration activity were, in descending order by number of sites for which data were compiled, Mexico, Brazil, Peru, Argentina, Chile, and Colombia. Gold attracted about 38% of total exploration activity; base metals, 29%; and silver, about 13%. Investment in 2010 was primarily used to further define early-stage resources (70%), conduct exploration at a producing site (14%), conduct feasibility studies of promising discoveries (11%), and further explore for resources of deposits under development (5%) (Metals Economics Group, 2010a, c).

Exploration activity in Mexico has focused on precious metal, base-metal, and polymetallic deposits. Gold is the primary product in about 61% of the currently active exploration projects in Mexico, and silver is the primary product in 28% of the active projects. Exploration for precious metal and polymetallic mineral deposits has increased as a result of the successful development and commissioning of the following four mines in Mexico during 2009 and 2010: the Palmarejo precious metal mine operated by Coeur d'Alene Mines Corp. of the United States, the Penasquito polymetallic mine operated by Goldcorp Inc. of Canada, the Pinos Altos precious metals mine operated by Agnico Eagle Mines Ltd. of Canada, and the San Francisco gold mine operated by Timmins Gold Corp. of Canada.

Canadian Government statistics on Canadian mineral exploration released by Natural Resources Canada as of December 2010 show revised 2010 exploration spending projections through the feasibility level at Can$2.8 billion (US$2.7 billion). Of this total, gold and silver were projected to account for about Can$1.5 billion; base metals, Can$499 million; uranium, Can$200 million, and diamond, Can$153 million. The December projections were 27% higher than the group's March 2010 estimate of Can$2.2 billion (US$2.1 billion), although these adjusted figures may reflect increased exploration costs rather than a greater amount of exploration activity. In contrast, the MEG reported budgeted exploration spending in Canada for 2010 at US$2.0 billion, which amounted to about 19% of the estimated overall worldwide exploration budget (Metals Economics Group, 2010). Canadian Government statistics as presented by Natural Resources Canada, however, included planned exploration expenditures for a wider variety of minerals and materials than were included in the MEG estimates. When the Canadian Government's exploration statistics are reconfigured to make them comparable with the MEG statistics, the planned exploration budgets as reported in December 2010 by Natural Resources Canada would be Can$2.35 billion (US$2.28 billion), or about 17% higher than the initial budget estimate reported by the MEG (Natural Resources Canada, 2010, 2011).

Company exploration budgets for 2010 as reported by the Canadian Government as of December 2010 were greatest in the Provinces of Ontario (29% of the total exploration and deposit appraisal spending intention for Canada), Quebec (20%), British Columbia (12.5%), and Saskatchewan (11%), and in Nunavut Territory (10%). The Canadian Provinces and Territories with a 50% or more increase in exploration activity in 2010 compared with that of 2009 were New Brunswick (241% increase, primarily as a result of increased base- and precious-metal exploration), Nova Scotia (161% increase, primarily as a result of increased exploration for base and precious metals, as well as other metals and nonmetals), Northwest Territories (124% increase, primarily as a result of increased exploration for base and precious metals and diamond), Alberta (102% increase, primarily as a result of increased exploration for industrial minerals and coal), Yukon Territory (73% increase, primarily as a result of increased exploration for gold and base metals), British Columbia (63% increase, primarily as a result of increased exploration for base and precious metals, as well as other metals and nonmetals), Ontario (54% increase, primarily as a result of increased exploration for diamond and precious metals), Quebec (52% increase, primarily as a result of increased exploration for base and precious metals, lithium, and rare-earth elements), and Nunavut Territory (50% increase, primarily as a result of increased exploration for base metals, diamond, and iron ore) (Natural Resources Canada, 2011).

Canadian Provinces and Territories with a decrease in exploration activity in 2010 from 2009 were Manitoba (12% decrease, primarily as a result of decreased exploration for precious metals) and Saskatchewan (3% decrease, primarily as a result of decreased exploration for coal and uranium). Junior exploration companies accounted for about 53% of total expenditures in 2010 compared with 61% in 2005, 65% in 2006, 67% in 2007, 65% in 2008, and 57% in 2009. In terms of mineral commodities being sought countrywide, precious metals received the largest exploration budget (53%), followed by base metals (18%), uranium and nonmetals (7%), and diamond (5%). Coal, iron ore, and other minerals made up the remaining 17% (Natural Resources Canada, 2011).

Based on MEG statistics, Canada's share of the world nonfuel minerals exploration budget was about 19%. In 2010, about 53% of all companies exploring in Canada were considered junior companies. The Canadian Provinces and Territories with the greatest exploration activity were, in descending order by number of active sites in 2010, Ontario, Quebec, British Columbia, Saskatchewan, Yukon Territory, Newfoundland, Nunavut Territory, Manitoba, Northwest Territories, Nova Scotia, New Brunswick, and Alberta. Based on the site data, exploration for gold accounted for approximately 46% of Canadian exploration in 2010; copper, about 14%; nickel and uranium, 6% each; lead and zinc combined and platinum-group metals, 4% each; and diamond, 3%. Exploration for lithium, potash, and rare-earth elements increased significantly in 2010.

Approximately 83% of all reported exploration sites were considered early-stage sites. Gold exploration in Canada (based on the number of active sites reporting activity in 2010) was focused on British Columbia, Ontario, Quebec, and Yukon Territory, and base-metal exploration was focused primarily on British Columbia, Manitoba, and Ontario. Uranium exploration took place primarily in Saskatchewan. Exploration for rare-earth elements took place primarily in British Columbia, Newfoundland, Northwest Territories, and Quebec. Potash exploration took place in Quebec and Saskatchewan. Exploration for lithium deposits took place in Nova Scotia, Ontario, and Quebec (Natural Resources Canada, 2011).

Commodity Overview

Metals

Aluminum and Bauxite and Alumina.—*Aluminum.*—World primary aluminum production increased by about 11% in 2010 compared with that of 2009. Canada was the leading producer of primary aluminum in the region, accounting for about 7% of the world's production. Latin America (primarily Brazil, but also including Argentina and Venezuela) accounted for about 6% of the world's primary aluminum metal production. Aluminum production was expected to increase in 2011, but demand and prices could affect production levels, depending on global economic trends as well as potentially rising fuel costs because aluminum production is energy intensive (tables 4, 6).

Statistical data from the International Aluminium Institute of the United Kingdom indicated that the average number of kilowatthours (kWh) required to produce 1 metric ton (t) of primary aluminum (that is, the power used for electrolysis and normal smelter auxiliaries up to the point where the liquid aluminum is tapped from the pots) had decreased from 16,951 kWh in 1980 to 16,093 kWh in 1990 and to 15,365 kWh in 2000; it was somewhat erratic in the 2000s (especially since 2005), and was at 15,496 kWh in 2010.

The energy sources used for production since 1980 have included coal, hydroelectric, natural gas, nuclear, and petroleum products. Hydroelectric power supplied between about 50% and 60% of the energy requirement for global primary aluminum production in 1980, 1990, and 2000, and about 65% by 2010. Coal supplied 25%, 34%, and 32% of the energy needed for global primary aluminum production in 1980, 1990, and 2000, respectively, but this percentage had decreased to 23% in 2010. In South America only, hydroelectric power supplied about 94% of the energy requirement for aluminum production in 1980, 97% in 1990, 92% in 2000, and 84% in 2010. Coal was not used as a power source in South America from 1980 through 2010, whereas the share of natural gas, which supplied 1.8% of that region's energy requirement for primary aluminum production in 1980, increased to 16% by 2010. The use of petroleum products for primary aluminum production decreased sharply both globally and in South America from about 10% of the global share in 1980 to 0.1% in 2010 and from about 4.5% of South America's share in 1980 to zero in 2010 (International Aluminium Institute, 2012).

Bauxite and Alumina.—Latin America accounted for about 24% of the world's production of bauxite in 2010, of which Brazil accounted for about 15%. Brazil was the leading regional producer, accounting for about 62% of the regional production. Other bauxite producing countries in the region included Guyana (less than 1% of world production), Jamaica (4%), Suriname (1.9%), and Venezuela (2.6%). An estimated 6% increase in global bauxite production in 2010 was attributed to reopened, new, and (or) expanded mines in the world, including in Brazil and Jamaica. Global alumina production increased by 14%. South America and the Caribbean were estimated to have 21% of the world's bauxite resources (table 4; Bray, 2011).

Copper.—*Ore.*—Production of copper ore in Latin America and Canada accounted for about 48% of the world output in 2010. The region was expected to increase its copper ore production capacity by about 18% by 2017 as production increases at existing operations and (or) new projects are commissioned in Argentina, Chile, Colombia, Ecuador, Mexico, and Peru. In 2010, however, Chile accounted for about 34% of global copper mine production [followed by Peru (7%) and Canada (3%)], and Chile's Escondida copper mine remained the world's leading copper producer. Production at Escondida Mine (majority owned by BHP Billiton plc of the United Kingdom) decreased slightly in 2010 to 1.09 million metric tons (Mt) of copper from 1.1 Mt in 2009 after maintenance work at its electrowinning plants caused a reduction in copper cathode production. Brazil was expected to increase its copper output by about 2015 with the commissioning of several projects, primarily in the State of Para where production increases could be about 250,000 metric tons per year (t/yr). Recent assessments of copper resources indicated 1.3 billion metric tons (Gt) of copper in discovered, mined, and undiscovered resources in the Andes Mountains of South America (tables 4, 8; Cunningham and others, 2008; Edelstein, 2011; Soto, 2011).

Refined Copper.—Chile was the world's leading producer of primary refined copper, and the country outpaced other producers in the region (including Bolivia, Brazil, Canada, Mexico, and Peru), accounting for 72% of the region's output. In 2010, Vale S.A. of Brazil, which had a 36% share of the refined copper market in Brazil, announced its intention to buy Paranapanema S.A., which was Brazil's leading copper refining company and its second ranked producer of copper semimanufactures. Vale failed to win a majority share in the company and withdrew from the deal. Upon announcing its intention to acquire a majority share of Paranapanema, however, Vale reported that one of its midterm objectives was to become a leading world copper producing company (it was already the world's leading iron ore producer). The company was developing two copper projects with startups scheduled in 2011; they were the Salobo project in Carajas, Brazil, with a production capacity of 100,000 t/yr, and the Tres Valles project in Chile, with a production capacity of 18,000 t/yr (tables 4, 9; Engineering and Mining Journal, 2010; Murphy, 2010).

Gold.—Latin America and Canada accounted for about 23% of the world's production of gold in 2010. Peru and Canada were the first and second ranked producers, respectively, in the region and together accounted for about 42% of regional production. Canada's production had declined since at least 2000, but was projected to increase by 2013 and to continue to do so for the foreseeable future thereafter, presuming the country's economy recovers sufficiently to allow for operations that were suspended during the global economic crisis to resume production and (or) new projects come online (tables 4, 10).

Peru's gold production decreased by about 13% in 2010 compared with that of 2009, primarily owing to lower grades being mined at the country's largest gold mine, Yanacocha [which was jointly owned by operator Newmont Mining Corp. of the United States (51.35%), Compania de Minas Buenaventura S.A.A. of Peru (43.65%), and the International Finance Corp. (5%)]. Buenaventura's most recent production unit, La Zanja [which was jointly owned by Buenaventura (53%) and Newmont (47%)] started production in September 2010 and was expected to produce about 3,000 kilograms per year of gold. Buenaventura also held a 40% interest in the Tanahuatay gold and silver project that was expected to produce about another 3,000 kilograms (kg) of gold and about 13,000 kg of silver annually (Engineering and Mining Journal, 2011).

Peru's second largest gold mine was Barrick Lagunas Norte Mine, which produced about 25,000 kg of gold in 2010. Barrick's other operation in Peru, Pierina Mine, had been expected to shut down in 2009, but operations were extended until 2014. Gold Fields Ltd. of South Africa operated the Cerro Corona gold-copper mine in Cajamarca. The operation reached full production in 2009 and produced about 500 kg of gold and 43,000 t of copper in 2010. Gold production from artisanal and small miners in the Madre de Dios area of southeastern Peru accounted for about 19,000 kg in 2010 (Engineering and Mining Journal, 2011).

Iron Ore and Iron and Steel.—*Iron Ore.*—Latin America and Canada accounted for about 16% of the world's iron ore output in terms of gross weight. In terms of iron content, Brazil continued to be the leading producer in the region, accounting for about 81% of the region's production of iron. In 2010, Brazil's iron ore reserves were increased following the discovery of a significant iron ore deposit in the southwestern State of Mato Grosso, which was reported to consist of an

estimated 11.5 Gt of iron ore (grading 41% iron content) plus about 430 Mt of phosphates. The newly discovered deposit would reportedly dwarf the country's Carajas Mine, but the Carajas Mine had a higher grade ore (about 66% iron content). Development of the Mato Grosso discovery could cost hundreds of millions of dollars as the site is located in the interior of the country where there was no infrastructure for getting processed ores and products to the nearest ports (tables 4, 11; United Press International, 2010).

The government of Mato Grosso committed to provide financial assistance with infrastructure developments for Mato Grosso, and Brazil already had potential backers for other iron ore development projects, including the Government of China. China currently buys about 25 million metric tons per month of Brazilian iron ore (most of it from Vale, which was the world's leading iron ore exporter), and Brazil earned about $12.4 billion from iron ore and concentrates exports in the first 7 months of 2010 (United Press International, 2010).

Steel.—In 2010, Latin America and Canada accounted for 5% of the world's production of crude steel. Regionally, Brazil was the leading producer, accounting for 43% of the region's production, followed by Mexico (22%) and Canada (17%). By August 2010, steel mills globally were increasing their stockpiles of iron ore in anticipation of increased demand in late 2010 and into 2011 as the global recession appeared to be easing. Apparent world steel consumption increased by 13% in 2010.

Interest in Canada's iron ore supply was increasing among some steel producers that sought a competitive alternative to the three companies that controlled about two-thirds of the global iron ore trade market—Vale, Rio Tinto Group of the United Kingdom, and BHP Billiton. In 2010, those three global leaders ended their practice of annual price-setting of iron ore supplies in favor of a quarterly price-setting system that could cause significant variability in the price of iron ore, which is a steel producer's greatest expense.

Some industry analysts reported that steel companies would need to begin to invest in their own iron ore development projects to obtain a competitive edge in the iron ore market, and Canada, although ranked only 8th among global iron ore producers, was attracting investment to its large deposits of iron ore. Tata Steel of India, which was the world's seventh ranked steel producer, announced that it had exercised an option to acquire 80% interest in a joint venture with Canada's New Millennium Capital Corp. Tata Steel proposed to make a nearly $300 million investment that would allow the joint venture to develop the DSO Project (a direct-shipping ore project). Tata also was expected to evaluate investment in other lower grade iron ore (taconite) projects in Canada.

Platinum-Group Metals.—Canada and Colombia were the only countries to produce any platinum-group metals (PGM) in the region in 2010. Canada was the only palladium producer in the region, and it accounted for 78% of regional platinum production. The Lac des Isles palladium and platinum mine in Canada (owned by North American Palladium Ltd. of Toronto, Ontario) reopened in April 2010 after having been placed on care-and-maintenance status in October 2008 owing to low metal prices. Canada's production of both commodities had decreased by about 50% since that time. Other producers of PGM in Canada were Xstrata plc of Switzerland and Vale Ltd. of Canada. Both companies produced PGM as byproducts from their nickel mining operations in Sudbury (tables 4, 14).

Tin.—In 2010, Peru was the leading tin mine producer in the region, accounting for about 14% of the world production of tin ore, followed by Bolivia (8%) and Brazil (4%). Canada was not a tin producing country, but there were tin exploration projects underway in the country (tables 4, 15).

Zinc.—Peru was the leading zinc mine producer in the Latin America and Canada region in 2010, accounting for about 43% of regional production and 12% of total world production. Other producers in the region included Argentina, Bolivia, Brazil, Canada, Chile, Honduras, and Mexico. Peru's leading zinc mine, Antamina, which is a copper zinc mine, was jointly owned by BHP Billiton Ltd. of Australia, Xstrata, Teck Resources Ltd. of Canada, and Mitsubishi Corp. of Japan. In 2010, the owners announced a $1.2 billion expansion that would extend the life of the mine to at least 2029 and increase output by up to 40% once the expansion was concluded. Yukon Zinc Corp. of Canada commissioned the mill at its Wolverine zinc mine in 2010 and was expected to reach design capacity of 1,700 metric tons per day (t/d) in 2012. The current mine life was 9.5 years based on a 5.2 Mt deposit, and the operation was expected to produce, in order of volume, zinc, copper, and lead concentrates (table 4; Velez, 2009; Compania Minera Antamina, S.A., 2012; Yukon Zinc Corp., 2012).

Industrial Minerals

Diamond.—Canada was the only significant diamond mine producer in the Latin America and Canada region in 2010, accounting for 98% of the regional total. Other countries in the region that were minor producers included Brazil, Guyana, and Venezuela. Globally, Canada was the world's fourth ranked producer in terms of volume after Russia, Botswana, and Congo (Kinshasa), and was ranked third in terms of the value of production after Botswana and Russia. Canada's diamond mine production was expected to increase starting in 2011 until at least 2017 as the Jericho Mine, which had been on care-and-maintenance status since 2008, was expected to be restarted under new ownership, and as several new early-stage projects come online in 2013–16. The projected production would result in several additional thousand carats per year to the regional and global production totals (table 17; Kimberley Process, 2011).

Lithium.—In 2010, global production of lithium increased by 44% compared with that of 2009. The Latin America and Canada region accounted for about 70% of world production. Chile was the leading producer in the region, accounting for about 58% of the regional total, followed by Argentina (39%) and Brazil (3%) (table 18).

Argentina was the world's fourth ranked producer of lithium, and the country's Puna Plateau in northwestern Argentina was estimated to contain more than 80% of the world's lithium brine reserves. These evaporite brines, which are commonly referred to as salars, are an economical and plentiful source of lithium in aqueous solution that is pumped from aquifers (as well as being a source of commercially important boron and potassium) (Houston and others, 2011; Jaskula, 2011b).

The world's largest tonnages of lithium and potassium in brines are located in the Andes Mountains of Argentina, Bolivia, and Chile, and in western China and Tibet [Xizang] Autonomous Region. Recent developments in the automotive industry and other industries that use lithium in manufacturing led to an exploration boom within the salars of the central Andes, primarily because the brine bodies in China and Tibet have a more complex chemistry that makes recovery of the contained elements more difficult and less economical (Houston and others, 2011).

In 2010, at least a dozen brine projects were at various stages of development in Argentina. In December 2010, Rincon Lithium Ltd. (owned by The Sentient Group of the United Kingdom) commenced its operation at the Salar del Rincón. The company was expected to produce 10,000 t/yr of lithium carbonate, 4,000 t/yr of lithium hydroxide, and 3,000 t/yr of lithium chloride. Orocobre Ltd. of Australia entered into a joint-venture agreement with Toyota Tsusho Corp. of Japan, which was a key supplier to Toyota Motor Corp., Panasonic Corp., and Sanyo Electric Co. Ltd.; the aim was to secure low-cost lithium to supply their partners in the automotive and battery industries. Regional production was expected to increase by about 40% by 2017 (table 18; Houston and others, 2011; Jaskula, 2011a).

Mineral Fuels and Related Materials

Coal.—Colombia was the regional leader in coal production in 2010 (followed by Canada, Mexico, Venezuela, and Brazil); it accounted for about 40% of regional production and 1% of global production. The Colombian Government planned to seek up to $6.8 billion in private investment to expand production and increase the country's output of coal to about 150 Mt by 2020. The country was estimated to have about 24 Gt of coal reserves. Port capacity was expected to be increased to 151 million metric tons per year (Mt/yr) in 2019 from 80.6 Mt/yr. At yearend 2010, the total proven global reserves of coal were estimated to be about 860 Gt, of which the region composed of South and Central America accounted for just 1.5%, and almost all of which was anthracite and bituminous coal from Colombia. Canada accounted for about 0.8% of global coal reserves composed of about equal amounts of (1) anthracite and bituminous and (2) subbituminous and lignite (tables 4, 19; BP p.l.c., 2012, p. 30).

Uranium.—In 2010, Canada was the world's second ranked producer of uranium, accounting for about 18% of total global output. The country had 17 nuclear reactors connected to its power grid, and its deuterium reactors supplied about 15% of the country's electricity. France, which used about 12,000 t/yr of uranium oxide concentrate (10,500 t/yr of U), obtained about 4,500 t/yr of that supply from Canada. Cameco Corp. was Canada's top uranium producer, and most of the company's uranium came from the Athabasca basin in northern Saskatchewan and Alberta, which was the source of the world's highest grade uranium (Gordon, 2012; Natural Resources Canada, 2012; Organisation for Economic Co-operation and Development, 2012; World Nuclear Association, 2012).

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TABLE 1
THE AMERICAS: AREA AND POPULATION IN 2010

Country	Area[1] (square kilometers)	Estimated population[2] (thousands)
Antigua and Barbuda	443	88
Argentina	2,780,400	40,412
Aruba	180	107
Bahamas, The	13,880	342
Barbados	430	273
Belize	22,966	344
Bermuda	54	65
Bolivia	1,098,581	9,930
Brazil	8,514,877	194,946
Canada	9,984,670	34,109
Chile	756,102	17,114
Colombia	1,138,910	46,295
Costa Rica	51,100	4,659
Cuba	110,860	11,258
Dominica	751	68
Dominican Republic	48,670	9,927
Ecuador	283,561	14,465
El Salvador	21,041	6,193
Grenada	344	104
Guatemala	108,889	14,389
Guyana	214,969	754
Haiti	27,750	9,993
Honduras	112,090	7,601
Jamaica	10,991	2,702
Mexico	1,964,375	113,423
Montserrat	102	5 [1]
Nicaragua	130,370	5,788
Panama	75,420	3,517
Paraguay	406,752	6,455
Peru	1,285,216	29,077
Saint Kitts and Nevis	261	52
Saint Lucia	616	174
Saint Vincent and the Grenadines	389	109
Suriname	163,820	525
Trinidad and Tobago	5,128	1,341
United States[3]	9,826,675	309,051
Uruguay	176,215	3,357
Venezuela	912,050	28,834
Other[4]	104,121	5,469 [5]
Americas total	40,354,019	933,315
World total	148,940,000	6,840,507

[1]Source: U.S. Central Intelligence Agency, The World Factbook 2010.

[2]Source: The World Bank, 2011 World Development Indicators Database.

[3]Excludes Puerto Rico and U.S. Virgin Islands.

[4]Includes Anguilla, British Virgin Islands, Cayman Islands, Curacao, French Guiana, Guadeloupe, Martinique, Puerto Rico, Saint Barthelemy, Saint Martin, Sint Maarten, Turks and Caicos Islands, and U.S. Virgin Islands.

[5]Sources: L'Institut national de la statistique et des études économiques, Populations de 1975 à 2040–comparaisons départementales; U.S. Central Intelligence Agency, The World Factbook 2010; and The World Bank, 2011 World Development Indicators Database.

TABLE 2
THE AMERICAS: GROSS DOMESTIC PRODUCT[1, 2]

Country	Gross domestic product based on purchasing power parity		Real gross domestic product growth rate (percentage)		
	Gross value (million dollars)	Per capita (dollars)	2008	2009	2010
Antigua and Barbuda	1,709	21,460	2.2	-9.6	-4.1
Argentina	644,301	15,901	6.8	0.8	9.2
Bahamas, The	10,353	30,049	-1.3	-5.4	1.0
Barbados	6,300	22,776	-0.2	-4.7	0.3
Belize	2,679	8,080	3.8	0.0	2.7
Bolivia	47,997	4,604	6.1	3.4	4.1
Brazil	2,178,530	11,273	5.2	-0.6	7.5
Canada	1,334,140	39,171	0.7	-2.8	3.2
Chile	258,536	15,040	3.7	-1.7	5.2
Colombia	436,588	9,593	3.5	1.5	4.3
Costa Rica	51,319	11,043	2.7	-1.3	4.2
Dominica	952	13,258	7.8	-0.7	0.3
Dominican Republic	87,508	8,860	5.3	3.5	7.8
Ecuador	115,753	7,828	7.2	0.4	3.6
El Salvador	43,042	7,340	1.3	-3.1	1.4
Grenada	1,366	13,110	2.2	-7.7	-1.4
Guatemala	70,466	4,907	3.3	0.5	2.8
Guyana	5,433	7,035	2.0	3.3	4.4
Haiti	11,466	1,163	0.8	2.9	-5.4
Honduras	33,731	4,194	4.1	-2.1	2.8
Jamaica	23,765	8,745	-0.9	-3.0	-1.2
Mexico	1,564,870	14,406	1.2	-6.2	5.4
Nicaragua	17,661	3,037	28.0	-1.5	4.5
Panama	44,492	12,615	10.1	3.2	7.5
Paraguay	33,340	5,208	5.8	-3.8	15.0
Peru	276,542	9,358	9.8	0.9	8.8
Saint Kitts and Nevis	892	16,192	5.7	-4.4	-1.5
Saint Lucia	2,071	12,507	5.8	-1.3	4.4
Saint Vincent and the Grenadines	1,237	11,542	-0.6	-2.3	-1.8
Suriname	4,725	8,951	4.7	3.1	4.4
Trinidad and Tobago	26,016	19,743	2.4	-3.5	-0.6
United States[3]	14,526,550	46,860	-0.3	-3.5	3.0
Uruguay	48,129	14,339	8.6	2.6	8.6
Venezuela	351,609	12,048	5.3	-3.2	-1.5
Americas total[4]	22,264,068	XX	XX	XX	XX
World total	74,384,980	XX	2.8	0.7	5.1

NA Not available. XX Not applicable.

[1]Source: International Monetary Fund, World Economic Outlook Database, September 2011.

[2]Gross domestic product listed may differ from that reported in individual country chapters owing to differences in source or date of reporting.

[3]Excludes Puerto Rico and U.S. Virgin Islands.

[4]Excludes Anguilla, Aruba, Bermuda, British Virgin Islands, Cayman Islands, Cuba, Curacao, French Guiana, Guadeloupe, Martinique, Montserrat, Puerto Rico, Saint Barthelemy, Saint Martin, Saint-Pierre & Miquelon, Sint Maarten, Turks and Caicos Islands, and U.S. Virgin Islands.

TABLE 3

SELECTED LATIN AMERICA AND CANADA EXPLORATION ACTIVITY IN 2010[1]

Location	Type[2]	Site	Commodity	Company	Resource[3,4]
Argentina	E	Cauchari-Olaroz	Li, Potash	Lithium Americas Corp.	5.3 Mt Li_2CO_3, 17.3 Mt KCl (D).
Do.	F	Don Nicholas	Au	Minera IRL Ltd.	202,000 oz Au (ID).
Brazil	F	Raicho dos Machados	Au	Carpathian Gold Inc.	813,000 oz Au (ID).
Do.	E	Volta Grande	Au	Belo Sun Mining Corp.	893,000 oz Au (ID).
Canada	F	Black River	Au	Sabina Gold & Silver Corp..	612,000 oz Au (ID).
Do.	E	Brewery Creek	Au	Golden Predator Corp.	145,000 oz Au (ID).
Do.	E	Capoose	Au, Ag	Silver Quest Resources Ltd.	700,000 oz Au, 41 Moz Ag (IF).
Do.	P	Casa Berardi	Au	Aurizon Mines Ltd.	914,000 oz Au (D).
Do.	E	Casino	Cu, Au, Mo, Ag	Western Copper Ltd.	2.1 Mt Cu, 9 Moz Au, 250,000 t Mo, 64 Moz Ag (D).
Do.	E	Comtois	Au	Maudore Minerals Ltd.	1.2 Moz Au (IF).
Do.	E	Courageous Lake	Au	Seabridge Gold Inc.	4.2 Moz Au (D).
Do.	F	Detour Lake	Au	Detour Gold Corp.	11.4 Moz Au (R).
Do.	E	Discovery	Au	North American Palladium Ltd.	237,000 oz Au (D).
Do.	E	Duparquet	Au	Osisko Mining Corp.	345,000 oz Au (D).
Do.	E	East Amphi	Au	Do.	164,000 oz Au (D).
Do.	E	Eastmain	Au	Eastmain Resources Inc.	256,000 oz Au (IF).
Do.	E	Fermont	Iron ore	Champion Minerals Inc.	141 Mt Fe (IF).
Do.	E	Frankfield	Au	Gowest Amalgamated Resources Ltd.	502,000 oz Au (IF).
Do.	E	Hackett River	Zn, Ag, Cu, Pb, Au	Sabina Gold & Silver Corp..	2 Mt Zn, 200 Moz Ag, 0.180 Mt Cu, 0.280 Mt Pb, 400,000 oz Au (ID).
Do.	E	Hammond Reef	Au	Brett Resources Inc.	6.7 Moz Au (IF).
Do.	E	Joanna	Au	Aurizon Mines Ltd.	1.7 Moz Au (D).
Do.	P	Lac Des Iles	Pd, Pt, Au, Ni, Cu	North American Palladium Ltd.	1.7 Moz Pd, 0.120 Moz Pt, 0.110 Moz Au, 12,000 t Zn, 9,500 t Cu (ID).
Do.	E	Lamaque	Au	Integra Gold Corp.	456,000 oz Au (IF).
Do.	E	Larder Lake	Au	Bear Lake Gold Ltd.	283,000 oz Au (D).
Do.	F	Legacy	Potash	Potash One Inc.	39 Mt potassium chloride (KCl) (D).
Do.	E	Midwest Northeast	U	Hathor Exploration Ltd.	3,000 t U_3O_8 (ID).
Do.	E	Nechalacho (Thor Lake)	REO, Zr, Nb, Ta, Ga	do.	0.5 Mt REO, 2.4 Mt ZrO_2, 0.326 Mt Nb_2O_5, 0.029 Mt Ta_2O_5, 0.010 Mt Ga (ID).
Do.	E	Phoenix	Au	Rubicon Minerals Corp.	4 Moz Au (IF).
Do.	E	Premier	Au, Ag, Zn	Ascot Resources Ltd.	140,000 oz Au, 520,000 oz Ag, 56,000 t Zn (R).
	E	Raglan (Goldbrook)	Ni, Cu, PGM	Goldbrook Ventures Inc.	Data not released.
Do.	E	Rainy River	Au, Ag	Rainy River Resources Ltd.	2.4 Moz Au, 3.3 Moz Ag (ID).
Do.	E	Rau	Au	ATAC Resources Ltd.	Data not released.
Do.	E	Silvertip	Ag, Zn, Pb, Au	Silvercorp Metals Inc.	27 Moz Ag, 221,000 t Zn, 158,000 t Pb, 41,000 oz Au (ID).
Do.	E	Springpole	Au	Gold Canyon Resources Inc.	242,000 oz Au (IF).

See footnotes at end of table.

TABLE 3—Continued
SELECTED LATIN AMERICA AND CANADA EXPLORATION ACTIVITY IN 2010[1]

Location	Type[2]	Site	Commodity	Company	Resource[3, 4]
Canada—Continued	E	Thunder Bay North	Pt, Pd, Rh, Au, Ag, Cu,	Magma Metals Ltd.	0.33 Moz Pt, 0.31 Moz Pd, 15,000 oz Rh, 20,000 oz Au, 0.495 Moz Ag, 25,000 t Cu, 17,000 t Ni, 1,400 t Co (D).
Do.	D	Timmins	Au	Lake Shore Gold Corp.	812,000 oz Au (ID).
Do.	E	White Gold	Au	Kinross Gold Corp.	1 Moz Au (ID).
Chile	E	Arqueros	Ag, Au	Laguna Resources NL	18 Moz Ag, 72,000 oz Au (ID).
Do.	E	Caspiche	Au, Ag, Cu	Exeter Resource Corp.	21 Moz Au, 48 Moz Ag, 2.4 Mt Cu (D).
Do.	E	El Espino	Cu, Au	Explorator Resources Inc.	815,000 t Cu, 947,000 oz Au (D).
Do.	P	Quebrada Blanco	Cu	Teck Resources Ltd.	679,000 t Cu (R).
Do.	E	Volcan	Au	Andina Minerals Inc.	9.8 Moz Au (D).
Do.	E	West Wall	Cu, Au, Mo	Xstrata plc.	4 Mt Cu, 1.2 Moz Au, 75,000 t Mo (IF).
Colombia	E	Buritica	Au	Continental Gold Ltd.	Data not released.
Do.	E	Marmato	Au, Ag	Medoro Resources Ltd.	7.5 Moz Au, 48 Moz Ag (D).
Ecuador	E	Condor	Au, Ag	Kinross Gold Corp.	5.7 Moz Au, 7.3 Moz Ag (D).
Guatemala	E	Escobal	Ag, Ag, Pb, Zn	Tahoe Resources Inc.	246 Moz Ag, 0.251 Moz Au, 0.122 Mt Pb, 0.205 Mt Zn (ID).
Do.	E	Mayaniquel	Ni	Anfield Nickel Corp.	270,000 t Ni (ID).
Mexico	E	Cerro Jumil	Au, Ag	Esperanza Silver Corp.	910,000 oz Au, 1.9 Moz Ag (D).
Do.	E	Cordero	Ag, Zn, Au, Pb	Levon Resources Ltd.	Data not released.
Do.	P	El Castillo	Au	Argonaut Gold Inc.	752,000 oz Au (R).
Do.	E	El Gallo	Ag, Au	US Gold Corp.	25 Moz Ag, 21,000 oz Au (D).
Do.	P	Mulatos	Au	Alamos Gold Inc.	1.7 Moz Au (R).
Do.	F	San Antonio	Au	Pediment Gold Corp.	1.2 Moz Au (D).
Do.	P	San Francisco	Au	Timmins Gold Corp.	611,000 oz Au (R).
Do.	E	San Jose de Gracia	Au, Ag	Goldgroup Mining Inc.	310,000 oz Au, 500,000 oz Ag (IF).
Do.	E	Santana	Au	Corex Gold Corp.	Data not released.
Nicaragua	P	La Libertad	Au	B2Gold Corp.	510,000 oz Au (R).
Peru	E	Cerro Ccopane	Iron ore	Cuervo Resources Inc.	26 Mt Fe (D).
Do.	E	Haquira	Cu, Mo, Au, Ag	Antares Minerals Inc.	3.2 Mt Cu, 50,000 t Mo, 500,000 oz Au, 20 Moz Ag (D).
Do.	E	Inmaculada	Au, Ag	Hochschild Mining plc.	530,000 oz Au, 16 Moz Ag (ID).
Do.	E	Zafranal	Cu, Au	AQM Copper Corp.	1.4 Mt Cu, 774,000 oz Au (R).

[1]Abbreviations used in this table for commodities are as follows: Ag, silver; Au, gold; Co, cobalt; Cu, copper; Fe, iron ore; Ga, gallium; Li, lithium; Mo, molybdenum; Nb, niobium; Ni, nickel; Pb, lead; PGM, platinum-group metals; Pd, palladium; Pt, platinum; REO, rare-earth oxides; Rh, rhodium; Ta, tantalum; U, uranium; Zn, zinc; Zr, zirconium.

[2]D, approved for development; E, active exploration; F, feasibility work ongoing/completed; P, exploration at producing site.

[3]Abbreviations used in this table for units of measurement are as follows: Moz, million troy ounces; Mt, million metric tons; oz, troy ounces; t, metric tons.

[4]Based on 2010 data reported from various sources: D, measured + indicated; ID, indicated; IF, inferred, R, proven + probable. Data not verified by U.S. Geological Survey.

TABLE 4

LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2010[1]

(Thousand metric tons unless otherwise specified)

	Metals									
	Aluminum		Copper, mine	Gold,	Iron and steel		Lead, mine	Nickel, mine	Silver, mine output,	Tin, mine output,
Country	Bauxite	Metal, primary	output, Cu content	Au content (kilograms)	Iron ore, gross weight	Steel, crude	output, Pb content	output, Ni content	Ag content (metric tons)	Sn content (metric tons)
Argentina	--	413	140	63,138	--	5,138	23	--	723	--
Bolivia[p]	--	--	2	6,394	--	--	73	--	1,259	20,190
Brazil[p]	31,700	1,535	214	62,047	372,120	33,033	20	109	37	10,400
Chile	--	--	5,419	39,494	9,130	1,011	1	--	1,287	--
Colombia	--	--	4	53,606	77	1,213	--	70 [e]	15	--
Costa Rica	--	--	--	--	--	--	--	--	--	--
Cuba	--	--	--	--	--	278	--	71 [e]	--	--
Dominican Republic	--	--	9	500	--	60 [e]	--	--	20	--
Ecuador	--	--	--	1,300 [e]	--	372	--	--	1 [e]	--
El Salvador[e]	--	--	--	--	--	56	--	--	--	--
French Guiana[e]	--	--	--	2,000	--	--	--	--	--	--
Guatemala	--	--	--	9,213	2	274	--	--	195	--
Guyana	1,100	--	--	9,594	--	--	--	--	--	--
Honduras	--	--	(2) [e]	2,197	--	--	17	--	49	--
Jamaica[e]	8,540	--	--	--	--	--	--	--	--	--
Mexico	--	--	238	72,596	13,998	16,710	192	--	4,411	--
Nicaragua	--	--	--	2,065	--	--	--	--	6,995	--
Panama[e]	--	--	--	870	--	--	--	--	--	--
Paraguay[e]	--	--	--	--	--	63 [3]	--	--	--	--
Peru[p]	--	--	1,094	164,060	9,160	750 [e]	262	--	3,640	33,848
Suriname[e]	4,000	--	--	12,286 [3]	--	--	--	--	--	--
Trinidad and Tobago	--	--	--	--	--	572	--	--	--	--
Uruguay[e]	--	--	--	1,736 [3]	16	66	--	--	--	--
Venezuela[e]	5,500	355	--	12,000	14,900	5,000	--	20	--	--
Other[e, 4]	--	--	--	--	--	--	--	--	--	--
Total	50,800	2,300	7,120	515,000	419,000	64,600	587	270	18,600	64,400
Share of world total	24%	6%	45%	20%	16%	4%	14%	15%	60%	26%
Canada[p]	--	2,963	525	91,024	37,001	13,003	65	158	596	--
Share of world total	--	7%	3%	4%	1%	1%	2%	9%	2%	--
United States	NA	1,730	1,110	231,000	49,900	80,500	369	--	1,280	--
Share of world total	NA	4%	7%	9%	2%	6%	9%	--	4%	--
Total Western Hemisphere	50,800	6,990	8,750	837,000	506,000	158,000	1,020	429	20,500	64,400
Share of world total	24%	17%	55%	33%	19%	11%	24%	24%	66%	26%
World total	216,000	40,900	15,800	2,560,000	2,600,000	1,440,000	4,170	1,790	30,900	251,000

See footnotes at end of table.

TABLE 4—Continued

LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2010[1]

(Thousand metric tons unless otherwise specified)

Country	Metals—Continued	Industrial minerals				Mineral fuels and related materials				
							Natural gas		Petroleum	
	Zinc, mine output, Zn content (metric tons)	Cement, hydraulic	Gypsum	Phosphate rock, P_2O_5 content	Salt	Coal, all grades	Dry (million cubic meters)	Plant liquids (thousand 42-gallon barrels)	Crude, including condensate (thousand 42-gallon barrels)	Refinery products (thousand 42-gallon barrels)
Argentina	32,566	10,000 e	1,347	NA	1,527	140	NA	10,000 e	222,436	275,390
Bolivia[p]	411,409	2,414	1	--	45 e	--	14,923	3,022	12,607	11,900 e
Brazil[p]	211,203	59,066	2,750	2,179	7,030	6,500	22,938	9,570	752,253	726,700
Chile	27,662	3,871	758	3 e	7,695	619	1,793	NA e	1,536	67,131
Colombia	--	10,000 e	--	--	654	74,350	11,300	--	286,890	112,570
Costa Rica	--	2,500 e	--	--	--	--	--	--	--	--
Cuba	--	1,631	111	--	272	--	1,073	--	19,507	6,642
Dominican Republic	--	3,200	195	--	50 e	--	--	--	--	13,000 e
Ecuador	--	5,000 e	--	--	--	--	600 e	300 e	177,374	50,716
El Salvador[e]	--	1,200	--	--	--	--	--	--	--	6,200
French Guiana[e]	--	62	--	--	--	--	--	--	--	--
Guatemala	--	1,500 e	59	--	50 e	(2)	(2)	--	4,363	473
Guyana	--	--	--	--	--	--	--	--	--	--
Honduras	36,370	1,800 e	--	--	40 e	--	--	--	--	--
Jamaica[e]	--	740	230	--	19	--	--	--	--	299,000
Mexico	570,004	34,503	3,560	452	8,430	27,565	33,632	137,605	940,240	428,513
Nicaragua	--	530 e	20	--	30 e	--	--	--	--	5,500 e
Panama[e]	--	1,700	--	--	17	--	--	--	--	--
Paraguay[e]	--	600	5	--	--	--	--	--	--	2,660
Peru[p]	1,470,450	8,100	321	17 e	1,570	92	2,251	30,963	33,759	74,620
Suriname[e]	--	65	--	--	--	--	--	--	5,700	2,940
Trinidad and Tobago	--	784 e	--	--	--	--	44,565	17,222	33,665	46,167
Uruguay[e]	--	620	1,150	--	--	--	--	--	--	15,300
Venezuela[e]	--	11,000	7	115	350	7,500	24,900	78,500	985,500	434,000
Other[e, 4]	--	1,040	--	--	1,249 [3]	--	12	--	1,814	40,567 [3]
Total	2,760,000	162,000	10,500	2,770	29,000	117,000	158,000	287,000	3,480,000	2,620,000
Share of world total	23%	5%	8%	5%	11%	2%	5%	11%	13%	9%
Canada[p]	648,905	12,431	2,717	210 e	10,537	67,876	144,378	230,000	990,000	730,000 e
Share of world total	5%	(2)	2%	(2)	4%	1%	5%	9%	4%	3%
United States	748,000	67,200	8,840	7,400	43,300	985,000	611,000	757,000	2,000,000	4,570,000
Share of world total	6%	2%	7%	13%	3%	14%	20%	28%	7%	16%
Total Western Hemisphere	4,160,000	242,000	22,100	10,400	82,900	1,170,000	913,000	1,270,000	6,470,000	7,920,000
Share of world total	34%	7%	17%	19%	36%	16%	29%	47%	24%	28%
World total	12,100,000	3,360,000	132,000	55,900	274,000	7,280,000	3,120,000	2,700,000	27,400,000	28,400,000

See footnotes at end of table.

TABLE 4—Continued

LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2010[1]

[e]Estimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits. [p]Preliminary. NA Not available. -- Zero or zero percent.

[1]Totals may not add due to independent rounding. Percentages are calculated on unrounded data. Table includes data available as of February 3, 2012.

[2]Less than 1/2 unit.

[3]Reported figure.

[4]Includes Aruba, Barbados, Belize, Curacao, Guadeloupe, Haiti, Martinique, Saba, Sint Eustatius, and Sint Maarten.

TABLE 5
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED BAUXITE MINE PRODUCTION, 2000–2017[1]

(Thousand metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Brazil	13,800	22,034	31,700	32,000	32,000	32,000
Dominican Republic	--	535	--	--	--	--
Guyana	2,471	1,648	1,100	2,100	2,100	2,100
Jamaica	11,100	14,116	8,540	11,000	11,000	11,000
Suriname	3,610	4,757	4,000	5,000	5,000	5,000
Venezuela	4,360	5,900	5,500	5,500	5,500	5,000
Total	35,300	49,000	51,000	55,600	55,600	55,100

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 6
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PRIMARY AND SECONDARY ALUMINUM PRODUCTION, 2000–2017[1]

(Thousand metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	278	270	400	400	400	400
Brazil	1,487	1,749	1,787	2,000	2,500	2,500
Canada[2]	2,521	3,070	3,000	3,600	3,900	3,900
Mexico	348	574	700	700	700	700
Venezuela	571	615	355	500	500	500
Total	5,200	6,300	6,200	7,200	8,000	8,000

[e]Estimated.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes secondary aluminum production.

TABLE 7
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COBALT MINE PRODUCTION, 2000–2017[1]

(Metal content in metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Brazil	900	1,500	1,500	1,500	1,500	1,500
Canada	5,298	5,767	4,568	7,000	9,000	9,000
Cuba	2,852 *	4,798 *	3,600 *	3,600 *	4,400 *	4,400 *
Total	9,000 *	12,000 *	9,700 *	12,000 *	15,000 *	15,000 *

[e]Estimated.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

*Correction posted August 9, 2012.

TABLE 8
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 2000–2017[1]

(Metal content in thousand metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	145	187	140	200	300	300
Bolivia	1	1	2	2	2	2
Brazil	32	133	214	240	250	260
Canada	634	595	525	640	640	650
Chile	4,602	5,321	5,419	5,700	5,900	6,000
Colombia	10	9	4	7	7	7
Ecuador	--	--	--	6	6	6
Mexico	365	429	238	320	350	350
Peru	554	1,010	1,094	1,350	1,400	1,450
Total	6,300	7,700	7,600	8,500	8,900	9,000

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 9
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED REFINED COPPER PRODUCTION, 2000–2017[1]

(Thousand metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina[2]	16	16	16	--	--	--
Bolivia	--	--	1	2	2	2
Brazil	233	224	233	250	260	270
Canada	613	515	319	370	370	370
Chile[3]	2,668	2,824	3,244	3,400	3,400	3,400
Mexico	411	416	278	360	390	390
Peru[3]	452	512	394	450	500	550
Total	4,400	4,500	4,500	4,800	4,900	5,000

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.
[2]Secondary only.
[3]Primary only.

TABLE 10
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 2000–2017[1]

(Au content in kilograms)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	26,000	27,904	63,138	60,000	60,000	60,000
Belize	7	(2)	--	--	--	--
Bolivia	12,000	8,871	6,394	4,000	4,000	4,000
Brazil	50,400	38,293	62,047	65,000	65,500	66,000
Canada	156,200	120,541	91,024	105,000	100,000	110,000
Chile	54,100	40,447	39,494	45,000	60,000	70,000
Colombia	37,000	35,783	53,600	55,000	55,000	55,000
Costa Rica	50	424	--	--	--	--
Cuba	1,000	--	--	--	--	--
Dominican Republic	--	--	500	25,000	25,000	25,000
Ecuador	2,870	5,338	4,600	5,000	6,000	6,000
French Guiana	3,492	1,955	2,000	2,000	2,000	2,000
Guatemala	140	741	9,213	10,000	10,000	10,000
Guyana	13,510	8,325	9,594	10,000	10,000	10,000
Honduras	878	4,438	2,197	1,500	1,500	2,000
Mexico	26,400	30,356	72,600	75,000	80,000	80,000
Nicaragua	3,670	3,674	4,900	3,000	3,000	3,000
Panama	--	--	--	2,000	2,000	
Peru	139,000	208,002	164,060	170,000	180,000	185,000
Suriname	300	10,619	12,286	12,500	13,000	13,500
Uruguay	2,180	3,151	1,736	2,000	2,300	2,500
Venezuela	7,330	10,480	12,000	12,000	12,500	13,000
Total	537,000	559,000	611,000	664,000	692,000	717,000

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2]Less than 1/2 unit.

TABLE 11
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED IRON ORE PRODUCTION, 2000–2017[1]

(Fe content in thousand metric tons)

Country	Iron content	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	68%	--	--	--	500	500	500
Bolivia	65%	--	--	--	--	500	1,000
Brazil	66%	141,000	186,891	247,772	250,000	250,000	260,000
Canada[2]	64%	22,700	19,333	23,300	28,000	28,000	30,000
Chile	61%	5,400	4,707	5,852	7,000	8,000	9,000
Colombia	55%	363	325	77	200	300	300
Cuba	45%	9	9	--	--	--	--
Guatemala	65%	10	7	(3)	--	--	--
Mexico	60%	6,800	7,012	7,900	8,000	8,500	8,500
Peru	68%	2,810	4,565	6,140	6,500	7,000	7,000
Uruguay	50%	4	12	16	18	20	20
Venezuela	65%	11,100	13,000	15,200	16,000	16,500	16,500
Total	XX	190,000	236,000	306,000	320,000	320,000	333,000

[e]Estimated. XX Not applicable. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes beneficiated and direct-shipping ore.

[3]Less than 1/2 unit.

TABLE 12
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 2000–2017[1]

(Thousand metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	4,470	5,386	5,138	5,700	5,700	5,700
Brazil	27,900	31,631	33,033	34,000	35,000	40,000
Canada	15,900	15,327	13,003	13,000	15,000	15,000
Chile	1,350	1,537	1,011	1,500	1,700	1,700
Colombia	660	842	1,213	1,300	1,300	1,300
Cuba	327	245	278	280	280	280
Dominican Republic	36	60	60	60	70	70
Ecuador	58	84	80	85	85	85
El Salvador	41	48	56	65	70	80
Guatemala	166	207	274	300	300	300
Jamaica	--	--	--	--	--	--
Mexico	15,600	16,202	16,710	17,000	19,000	20,000
Paraguay	77	101	90	140	150	150
Peru	749	750	750	750	750	750
Trinidad and Tobago	753	711	572	600	700	700
Uruguay	38	64	66	71	72	75
Venezuela	3,840	4,907	5,000	5,000	5,000	5,000
Total	72,000	78,100	77,300	80,000	85,000	91,200

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 13
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 2000–2017[1]

(Pt content in kilograms)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Canada	5,700	6,075	3,600	9,000	9,000	10,000
Colombia	339	1,082	997	1,200	1,200	1,200
Total	6,000	7,200	4,600	10,200	10,200	11,200

[e]Estimated.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 14
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 2000–2017

(Pd content in kilograms)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Canada	10,400	10,400	6,200	15,000	15,000	19,000

[e]Estimated; estimated data are rounded to no more than three significant digits.

TABLE 15

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 2000–2017[1]

(Sn content in metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	4	1	--	1	1	1
Bolivia	12,293	18,640	20,190	20,000	23,000	24,000
Brazil	14,200	11,739	10,400	12,000	14,000	14,500
Peru	70,901	42,145	33,848	41,000	42,000	42,500
Total	97,400	72,500	64,400	73,000	79,000	81,000

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 16

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 2000–2017[1]

(Metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	--	120	--	150	150	150
Brazil	14,023	9,236	9,348	10,500	12,000	12,000
Bolivia	9,353	13,841	14,975	17,000	20,000	21,000
Mexico	1,200	17	--	--	--	--
Peru	37,410	36,733	36,451	39,500	40,000	40,000
Total	62,000	59,800	60,800	67,200	72,000	73,200

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 17

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED DIAMOND MINE PRODUCTION, 2000–2017[1]

(Thousand carats)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Brazil	1,600	208	25	100	100	100
Canada	2,530	12,314	11,773	12,000	13,000	16,000
Guyana	82	357	50	180	200	200
Venezuela	110	115	115	115	115	115
Total	4,300	13,000	12,000	12,000	13,000	16,000

[e]Estimated.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 18

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED LITHIUM PRODUCTION, 2000–2017[1]

(Li content in metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	25	2,800	3,200 *	4,200 *	4,200 *	4,200 *
Bolivia	--	--	--	--	50	90
Brazil	260	210	489	510	510	510
Canada	670	670	--	2,000	3,000	3,000
Chile	6,740	8,354	10,361	13,000	13,000	13,000
Total	7,700	12,000	17,800	22,500	24,600	24,600

[e]Estimated. -- Negligible or no production.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

*Correction posted August 9, 2012.

TABLE 19

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 2000-2017[1]

(Thousand metric tons)

Country	2000	2005	2010	2013[e]	2015[e]	2017[e]
Argentina	246	320	140	300	300	300
Brazil	6,000	6,480	6,310	6,500	6,850	6,850
Canada[2]	69,200	67,555	67,876	70,000	75,000	80,000
Chile	509	732	619	1,500	2,500	3,000
Colombia	38,200	59,064	74,350	85,000	85,000	100,000
Mexico[2]	14,300	11,750	27,565	30,000	32,000	32,000
Peru[2]	27	22	92	145	150	150
Venezuela	7,910	7,195	7,500	7,550	7,600	7,600
Total	136,000	153,000	184,000	200,000	209,000	230,000

[e]Estimated.

[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

[2]Run of mine.