



# 2011 Minerals Yearbook

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## CHILE

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# THE MINERAL INDUSTRY OF CHILE

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Chile's position in the world mineral economy was as a leading supplier of many minerals in crude form, especially metals associated with the mining of copper and industrial minerals (such as lithium carbonate and potash) obtained from mining the salars and arid areas in the country. In 2011, Chile remained the world's leading producer of copper, accounting for about 32% of world mine production; iodine, 59%<sup>1</sup> of world mine production; rhenium, 51%; and lithium (Li content), about 39%<sup>1</sup>. The country was estimated to have been the world's second ranked producer of arsenic, accounting for an estimated 20% of world production; (total) refined copper, about 16%; and mined boron (ulexite), 11%<sup>1</sup>. It was the world's third ranked producer of molybdenum (15% of world production), the fifth ranked producer of silver (mine output) (5.4%), and the sixth ranked producer of pumicite (5%) and refined selenium (4.5%<sup>1</sup>). Chile was estimated to have accounted for about 3% of the world's mine output of salt (NaCl); 2% of gold (mine output), potash (K<sub>2</sub>O equivalent), and sulfur, and slightly greater than 1% of global production of diatomite (table 1; Angulo, 2012a, b; Apodaca, 2012; Brooks, 2012a, b; Comisión Chilena del Cobre, 2012, p. 138–139, 142–143, 145–147; Crangle, 2012a, b; Edelstein, 2012; George, 2012a, b; Jasinski, 2012; Jaskula, 2012; Kostick, 2012; Polyak, 2012a, b; Servicio Nacional de Geología y Minería, 2012, p. 12–14, 35).

## Minerals in the National Economy

In 2011, total mine production accounted for 15% (about \$38 billion<sup>2</sup>) of the country's gross domestic product (GDP) compared with 16% (about \$35 billion) in 2010, and copper mine production was valued at about \$33 billion compared with \$32 billion in 2010. In real terms,<sup>3</sup> the total value of mine production decreased by about 4.8% compared with that of 2010 owing to a decrease of 6% in the real value of the country's copper mine production; the real value of all noncopper mine production increased by 9.5% during the same timeframe (Banco Central de Chile, 2012a, p. 34–38; Comisión Chilena del Cobre, 2012, p. 72–73; International Monetary Fund, 2012).

The mineral trade balance of Chile (including crude petroleum and natural gas) decreased to \$28.6 billion from \$30 billion in 2010. The value of the country's exports of nonfuel mineral products increased to \$50 billion from \$46 billion in 2010, led by an increase in the value of its exports of nonferrous metals (the leading mineral export sector) to \$30.5 billion from \$27.5 billion in 2010; the value of the country's imports of

mineral fuels and related materials increased to about \$16 billion from \$11.4 billion in 2010, led by an increase in the value of its imports of crude petroleum and petroleum refinery products (the leading mineral import sector) to \$12.4 from \$9 billion in 2010 (Banco Central de Chile, 2012b, p. 31, 61).

At current prices, labor costs in the mineral industry continued to increase during 2010. According to the change in a nominal wage index for Chile, the total wage bill for all mining and the extraction of crude petroleum increased by 8% in 2011 compared with that of 2010 and by about 3% in 2010 compared with that of 2009. According to Chile's Comisión Chilena del Cobre (COCHILCO), mining and the extraction of crude petroleum employed 68,372 workers compared with 66,063 workers in 2010; of the total number of workers directly employed in mining and the extraction of crude petroleum, about 77% were employed in copper mining; and workers directly employed in mining and the extraction of crude petroleum accounted for about 1% of all employees in Chile. COCHILCO's reported data on employment in mining and the extraction of crude petroleum does not appear, however, to include the large number of workers who provided necessary services for these mineral extraction sectors (such as administrative, consulting, legal, marketing, security, and transportation services), those who were employed in domestically producing downstream mineral-based products from raw minerals extracted in Chile, and those whose jobs otherwise critically depended on the extraction of minerals in the country. The country's Servicio Nacional de Geología y Minería (SERNAGEOMIN) reported that the number of workers employed in the mining sector increased to 197,197 in 2011 from 191,043 in 2010, and these data could include the annual average number of contractual workers in addition to the number of permanent employees (Comisión Chilena del Cobre, 2012, p. 77, 81; Servicio Nacional de Geología y Minería, 2012, p. 161).

In 2011, total investment in the mining and quarrying sector of Chile increased to \$8.1 billion compared with about \$7.4 billion in 2010. This increase was mostly owing to an increase of foreign direct investment (FDI) into the sector to \$2.5 billion compared with about \$0.93 billion (not including a net disinvestment of about \$0.05 billion by the United States) in 2010. In 2011, the combined investment by state-owned mining and mineral processing companies Corporación Nacional del Cobre (CODELCO) and Empresa Nacional de Minería (ENAMI) decreased to \$2.26 billion from about \$2.35 billion in 2010. Of the total amount of FDI in the mining and quarrying sector of Chile in 2011, Japan accounted for about 54%, Canada accounted for about 38%, the Republic of Korea accounted for about 6.4%, and no other country accounted for greater than 1%. In 2010, Argentina accounted for about 63%, Australia accounted for about 35%, Canada accounted for 1%, and no other country accounted for greater than 0.5%

<sup>1</sup>Excludes production by the United States.

<sup>2</sup>Where necessary, nominal values have been converted from Chilean pesos (Ch\$) to U.S. dollars (US\$) at an annual average exchange rate of about Ch\$510.24=US\$1.00 for 2010 and about Ch\$483.76=US\$1.00 for 2011. All values are nominal, at current prices, unless otherwise stated.

<sup>3</sup>Real values are adjusted for inflation using constant 2008 prices and chain-weighted from 2003.

(Comisión Chilena del Cobre, 2012, p. 74–75, 127; Comité de Inversiones Extranjeras, undated).

## Government Policies and Programs

On June 16, 2005, the Government had approved Law 20.026 to establish a mining-specific tax (royalty), which modified both the applicable Mining Code (approved on September 26, 1983) and the 1974 foreign investment statute, known as Decree Law 600 (D.L. 600). The tax, which is assessed on a per-company basis, took effect at the beginning of 2006 and applies only if the total value of mine production by a single company exceeds the average value of 12,000 metric tons (t) of copper during the year. The royalty rates that mining companies were estimated to be paying in 2010 were between 4% and 5%. On October 21, 2010, the Government enacted amendments to the mining royalty law to help finance reconstruction costs following an earthquake in northern Chile on February 27. In January 2011, it was estimated that between 80% and 90% of mining companies in the country had adopted the new tax scheme for earthquake reconstruction, which was supposed to extend through 2012. In 2011, the earthquake-reconstruction tax could have expanded the effective mining royalties rate for the companies that adopted it to between 4% and 9%. Acceptance of the temporary earthquake-reconstruction tax by mining (and some other) companies was voluntary, but the Government offered to extend existing tax-rate stability agreements (which could be reinstated after 2012) for those that adopted the new flexible-rate tax scheme (Rojas and others, 2006, p. 360–362; Economist, The, 2010; Cambero and Soto, 2011; London Stock Exchange plc, 2011).

Before passage of the mining-specific tax law in 2005, the most recent significant modifications of the Mining Code had been through approval of a Mining Safety Act on December 30, 2002. The main environmental law was Decree Law 19.300, which was approved on March 9, 1994, and was supplemented on December 7, 2002, by approval of Decreto Supremo 95, which is a Government decree that requires environmental impact statements for any new investment projects that involve either exploration for or extraction of the country's natural resources (including minerals). Decreto Supremo 95 is the primary statute for environmental regulation of mining concessions in Chile (Rojas and others, 2006, p. 360–362; Biblioteca del Congreso Nacional de Chile, 2008; Economist, The, 2010).

In 2006, the Government passed the Fiscal Responsibility Law (FRL) that created two funds to manage increased revenues from mining royalty payments and from the state-owned mining company CODELCO. The FRL extends the commitment of the Government to a structural fiscal surplus rule that was established in 2000 to help insulate the economy from fluctuations in mineral commodity prices. During a boom period (as during 2007), this rule allows the Government to spend only the portion of the surplus revenue that is considered permanent and to save the transitory portion. (Transitory Government surpluses from the copper sector have been termed “copper windfall revenues”.) As part of the FRL, a panel of

six members was selected to form a financial advisory council to advise the Minister of Finance concerning investment guidelines and other matters related to the two funds, including helping to determine what portion of the surplus mining revenues was permanent and what portion was transitory. The first fund is called the Economic and Social Stabilization Fund (ESSF) and was established with an initial investment of about \$6 billion in 2006, mostly from the closure of the old Copper Stabilization Fund (established in 1985); the second fund is called the Pension Reserve Fund and was established with an initial investment of \$600 million. At the end of 2011, the two funds contained about \$13.2 billion and \$4.4 billion in assets, respectively, compared with about \$12.7 billion and \$3.84 billion, respectively, at yearend 2010 (International Monetary Fund, 2009, p. 60; Kumbhof and Laxton, 2009, p. 25; Ministerio de Hacienda, 2012, p. 8).

The Chilean Government, through the Ministerio de Minería, exercises control of the mineral industry through three state-owned companies and four regulatory agencies. The state-owned companies that are significant to the mineral industry include CODELCO, some subsidiaries of Corporación de Fomento de la Producción (CORFO), and ENAMI. The specific subsidiaries of CORFO that are significant to the mineral industry include Cía. Chilena de Electricidad S.A., Empresa Nacional del Carbón S.A. (ENACAR), and Empresa Nacional del Petróleo (ENAP). The four regulatory agencies are COCHILCO, the Comisión Nacional del Medio Ambiente (CONAMA), Comité de Inversiones Extranjeras (CIE), and SERNAGEOMIN.

## Production

In 2011, copper smelter production decreased by about 13% compared with that of 2010, perhaps at least partially owing to a possible extended period of annual shutdown and modification of some procedures at the Ventanas smelter following emissions incidents in March. Production of gold increased by about 14% mostly owing to increased production of gold as a byproduct of copper mining by large-scale copper mining companies, and partially owing to increased production by primarily gold mining companies. Production of iron ore (Fe content) increased by 32% owing to the start-up of production at Minera Santa Fe SCM's Carmen Mine in June 2011 and increased production by Compañía Minera del Pacífico S.A. (CMP) at the company's El Romeral Mine. Production of pig iron and crude steel were estimated to have increased by 78% and 60%, respectively, owing to a full year of production by CAP S.A. in 2011, after having to close the company's iron and steel plants for 4 months to repair the damage caused by the earthquake on February 27, 2010. Information concerning the causes of the changes in production of ferroalloys in 2011 compared with that of 2010 was not available (table 1; Henríquez, 2011; CAP S.A., 2012, p. 4–5, 24, 28, 34–36, 40; Comisión Chilena del Cobre, 2012, p. 21, 25; Corporación Nacional del Cobre, 2012, p. 12, 54, 69, 92, 95–98, 212, 247; Servicio Nacional de Geología y Minería, 2012, p. 43–48, 51, 128–131; Vidal and González, 2012, p. 22, 51; Minera Santa Fe SCM, undated).

Production of mined lead and zinc were estimated to have increased by 21% and 32%, respectively, compared with that of 2010. This was mostly owing to a labor strike in 2010 at Breakwater Resources Ltd. of Canada's El Toqui Mine, which caused the company to modify the mining sequence to produce more gold and silver in concentrates and less lead and zinc in concentrates than initially planned, followed by a full year of production at El Toqui Mine in 2011 according to a mining plan that was balanced more toward production of lead and zinc. Information was not available concerning total production of mercury in Chile or the main cause of the 49% decrease in estimated U.S. imports of mercury from Chile compared with that of 2010. Information was also not available concerning the main reason for the 18% decrease in production of molybdenum oxides by the CODELCO Norte Division (table 1; Breakwater Resources Ltd., 2011, p. 1, 6, 17, 21–23; Comisión Chilena del Cobre, 2012, p. 23; Nyrstar NV, 2012, p. 12, 14; Servicio Nacional de Geología y Minería, 2012, p. 53–55).

At 2003 prices, the real value of production by Chile's construction sector increased by about 8% in 2011 compared with about 4% in 2010, and domestic demand for construction materials increased accordingly. In response, production of dimension marble stone increased by about 48% in 2011 compared with that of 2010; gypsum, 21%; cement, 14%; and ball and plastic clays, about 14%. Production of refractory or bauxitic clays increased by about 28% during the same timeframe, likely in response to an increase in domestic demand for refractory materials (bricks) made from bauxitic clays for use in the production of crude steel. After producing substantially more than 40,000 t of phosphorite in 2010, Compañía Minera de Fosfatos Naturales Ltda. did not report any production in 2011. Information concerning a reason for the company's apparent halt in phosphorite production was not available, however, and neither was information available to explain why Chile's production of guano and apatite increased by 92% and about 59%, respectively, during the same timeframe, nor the 26% decrease in the country's production of diatomite (table 1; Cámara Chilena de la Construcción, 2012, p. 77; Servicio Nacional de Geología y Minería, 2011, p. 65–68, 89, 99–104; 2012, p. 60–63, 84, 94–99).

Chile's total production of potash ( $K_2O$  equivalent) decreased by about 11% compared with that of 2010 despite Sociedad Química y Minera de Chile S.A.'s (SQM's) slight increase in the combined production of potassium chloride (KCl) and potassium sulfate ( $K_2SO_4$ ) at the company's dual-use production facilities (with a capacity to produce more KCl in exchange for producing less  $K_2SO_4$ , and vice versa) in the Salar de Atacama. Total production of  $K_2SO_4$  in the country increased dramatically in percentage terms, but this accounted for only a slight increase in the tonnage of  $K_2O$ -equivalent potash production, which was dominated by a 13% decrease in KCl production. In 2011, SQM increased its production of lithium carbonate to about 38,000 t from about 26,000 t in 2010 in response to an increase in global demand (mostly demand for lithium for use in rechargeable batteries). The other major producer of lithium products from the brines of the Salar de Atacama appeared to have increased production of lithium carbonate by about 4,000 t during this same timeframe (tables 1, 2; Servicio Nacional de Geología y

Minería, 2012, p. 77–83; Sociedad Química y Minera de Chile S.A., 2012, p. 5–6, 14–17, 25–26, 29–30, 32–33, 37–39, 49).

In 2011, total production of nitrates decreased by 12% compared with that of 2010, despite SQM increasing its production of crystallized nitrates to about 850,000 t from about 675,000 t in 2010, but information about the production of nitrates by other producers in Chile was not available. Production of salt increased by about 30%, at least partially owing to continuing investment by K+S Aktiengesellschaft (K+S AG) of Germany to increase annual production by its Chilean subsidiary Sociedad Minera Punta de Lobos S.A. by about 1.5 million metric tons per year (Mt/yr). Detailed information was not available concerning the 69% decrease in Chile's production of pyrophyllite, but there was no reported production in Region V of the country in 2011 compared with 435 t of production in the same region in 2010. Information was also not available regarding the main causes of the 29% decrease and the 16% decrease in the country's production of peat and unspecified quartz, respectively, compared with levels of production in 2010 (tables 1, 2; K+S Aktiengesellschaft, 2012, p. 62–63, 107, 141, 145; Servicio Nacional de Geología y Minería, 2012, p. 71, 87, 89, 91–93, 104; Sociedad Química y Minera de Chile S.A., 2012, p. 14–18, 22–26, 30–32, 34–37, 49).

Production of coke was estimated to have increased by 60% to be in accordance with the estimated increase in demand for coke by producers of crude steel in Chile. The country's production of crude petroleum increased by 13% and that of natural gas decreased by about 20%. These changes in production were owing to GeoPark Chile Ltd.'s significant increase in the production of crude petroleum but not of natural gas, and to ENAP's decrease in the production of crude petroleum by 7.9% and production of natural gas by 23% compared with levels of production in 2010. In 2011, Chile's production of methanol decreased by 41% because decreased availability of natural gas for Methanex Corp. to process led the company to idle at least one of its four methanol plants in Chile and to decide to move the plant to Louisiana (tables 1, 2; Empresa Nacional del Petróleo, 2012, p. 81; GeoPark Holdings Ltd., 2012, p. 6, 12, 18–19; Methanex Corp., 2012, p. 3, 6, 12; Servicio Nacional de Geología y Minería, 2012, p. 110–111).

## Structure of the Mineral Industry

In 2011, many of the world's leading private mining companies were deeply invested in the mining sector of Chile. These companies included Anglo American plc and Antofagasta plc of the United Kingdom, Barrick Gold Corp. and Teck Cominco Ltd. of Canada, BHP Billiton Ltd. and BHP Billiton plc of Australia and the United Kingdom (BHP Billiton), Freeport-McMoRan Copper & Gold Inc. of the United States, K+S AG, Rio Tinto Ltd. and Rio Tinto plc of Australia and the United Kingdom (Rio Tinto), and Xstrata plc of Switzerland (table 2).

The leading Chilean-owned companies in the mineral industry were CAP, CODELCO, Molibdenos y Metales S.A. (MOLYMET), and SQM; CAP, MOLYMET and SQM were privately owned. CAP controlled most of the production of



ferrous metals in the country; state-owned CODELCO was the leading copper mining company in the world; SQM was reportedly the leading integrated producer of iodine, lithium carbonate, and potassium nitrate in the world; and MOLYMET was the world's leading producer of rhenium (table 2; CAP S.A., 2012, p. 3, 6, 12–14, 61–62; Corporación Nacional del Cobre, 2012, p. 5, 9; Molibdenos y Metales S.A., 2012, p. 9–10, 32; Sociedad Química y Minera de Chile S.A., 2012, p. 12, 14, 17–20).

In the fourth quarter of 2011, Anglo American completed its project to expand copper production at the company's Los Bronces Mine by about 200,000 metric tons per year (t/yr) of fine copper (to an estimated 450,000 t/yr of copper). In June 2010, CODELCO completed phase I of a project to expand production of copper by the company's Andina Division, which increased mine production capacity within the division by 60,000 t/yr to 270,000 t/yr of fine copper. In 2010 or 2011, CAP merged a company subsidiary Compañía Minera Huasco S.A. (CSH) into its larger mining subsidiary Compañía Minera del Pacífico S.A. (CMP), and MC Inversiones Ltda. acquired a 25% ownership interest in CMP in place of its former 50% interest in CSH. In June 2011, Minera Santa Fe SCM started commercial production at the company's Carmen iron ore mine. By the end of August, Nyrstar NV of Belgium had completed acquisition of Breakwater Resources and El Toqui Mine, which accounted for all the reported production of lead and 81% of zinc production in Chile (table 2; Vidal, 2011, p. 5, 26; Anglo American plc, 2012, p. 3, 12, 19; CAP S.A., 2012, p. 4, 15, 62; Corporación Nacional del Cobre, 2012, p. 27, 52–55; Nyrstar NV, 2012, p. 5, 14; Servicio Nacional de Geología y Minería, 2012, p. 53–55; Minera Santa Fe SCM, undated).

Sociedad Minera Punta de Lobos did not expect to complete the 1.5-Mt/yr salt production capacity expansion at its mine in the Salar Grande de Tarapaca until the end of 2012, and information concerning the intermediate production capacity during 2011 was not available. Consequently, the company's production capacity has not been updated in table 2, although the actual production capacity in 2011 was probably between the 2010 production capacity of 6.5 Mt/yr of salt and the expected capacity by yearend 2012 of 8.0 Mt/yr. During March 2011, SQM commissioned a new potassium nitrate plant at its Coya Sur nitrates processing facilities that increased the production capacity there to 950,000 t/yr of potassium nitrate from 650,000 t/yr in 2010; the company completed expansions of its lithium carbonate facility at the Salar del Carmen to be able to produce 48,000 t/yr of lithium carbonate compared with 43,500 t/yr in 2010; and it increased the capacity of its dual-use potash plant to be able to produce about 850,000 t/yr of K<sub>2</sub>O equivalent, which increased the company's total production capacity in Chile to about 1,075,000 t/yr of K<sub>2</sub>O equivalent. Near the end of 2011, Methanex began its project to disassemble and relocate (to Louisiana) one idle methanol plant with approximately 1 Mt/yr of methanol production capacity, so the company's production capacity in Chile decreased to 2.8 Mt/yr of methanol (table 2; K+S Aktiengesellschaft, 2012, p. 62; Methanex Corp., 2012, p. 6, 11–12, 15–16; Sociedad Química y Minera de Chile S.A., 2012, p. 15–16, 32–38).

## Commodity Review

### Metals

**Copper.**—BHP Billiton reported that the Escondida Mine would be able to produce at a rate of about 1.3 Mt/yr of fine copper by sometime during the second half of 2014 or the first half of 2015 compared with the slightly less than 820,000 million metric tons (Mt) produced in 2011. BHP Billiton also reported that Minera Escondida Ltda. (which was 57.5% owned by BHP Billiton) planned to complete a crusher and conveyor system relocation project to access higher grade ore at the Escondida Mine by the end of 2012. This expansion, combined with the completion of a debottlenecking project to provide additional copper ore processing capacity at the Laguna Seca concentration plant, could enable increased production of copper in concentrates at Escondida by the end of 2013 or sometime in 2014. Antofagasta projected that its new Esperanza Mine could produce 175,000 t of payable copper in 2012 and possibly 180,000 t of copper in 2013, after the mine produced about 97,000 t of copper in 2011 (table 2; Antofagasta plc, 2012, p. 2, 5, 11–12, 30–31; BHP Billiton Ltd., 2012; Bourke, 2012; Comisión Chilena del Cobre, 2012, p. 21).

Anglo American expected Los Bronces Mine to average more than double its level of production (221,800 t of fine copper in 2011) during the first 3 years after expected completion of the ramping up of production by the end of 2012, and to average about 425,000 t/yr of copper production at Los Bronces Mine during the first 10 years after this ramping up of production is completed. In November 2011, Anglo American announced that it intended to sell 24.5% of its ownership interest in Anglo American Sur S.A. (including Los Bronces Mine) to Mitsubishi Corp. of Japan, but this deal was on hold during all of 2011 while litigation was ongoing between Anglo American and CODELCO concerning the potential effects of this proposed sale on CODELCO's option agreement (until January 2027) to be able to acquire up to a 49% interest in Anglo American Sur (table 2; Anglo American plc, 2012, p. 3, 12, 18–19, 70–71, 169–170).

In 2011, the Andina Division produced about 235,000 t of copper compared with about 190,000 t in 2010, and CODELCO set a new company production record of 1,735,200 t of annual copper production compared with producing 1,689,100 t of copper in 2010. In 2011, CODELCO was working on construction of the Ministro Hales Mine near the Chuquicamata Mine in northern Chile and projected that construction would be completed by the end of 2013 and that mining could begin by sometime in 2014. The new mine was expected to eventually be able to produce about 160,000 t/yr of copper and about 300 t/yr of silver. During 2011, the company also continued with a feasibility study of converting the Chuquicamata Mine to an underground mining operation. A definitive timeline for beginning construction of the new underground mine was not available; however, the current open pit operation could stop being profitable sometime before 2020, so the company hoped to begin the underground operation sometime in 2019. After the conversion to an underground operation, the company estimated that the Chuquicamata Mine could produce about 340,000 t/yr

of copper and 18,000 t/yr of molybdenum (Corporación Nacional del Cobre, 2012, p. 6, 10, 24, 27, 52–55, 68–69; Vidal and González, 2012, p. 8, 19, 30–34).

**Iron Ore.**—In 2011, CAP continued with its project to expand the production capacity of Los Colorados Mine, which it expected would increase the mine's current capacity by 2 Mt/yr (to 5.8 Mt/yr) of iron ore. The company also began construction of the new Cerro Negro Norte Mine, which would have a production capacity of about 4 Mt/yr of iron ore. Both projects were expected to be completed by sometime in 2013. A joint venture called Santa Fe Mining (70% owned by JSW Steel Ltd. of India and 30% owned by Minera Santa Fe) was developing the Bellavista iron ore project in Copiapo Province; the owners expected the project to produce about 2.5 Mt/yr of marketable iron ore starting in 2015 (Kumar, 2011; CAP S.A., 2012, p. 40; Vidal and González, 2012, p. 9, 22–23, 48–51; Minera Santa Fe SCM, undated).

### **Industrial Minerals**

**Lithium, Nitrates, and Potash.**—Chile's globally significant production of industrial minerals was highly dependent on the mining of the brine deposits and caliche ores contained in the salars and arid areas, respectively, in the northern part of the country. In 2011, SQM used the flexibility of its dual-use plant to increase  $K_2SO_4$  production dramatically (in percentage terms), but the quantitative increase in tonnage of total potash production ( $K_2O$  equivalent) was not nearly enough to compensate for the 13% decrease in Chile's production of KCl compared with that of 2010. The company continued to invest in expanding its production capacity for potassium products. During 2011, SQM also invested in expanding its production of nitrates, with an aim towards being able to produce more solar salts (a mixture of 60% sodium nitrate and 40% potassium nitrate), which are used as a thermal storage medium in solar-based electricity-generating plants. The brines of the Salar de Atacama contained significant amounts of lithium as well as potassium, and SQM and one other company accounted for almost all (if not all) of the production of lithium carbonate from those brines (tables 1, 2; Sociedad Química y Minera de Chile S.A., 2012, p. 5, 14–18, 20–21, 28–33; Vidal and González, 2012, p. 9, 22–23, 52–53).

### **Reserves and Resources**

The estimates of mineral reserves in Chile in table 3 include proven and probable reserves as of the end of 2011. These data were compiled from company, Government, and other published sources. Table 3 includes SERNAGEOMIN's estimates of Chile's reserves of iodine and nitrates at the end of 2008 only, as this was the latest year for which information on Chile's reserves of these minerals was available from SERNAGEOMIN. The most recent estimate of coal reserves in Chile was also in 2008. Estimates of gold and silver reserves in table 3 include estimated gold and silver content of copper reserves using estimates of grams of gold and silver per metric ton of copper ore contained in some of the major copper porphyry deposits in Chile by Singer and others (2005) and

more recently by the Metals Economics Group (2012) (table 3; Servicio Nacional de Geología y Minería, 2010, p. 47–55).

At the end of 2011, the country was estimated to have the leading reserves of copper, lithium, rhenium, and selenium (tied with Russia) in the world; the second ranked reserves of iodine; and the third ranked reserves of molybdenum and silver. Chile was also estimated to have globally significant (equal to or greater than 5% of the world total) reserves of gold, and a substantial proportion of these gold and silver reserves were associated with the copper reserves at some of the major porphyry copper deposits in the country. Chile was estimated to have accounted for less than 2% of global potash reserves (table 3; Angulo, 2012b; Brooks, 2012b; Edelstein, 2012; George, 2012a, b; Jasinski, 2012; Jaskula, 2012; Polyak, 2012a, b).

### **Outlook**

In a mining survey conducted by Business News Americas Ltda. between October and early December 2011, 45% of survey respondents said that Chile had the best investment climate in Latin America for mining investment. The Fraser Institute's ranking of Chile as a desirable destination for investment by private companies in the mining and quarrying sector was 8th out of 79 jurisdictions worldwide in 2011 compared with 7th out of 72 jurisdictions in 2010. Chile was the only jurisdiction outside of North America that consistently ranked among the top 10 for mining investment in the Fraser Institute's mining survey. Uncertainty owing to labor negotiations, changing tax regimes, uncertainty in output prices, accidents, equipment failures, or even natural hazard incidents (such as earthquakes) is ever present and could affect many of the projected timelines for mining projects or companies' production plans at existing mineral production facilities. Especially for new mining projects that do not yet have a completed feasibility study or do not expect to begin production until 4 to 5 years after an announced timeline, uncertainty can lead to delays in the actual start of production until years after the initially announced startup date (McMahon and Cervantes, 2011, p. 6, 9, 12; Vidal, 2011, p. 3–9; Business News Americas Ltda., 2012; Vidal and González, 2012, p. 3–6).

Chile's production of mined copper could increase to about 5.45 Mt in 2012 (mostly owing to ramping up of production following the expansion at Los Bronces Mine and continued ramping up of production at the Esperanza Mine), 5.6 Mt in 2013 (mostly owing to the continued ramping up of production at ongoing expansions of existing mines and newer mines), and possibly about 5.75 Mt in 2014 (mostly owing to the completion of expansions at the Escondida Mine, and assuming that production at existing mines does not decrease substantially during the next 2 years). The country's production of gold and silver will probably not increase significantly above 2011 levels until Barrick's Pascua-Lama project begins production, which was not expected until sometime in 2014 (Vidal, 2011, p. 10–16; Garay and others, 2012, p. 11; Vidal and González, 2012, p. 15–21, 30–29).

SQM's production of iodine, nitrates, and potash (KCl) could eventually increase by about 11,000 t/yr, 2.5 Mt/yr, and 1.55 Mt/yr above 2011 levels, respectively, but these expansions

were expected to be implemented gradually, possibly extending into 2015. Current Chilean law reportedly limits production of lithium in the Salar de Atacama by Sociedad Chilena del Litio Ltda. to no more than 200,000 t/yr of Li content and by SQM Salar S.A. to no more than 180,000 t/yr of lithium owing to a classification of lithium as a strategic mineral in Chile; neither company appears likely to approach either of these legal production limits in the next few years, however. In 2012 and beyond, production of rhenium could remain at about 24,000 kilograms per year or less because MOLYMET expected that its rhenium production levels could be limited by decreasing rhenium content in the (molybdenum) concentrates that the company processes; production of molybdenum could decrease to about 35,000 t in 2012 (Azzopardi, 2010; Moores, 2010; Vidal and González, 2012, p. 23, 52–53).

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TABLE 1  
CHILE: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2007	2008	2009	2010	2011
METALS					
Arsenic trioxide <sup>e,3</sup>	11,000	10,000	11,000	11,000	10,000
Copper:					
Mine output, Cu content <sup>4</sup>	5,557	5,328	5,394	5,419	5,263
Metal:					
Smelter, primary	1,514	1,369	1,522	1,560	1,364
Refined:					
Electrowon	1,832	1,971	2,118	2,089	2,025
Primary, other	1,105	1,087	1,159	1,155	1,068
Total	2,937	3,058	3,277	3,244	3,093
Gold, mine output, Au content	41,527	39,162	40,834	39,494	45,137
Iron and steel:					
Ore and concentrate:					
Gross weight	8,818	9,316	8,242	9,129 <sup>r</sup>	12,625
Fe content	5,379	5,670	5,006	5,852	7,747
Metal:					
Pig iron	1,147	1,109	923	635	1,130 <sup>e</sup>
Ferroalloys <sup>e,5</sup> :					
Ferrosilicon	193	54	11	184 <sup>r</sup>	35
Ferromolybdenum	14,800	16,900	10,800	12,500	17,200
Steel, crude	1,679	1,523	1,308	1,011	1,620 <sup>e</sup>
Semimanufactures	1,607	1,573	1,286	896	1,500 <sup>e</sup>
Lead, mine output, Pb content	1,305	3,985	1,511	695	841
Manganese ore and concentrate:					
Gross weight	26,808	18,273	5,722	--	--
Mn content	7,287	5,096	1,642	--	--
Mercury <sup>e,6</sup>	NA	NA	88	176	90
Molybdenum, mine output, Mo content	44,912	33,687	34,925	37,186	40,889
Of which, oxides <sup>7</sup>	7,244	5,662	7,134	5,885	4,821
Rhenium, mine output, Re content <sup>e,8</sup>	22,900	27,600	25,000	25,000	24,000
Selenium <sup>c</sup>	70,000	78,000	90,000	90,000	90,000
Silver:					
Mine output, Ag content	1,936	1,405	1,301	1,287	1,291
Metal, Ag content <sup>9</sup>	141,071	161,992	195,375	150,060	166,000 <sup>e</sup>
Zinc, mine output, Zn content	36,453	40,519	27,801	27,662	36,602
INDUSTRIAL MINERALS					
Barite	77	--	--	--	--
Boron compounds:					
Boric acid (H <sub>3</sub> BO <sub>3</sub> )	7,143	7,525	5,214	--	2,898
Ulexite, natural	527,929	583,474	607,921	503,609	488,523
Total	535,072	590,999	613,135	503,609	491,421
Cement, hydraulic	4,440	4,622	3,876	3,871	4,406
Clays:					
Bentonite	533	--	--	--	1,255
Kaolin	87,901	63,526	48,354	62,226	59,912
Refractory (bauxitic)	24,434	60,022	69,634	29,832	38,312
Other, including ball and plastic clays	97,189	23,197	6,076	7,972	9,057
Total	210,057	146,745	124,064	100,030	108,536
Copper sulfate	10,217	12,971	11,860	12,023	11,187
Diatomite	25,405	25,497	23,027	30,925	22,938
Dolomite	13,791	14,263	--	--	1,498
Feldspar	6,704	17,834	9,079	7,723	7,563
Gypsum:					
Crude	773	774	724	758	918
Calcined	200	197	196	184	186

See footnotes at end of table.

TABLE 1—Continued  
CHILE: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2007	2008	2009	2010	2011
INDUSTRIAL MINERALS—Continued					
Iodine, elemental	15,473	15,503	17,399	15,793	16,000 <sup>e</sup>
Lime, hydraulic <sup>c</sup>	840	820	790	790	760
Lithium compounds, natural:					
Lithium carbonate	51,292	48,469	25,154	44,025	59,933
Lithium chloride	4,185	4,362	2,397	3,725	3,864
Lithium hydroxide	4,160	4,050	2,987	5,101	5,800 <sup>e</sup>
Nitrates, crude, natural	1,161 <sup>f</sup>	1,158	1,049	1,059	928
Peat, horticultural use	--	--	768	1,343	958
Phosphatic materials, natural:					
Phosphate rock (apatite):					
Gross weight	12,910	21,306	10,584	9,019	14,304
P <sub>2</sub> O <sub>5</sub> content <sup>e</sup>	3,980	6,570	3,260	2,780	4,410
Phosphorite	12,163	16,988	1,059	40,664	--
Guano	--	2,892	1,649	845	1,625
Potash, natural:					
Potassium chloride, KCl	690,692	753,995	942,309	1,523,222	1,328,504
Of which, K <sub>2</sub> O equivalent <sup>10</sup>	436,300	476,300	595,300	962,200	839,200
Potassium sulfate, K <sub>2</sub> SO <sub>4</sub>	155,853	163,096	188,643	2,774	43,185
Of which, K <sub>2</sub> O equivalent <sup>e,11</sup>	79,000	83,000	96,000	1,400	22,000
Pumicite	1,135,771	1,063,176	919,249	824,049	816,565
Pyrophyllite	1,340	1,147	412	1,126	349
Salt (NaCl)	4,404	6,431	8,382	7,695	9,966
Siliceous sand and gravel (silica):					
Quartz, unspecified	520	536	601	502	422
Silica sand	713	865	803	825	814
Total	1,234	1,401	1,405	1,326	1,237
Sodium compounds, n.e.s., sulfate <sup>12,13</sup>	100 <sup>c</sup>	128	112	60	--
Stone:					
Limestone, calcium carbonate	7,196	7,295	6,012	6,518	6,270
Of which:					
Coquina	392	420	297	329	391
Ground calcium carbonate, white	15	34	46	48	45
Lapis lazuli	72	5	215	--	--
Marble	204	187	1,582	2,170	3,201
Travertine	14,805	11,413	5,473	4,015	4,117
Sulfur, byproduct <sup>14</sup>	1,559	1,586 <sup>f</sup>	1,658 <sup>f</sup>	1,686 <sup>f</sup>	1,723
Talc	764	961	790	238	--
Zeolites	280	140	--	--	94
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous and lignite, marketable	288	534	636	619	654
Coke, coke oven <sup>c</sup>	580	520	450	350	560
Methanol	1,841	1,088	942	935	554
Natural gas, marketable	2,015	1,828	1,889	1,793	1,440
Petroleum:					
Crude and condensate <sup>15</sup>	931	966	1,355	1,536	1,741
Refinery products: <sup>16</sup>					
Liquefied petroleum gas	8,246	7,674	8,560	7,787	7,529
Gasoline, including for aviation	18,725	21,687	21,121	17,549	18,957
Kerosene, including for jet fuel	4,862	4,573	5,271	4,994	4,988
Diesel and distillate fuel oil	24,040	27,549	25,751	21,738	23,694
Residual fuel oil	16,310	12,756	11,177	9,202	8,737
Other, including asphalt, ethylene, naphtha, propylene, solvents, and so forth	10,032	8,334	7,875	5,862	6,277
Total	82,215	82,573	79,755	67,131	70,182

See footnotes at end of table.

TABLE 1—Continued  
CHILE: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

<sup>2</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>1</sup>Revised. do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through August 31, 2012.

<sup>2</sup>In addition to the commodities listed, pyrite is also produced, but available information is inadequate to make reliable estimates of output.

<sup>3</sup>Estimated arsenic trioxide equivalent of possible arsenic-containing residues and smelter dusts that might be recovered from nonferrous metals plants in Chile, although these residual materials may not have been processed to recover commercial-grade arsenic trioxide.

<sup>4</sup>Figures are the nonduplicate copper content of ore concentrates, blister, and refined copper measured at the last stage of commercial production, as reported by Comisión Chilena del Cobre (COCHILCO). Mine production reported by Servicio Nacional de Geología y Minería (SERNAGEOMIN) for the same years was only slightly higher (0.01% to 0.95%).

<sup>5</sup>Estimated from reported net exports.

<sup>6</sup>Data represent only U.S. imports from Chile. Source: U.S. International Trade Commission, Interactive Tariff and Trade DataWeb, Version 3.1.0

<sup>7</sup>Production of molybdenum oxide only from the CODELCO Norte Division of Corporación Nacional del Cobre de Chile (CODELCO).

<sup>8</sup>Rhenium content of mine output in Chile was estimated based on information from COCHILCO.

<sup>9</sup>Production of refined silver metal (granular) only from the Ventanas smelter and refinery.

<sup>10</sup>Based on 63.17% potassium oxide equivalent for potassium chloride (sylvite) in Chile, as reported by SERNAGEOMIN, and rounded to four significant digits.

<sup>11</sup>Based on an assumed 51% potassium oxide equivalent for potassium sulfate, according to a minimum global average estimate and rounded to two significant digits. Source: Jasinski, S.M., 2012, Potash, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2010, v. I, p. 58.1–58.9.

<sup>12</sup>Not elsewhere specified.

<sup>13</sup>Includes production of natural sodium sulfate and anhydrous sodium sulfate, which are coproducts of the nitrate industry (salitre).

<sup>14</sup>Sulfur content of sulfuric acid as a byproduct of metallurgy and processing of mineral fuels, as reported by COCHILCO.

<sup>15</sup>Includes natural gasoline.

<sup>16</sup>Includes production from both imported and domestic petroleum, as reported by Empresa Nacional del Petróleo (ENAP).

TABLE 2  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Barite metric tons	Sociedad Minera Godoy Schwenger y Cia.	La Calera, Region V	400
Bentonite do.	Sociedad Legal Minera Mabel Dos Primera de Arica	Quarry and plant near Arica, Region XV	1,500
Boron compounds, B <sub>2</sub> O <sub>3</sub> content	Química Industrial del Bórax Ltda. (private, Chile-based investors, 100%)	Ulexite mine at Salar del Surire; and boric acid and agrochemical plants near Arica, Region XV	550
Do.	S.Q.M. Boratos S.C.M. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Mine brines of Atacama Salar, and boric acid plant at Antofagasta, Region II	200
Do.	S.Q.M. Salar S.A. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Plant in Santiago Metropolitan Region	NA
Calcium carbonate, natural	Minera El Way S.A. (Cementos Bio Bio S.A., 100%)	Quarry near Antofagasta, Region II	NA
Do.	Minera El Jilguero S.A. (Cementos Bio Bio S.A., 100%)	Quarry near Copiapo, Region III	NA
Do.	Minera Río Teno S.A. (Cementos Bio Bio S.A., 100%)	Quarry and plant at Teno, near Curico, Region VII	NA
Do.	Minera Río Colorado S.A (Cementos Bio Bio S.A., 51%, and Soprocal Calerías e Industrias S.A., 49%)	La Perla Mine and plant near Melipilla, Santiago Metropolitan Region	NA
Do.	Sociedad Minera Las Abuelitas Ltda. (Soprocal Calerías e Industrias S.A., 100%)	Mine and plant near Melipilla, Santiago Metropolitan Region	NA
Do.	Minera Melón S.A. (Melón S.A., 100%)	Navío Mine near Quillota, Region V	NA
Do.	Alfredo Villalobos Román Tarsicio S.A.	Quarry and plant near Illapel, Region IV	NA
Do.	César B. Formas Ortiz S.A.	Plant at Chañaral, Region III	NA
Do.	Explotaciones de Minas Tongoy Ltda.	Quarry and plant near Tongoy, Region IV	NA
Do.	Imopac Ltda.	Plant at Vallenar, Region III	NA
Do.	Mario Alberto Pizarro A. S.A.	Plant at Los Vilos, Region IV	NA
Do.	Minera Trucco Ltda.	Mine and plant, Santiago Metropolitan Region	NA
Do.	Cristalerías Toro S.A.I.C.	Plant at Santiago, Santiago Metropolitan Region	NA
Do.	Sociedad Minera Godoy Schwenger y Cia.	Mine and plant near Quillota, Region V	NA
Do.	Compañía Minera Feltre Ltda.	Plant at Santiago, Santiago Metropolitan Region	NA
Do.	Compañía Minera Saturno Ltda.	do.	NA
Do.	Unimin Chile Ltda.	do.	NA
Do.	Sociedad Minera y Comercial Alegría y Cia Ltda.	Mine and plant at Coquimbo, Region IV	NA
Do.	Sociedad Contractual Minera Pirineos	Quarry and plant at Vallenar, Region III	NA
Do.	Cemento Polpaico S.A. (Holcim Ltd., 54.3%; Compañía de Consumidores de Gas de Santiago, 40.9%; other, 4.8%)	Cerro Blanco plant, Santiago Metropolitan Region; Mejillones plant, Region II; Coronel plant, Region VIII	NA
Cement	do.	do.	2,700 <sup>1</sup>
Do.	Melón S.A. (Inversiones Brescia S.A., 99.24%, and other private, 0.76%)	La Calera plant, Region V, and grinding plant at Puerto Montt, Region X	1,800 <sup>1</sup>
Do.	Cementos Bio Bio S.A. (private, 100%)	Talcahuano Plant, Region VIII	750 <sup>1</sup>
Do.	do.	Grinding plant at San Antonio, Region V	300 <sup>1</sup>
Do.	Industria Nacional de Cemento S.A. (INACESA), 100%	Plant near Antofagasta City, Region II	500 <sup>1</sup>
Do.	do.	Plant near Curico City, Region VII	1,700 <sup>1</sup>
Clays, unspecified	Sociedad Minera Casablanca S.A.	Quarry and plant in Santiago Metropolitan Region	NA
Do.	Sociedad Minera Godoy Schwenger y Cia.	Quarry and plant near Quillota, Region V	NA
Do.	Minera Lealtad Ltda.	Quarry and plant at Til Til, Santiago Metropolitan Region, and at Olmue, Region V	NA
Coal, bituminous and lignite	Empresa Nacional del Carbón S.A. (ENACAR)	Trongol Mine near Curanilahue, and plant at Lota, Region VIII	NA
Do.	Carbonifera Victoria de Lebu S.A. (Empresa Nacional del Carbón S.A., 100%)	La Fortuna de Lebu Mine near Lebu, Region VIII	150
Do.	Ingeniería del Sur S.A.	Bish Mine and possibly other active mines, Pecket deposit, Magallanes coal basin, Region XII	600
Copper, Cu content	Minera Escondida Ltda. (BHP Billiton plc, 57.5%; Rio Tinto plc, 30%; Japan Escondida Corp., 10%; International Finance Corp., 2.5%)	Escondida open pit mine, two concentrator plants, an oxide plant for cathode production (SX-EW <sup>2</sup> ), and a sulfide-leach plant for cathode production, Region II	1,200
Do.	Minera Spence S.A. (BHP Billiton plc, 100%)	Spence Mine and SX-EW <sup>2</sup> plant, Region II	200 <sup>1</sup>

See footnotes at end of table.



TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Copper, Cu content— Continued	Compañía Minera Cerro Colorado (BHP Billiton plc, 100%)	Cerro Colorado Mine and SX-EW <sup>2</sup> plant, Region I	120 <sup>1</sup>
Do.	Compañía Minera Doña Inés de Collahuasi SCM (Anglo American plc, 44%; Xstrata plc, 44%; companies led by Mitsui & Co. Ltd., 12%)	Collahuasi open pit mine, concentration plant, and SX-EW <sup>2</sup> plant, at Ujina, Region I	590 <sup>1</sup>
Do.	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	CODELCO Norte Division, including Chuquicamata, Mina Sur, and Radomiro Tomic Mines; and Chuquicamata SX-EW <sup>2</sup> plant (oxide), smelter, and refinery (oxide and sulfide), and Radomiro Tomic SX-EW <sup>2</sup> plant, Region II	900
Do.	do.	El Teniente Division and Mine, and Caletones smelter (anodes) and refinery (fire-refined ingots), Region VI	430
Do.	do.	Ventanas Division, Las Ventanas smelter and refinery (cathodes), Region V	400
Do.	do.	Andina Division, including Rio Blanco and Sur Sur Mines (concentrates), Region V	270
Do.	do.	Salvador Division, including Campamento Antiguo and Damiana Norte open pit mines; Inca underground mine; and Potrerillos SX-EW <sup>2</sup> plant and refinery, Region III	80
Do.	Minera Gaby S.A. [Corporación Nacional del Cobre (CODELCO) (Government, 100%), 100%]	Gabriela Mistral Mine and SX-EW <sup>2</sup> plant, Sierra Gorda, Region II	150 <sup>1</sup>
Do.	Compañía Minera Los Pelambres S.A. (Antofagasta plc, 60%, and a Japanese consortium, 40%)	Los Pelambres open pit mine and concentration plant, Region IV	340
Do.	Minera Esperanza S.A. (Antofagasta plc, 70%, and Marubeni Corp., 30%)	Esperanza sulfides mine and milling/flotation plant, Region II	175
Do.	Minera El Tesoro S.A. (Antofagasta plc, 70%, and Marubeni Corp., 30%)	El Tesoro open pit mine and SX-EW <sup>2</sup> plant, Region II	100
Do.	Minera Michilla S.A. (Antofagasta plc, 74.2%, and other private Chilean investors, 25.8%)	Michilla Mine and SX-EW <sup>2</sup> /sulfide-leaching plant, Region II	45
Do.	Empresa Nacional de Minería (ENAMI) (Government, 100%)	Hernán Videla Lira smelter (anodes and blister), Paipote, Region III	340
Do.	do.	Concentration plants: Manuel Antonio Matta, Paipote; Osvaldo Martínez, El Salado; and Vallenar, Region III; and José Antonio Moreno, Taltal, Region II	180
Do.	Anglo American Sur S.A. (Anglo American plc, 100%)	Los Bronces Mine (concentrates) and Tortolas SX-EW <sup>2</sup> plant (cathodes), Santiago Metropolitan Region	450
Do.	do.	Chagres smelter (anodes and blister), Region V	175
Do.	do.	El Soldado Mine (concentrates), Region V	50
Do.	Empresa Minera de Mantos Blancos S.A. (Anglo American plc, 99.9%, and other private, 0.1%)	Mantos Blancos open pit mine and SX-EW <sup>2</sup> plant, Region II	100
Do.	do.	Mantoverde open pit mine and SX-EW <sup>2</sup> plant, Region III	65
Do.	Xstrata Copper Chile S.A.	Altonorte smelter (anodes and blister), La Negra, Region II	280 <sup>1</sup>
Do.	Compañía Minera Xstrata Lomas Bayas (Xstrata plc, 100%)	Lomas Bayas Mine and SX-EW <sup>2</sup> plant, Region II	75 <sup>1</sup>
Do.	Sociedad Contractual Minera El Abra [Freeport-McMoRan Copper & Gold Inc., 51%, and Corporación Nacional del Cobre (CODELCO) (Government, 100%), 49%]	El Abra Mine and SX-EW <sup>2</sup> plant, near Calama, Region II	225 <sup>1</sup>
Do.	Cía. Contractual Minera Candelaria (Freeport-McMoRan Copper & Gold Inc., 80%, and SMMA Candelaria Inc., 20%)	Candelaria open pit mine, underground mine, and concentration plant, near Copiapo, Region III	150

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Copper, Cu content— Continued		Cía. Contractual Minera Ojos del Salado (Freeport-McMoRan Copper & Gold Inc., 80%, and SMMA Candelaria Inc., 20%)	Ojos del Salado Mine and concentration plant, near Copiapo, Region III	35
Do.		Compañía Minera Zaldívar (Barrick Gold Corp., 100%)	Zaldívar open pit mine and SX-EW <sup>2</sup> plant, Region II	150
Do.		Compañía Minera Quebrada Blanca [Teck Cominco Ltd., 76.5%; Inversiones Mineras S.A., 13.5%; Empresa Nacional de Minería (ENAMI) (Government, 100%), 10%]	Quebrada Blanca open pit mine and SX-EW <sup>2</sup> plant, Region I	100
Do.		Minera Valle Central S.A. (Amerigo Resources Ltd., 100%)	Facilities near Rancagua, Region VI, to process tailings of the Collahuasi and El Teniente Mines	30
Do.		Compañía Minera Carmen de Andacollo [Teck Cominco Ltd., 90%, and Empresa Nacional de Minería (ENAMI) (Government, 100%), 10%]	Carmen de Andacollo Mine and SX-EW <sup>2</sup> plant, Region IV	22
Do.		Alliance Copper Ltd. (Codelco Technologies Ltd., 100%)	Plant to acid-leach fine copper at Chuquicamata, Region II (from residual material produced at CODELCO Norte and El Teniente Divisions)	20
Copper sulfate	metric tons	Compañía Minera Cerro Negro	Portales Mine and a plant at Cabildo, Region V	200
Do.	do.	Minera Capacho Viejo Ltda.	Mine and plant near Tocopilla, Region II	5,000
Do.	do.	Compañía Minera San Gerónimo	Mine and plant near Coquimbo, Region IV	10,000
Diatomite		Celite Chile Ltda. (IMERYS S.A., 100%)	Plant at Port of Arica, and mining operations nearby in Regions I and XV	30
Dolomite		Minera El Jilguero S.A. (Cementos Bio Bio S.A., 100%)	Quarries and plant near Copiapo, Region III	30
Feldspar		Minera Alfa Quintay Ltda.	Quarry and plant, Santiago Metropolitan Region	NA
Do.		J.B. Schiappacase A.	Quarry and plant near Limache, Region V	NA
Do.		Minera Pacífico Ltda.	Quarries and plants in Region VI, and plant in Santiago Metropolitan Region	NA
Ferromolybdenum		Molibdenos y Metales S.A. (MOLYMET) (private, 100%)	Nos plant, San Bernardo, 30 kilometers south of Santiago, Santiago Metropolitan Region	25
Gold:				
Metal ingots	kilograms	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas refinery, Region V	6,000
Mine output	do.	do.	Andina, CODELCO Norte, El Teniente, and Salvador Divisions (byproduct of copper production)	2,000
Do.	do.	Minera Escondida Ltda., 100%	Escondida copper mine and plants, Region II	4,500
Do.	do.	Cía. Contractual Minera Candelaria, 100%	Candelaria copper mine and plant, Region III	2,500
Do.	do.	Cía. Contractual Minera Ojos del Salado, 100%	Ojos del Salado copper mine and plant, Region III	600
Do.	do.	Compañía Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Region IV	1,200
Do.	do.	Empresa Nacional de Minería (ENAMI) (Government, 100%)	Manuel Antonio Matta plant, Paipote; Osvaldo Martínez plant, El Salado; and Vallenar plant, Region III; and José Antonio Moreno plant, Taltal, Region II	400
Do.	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and plants, Region I	NA
Do.	do.	Compañía Minera Mantos de Oro (Kinross Gold Corp., 100%)	La Coipa Mine and plant, Region III, 140 kilometers north of Copiapo	7,400
Do.	do.	Compañía Minera Maricunga (Kinross Gold Corp., 100%)	Maricunga open pit, heap-leach mine, Region III, 100 kilometers east of Copiapo	7,500
Do.	do.	Cía. Minera Meridian S.A. (Yamana Gold Inc., 100%)	El Peñón Mine and concentration plant, Region II	7,000
Do.	do.	Minera Esperanza S.A. (Antofagasta plc, 70%, and Marubeni Corp., 30%)	Esperanza sulfides mine and milling/flotation plant, Region II	8,000
Do.	do.	Minera Florida S.A. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	2,700
Do.	do.	Compañía Minera Cerro Bayo Ltda. (Mandalay Resources Corp., 100%)	Cerro Bayo Mine and concentration plant, Region XI	1,000
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	1,500

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Gypsum, natural		Compañía Industrial El Volcán S.A. (Saint-Gobain Gypsum S.A., 100%)	El Volcan quarry near Santiago, Santiago Metropolitan Region	100
Do.		Compañía Minera Romeral S.A. (Etex Group S.A., 59.8%, and Melón S.A., 40.2%)	El Romeral quarry near Santiago, Santiago Metropolitan Region	50
Do.		Minera Lo Valdés Ltda.	Santiago Metropolitan Region	NA
Do.		Compañía Minera Polpaico Ltda.	Yeso Norte Mine, Region II	NA
Do.		Industria Nacional de Cemento S.A. (INACESA), 100%	Mantos verdes quarry near Antofagasta City, Region II	NA
Do.		Antonio Zotti Rosetti y Cía. Sociedad Minera	La Confianza and San Jose Mines near Los Vilos, Region IV; Margarita and San Nicolas Mines, and a plant near Renca, Santiago Metropolitan Region	NA
Iodine	metric tons	SQM Químicos S.A. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Nueva Victoria Mine and plant and Iris Plant, Region I; El Toco Mine and María Elena plant; and Pampa Blanca and Pedro de Valdivia Mines and plants, Region II	11,000 <sup>1</sup>
Do.	do.	Sociedad Contractual Minera Cosayach (Inverraz S.A., 100%)	Mine and plant near Iquique, Region I	3,000
Do.	do.	Atacama Minerals Chile Sociedad Contractual Minera (Atacama Minerals Corp., 100%)	Mine and plant in Aguas Blancas, Region II	1,100
Do.	do.	ACF Minera S.A.	Lagunas mine and plant near Iquique, Region I	1,400
Iron ore		Compañía Minera del Pacífico S.A. (CMP) (CAP S.A., 75%, and MC Inversiones Ltda., 25%)	Cristales and El Algarrobo Mines, El Algarrobo and Huasco concentration plants, Huasco pellet plant, and Los Colorados Mine and concentration plant, Region III; El Romeral and El Tofo Mines, and El Romeral concentration and pellet-feed plants, Region IV; and El Laco concentration plant, Region II	9,000
Do.		Minera Santa Fe SCM, 100%	Carmen Mine, near Copiapo, Region III	2,000
Do.		Sociedad Contractual Minera Vallenar Iron Co. (Admiralty Resources NL, 100%)	Japonesa and Japonesita Mines, near Vallenar, Region III	2,000
Kaolin		Compañía Minera Polpaico Ltda.	El Guindo Mine and a plant in the Santiago Metropolitan Region	NA
Do.		Minera Lealtad Ltda.	Mine and plant at Til Til, Santiago Metropolitan Region	NA
Do.	metric tons	Mario Alberto Pizarro A.S.A.	Plant at Los Vilos, Region IV	600
Lapis lazuli	do.	Las Flores de los Andes S.A.	Mine near Ovalle, Region IV	400
Lead, mine output	do.	Minera Florida S.A. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	NA
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	3,000
Lime, hydraulic		Industria Nacional de Cemento S.A. (INACESA) (Cementos Bio Bio S.A., 100%)	Plants near Antofagasta City, Region II, and near Copiapo City, Region III	880 <sup>1</sup>
Do.		Soprocal Calerías e Industrias S.A.	Plant at Melipilla, Santiago Metropolitan Region	165
Lithium carbonate	metric tons	Sociedad Chilena del Litio Ltda. (subsidiary of Chemetall GmbH, owned by Rockwood Holdings Inc., 100%)	Chemetalle Foote plant at La Negra, near the city of Antofagasta, Region II	26,000
Do.	do.	SQM Salar S.A. [subsidiary of Sociedad Química y Minera de Chile S.A. (SQM)] (private, 100%)	Plant at Salar del Carmen, near the city of Antofagasta, Region II	48,000 <sup>1</sup>
Lithium chloride	do.	do.	do.	NA
Lithium hydroxide	do.	do.	do.	6,000 <sup>1</sup>
Manganese	do.	Manganesos Atacama S.A. (subsidiary of CAP S.A.)	Plant in Coquimbo city and mines in Region IV <sup>3</sup>	10,000
Marble, dimension stone	do.	Pier Luigi Indri S.A.	Quarry at Cerrillos, Region III	250
Do.	do.	Compañía Minera Feltre Ltda.	Quarry and plant in Region III	1,400
Methanol		Methanex Chile S.A. (Methanex Corp.)	3 methanol plants at Cabo Negro, near Punta Arenas City, Region XII	2,800

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Molybdenum, mine output	metric tons	Anglo American Sur S.A., 100%	Los Bronces Mine and Tortolas molybdenum flotation plant, Santiago Metropolitan Region	3,000
Do.	do.	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	CODELCO Norte Division, Region II	20,000
Do.	do.	do.	El Teniente Mine and plant, Region VI	5,500
Do.	do.	do.	Andina Division, Region III	2,500
Do.	do.	do.	El Salvador Division, Region III	1,500
Do.	do.	Compañía Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Region IV	8,500
Do.	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and molybdenum plant, Region I	4,000
Molybdenum concentrate, Mo content	do.	Minera Valle Central S.A. (Amerigo Resources Ltd., 100%)	Facilities near Rancagua, Region VI, to process tailings of the Collahuasi and El Teniente Mines	400 <sup>e</sup>
Molybdenum oxide, Mo content	do.	Molibdenos y Metales S.A. (MOLYMET) (private, 100%)	Nos plant, San Bernardo, 30 kilometers south of Santiago, Santiago Metropolitan Region	45,000
Do.	do.	do.	Molynor plant, Mejillones, Region II	15,000
Do.	do.	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	CODELCO Norte Division, Region II	7,500
Natural gas	million cubic meters	Empresa Nacional del Petróleo (ENAP) (Government, 100%)	About 23 oilfields, including Costa Auera, in the Magallanes basin, Region XII	2,200
Do.	do.	GeoPark Chile Ltd. (operator) (GeoPark Holdings Ltd., 100%)	Oilfields and gasfields and the Kimiri Aike natural gas plan on the Fell block, Magellan or Austral Basin, Region XII	380
Nitrates:				
Primarily sodium nitrate		SQM Nitratos S.A. [subsidiary of Sociedad Química y Minera de Chile S.A. (SQM)] (private, 100%)	El Toco Mine and Maria Elena plant; Pampa Blanca and Pedro de Valdivia Mines and plants; and Coya Sur plant, Region II	770 <sup>1</sup>
Primarily potassium nitrate		do.	do.	950 <sup>1</sup>
Nitrates, in fertilizers		Cosayach Nitratos S.A. (Inverraz S.A., 100%)	Mine and plant near Iquique, Region I	200
Do.		SQM Industrial S.A.	Mine and plant near Santiago, Region II	100
Do.		ACF Minera S.A.	Lagunas Mine and plant near Iquique, Region I	NA
Petroleum	thousand 42-gallon barrels	Empresa Nacional del Petróleo (ENAP) (Government, 100%)	About 23 oilfields, including Costa Auera, in the Magallanes basin, Region XII	6,500
Do.	do.	GeoPark Chile Ltd. (operator) (GeoPark Holdings Ltd., 100%)	Oil and gas fields in the Fell block, Magellan or Austral Basin, Region XII	800
Petroleum refinery products	do.	Empresa Nacional del Petróleo (ENAP) (Government, 100%)	Aconcagua, Bio Bio, and Gregorio refineries	90,000
Phosphatic materials, natural:				
Guano		Guano Rojo Punta Gruesa Ltda.	Mine and plant near Iquique, Region I	3
Phosphate rock, apatite		César B. Formas Ortiz S.A.	Mine near Chanaral, Region II	20
Do.		Compañía Minera El Sauce Ltda.	Mine near La Serena, Region IV	5
Phosphorite		Compañía Minera de Fosfatos Naturales Ltda. (Bifox Ltda.) (TEHMCORP S.A., 100%)	Mines at and around Bahía Inglesa; Osorno plant near Bahía Inglesa, Region III; and Bahía Inglesa plant at Caldera, Region IV	45
Do.		Sociedad Contractual Minera Bahía Inglesa	Selaqueos Mine near Bahía Inglesa, Region III	NA
Pig iron		Cía. Siderúrgica Huachipato S.A. (subsidiary of CAP S.A.) (private, 100%)	Plant in Bahía de San Vicente, Region VIII, 14 kilometers northeast of Concepcion	1,200
Potash (KCl and K <sub>2</sub> SO <sub>4</sub> ), K <sub>2</sub> O content		SQM Salar S.A. [subsidiary of Sociedad Química y Minera de Chile S.A. (SQM)] (private, 100%)	A dual-use plant and 3 KCl plants at Salar del Carmen, near the city of Antofagasta, Region II	1,075
Do.		Sociedad Chilena del Lito Ltda. [Chemetal GmbH (Rockwood Holdings Inc., 100%), 100%]	Chemetal Foote plant at La Negra, near the city of Antofagasta, Region II	50
Potassium chloride (KCl)		Sociedad Contractual Minera Virginia (Inverraz S.A., 100%)	Mine and plant near Iquique, Region I	NA
Do.		ACF Minera S.A.	Lagunas Mine and plant near Iquique, Region I	NA

See footnotes at end of table.



TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Pumicite, including pozzolan		Empresas El Melón S.A.	Quarry at Rinconada Lo Vial near Maipu, and plant at Santiago, Santiago Metropolitan Region	1,200
Do.		Compañía Minera Polpaico Ltda.	Puzolana Norte Mine, Region II; and Puzolana Pudahuel Mine and a plant in the Santiago Metropolitan Region	NA
Do.		Minera Río Teno S.A. (Cementos Bio Bio S.A., 100%)	Quarry and plant near Curico, Region VI	200
Do.		Minera El Way S.A. (Cementos Bio Bio S.A., 100%)	Quarries and plant near Antofagasta, Region II	100
Do.		Harborlite Chile Ltda. (IMERYS S.A., 100%)	Laguna del Maule Mine at Talca, Region VII, and plant at Santiago, Santiago Metropolitan Region	NA
Pyrophyllite	metric tons	Sociedad Minera Godoy Schwenger y Cia.	Mine and plant near La Calera, Region V	1,800
Do.	do.	José Orrego Bugueño S.A.	Mine and plant near Chincolco, Region V	1,000
Do.	do.	Mario Alberto Pizarro A. S.A.	Plant at Los Vilos, Region IV	1,000
Rhenium, metal	kilograms	Molibdenos y Metales S.A. (MOLYMET) (private, 100%)	Nos plant, San Bernardo, 30 kilometers south of Santiago, Santiago Metropolitan Region	30,000
Salt, NaCl		Sociedad Minera Punta de Lobos S.A. (K+S Aktiengesellschaft, 100%)	Open pit mine in the Salar Grande de Tarapaca, Region I, and port facilities at Puerto Patillos	6,500 <sup>1</sup>
Do.		Benjamín Nuñez Ltda.	Mine near Iquique, Region I	NA
Do.		Inversiones Alpina Ltda.	Mine in the Salar Grande Irlanda and plant at Iquique Region I	NA
Do.		Playa Grande Ltda.	Mine in Region I	NA
Do.		José Álvarez Jara Ltda.	do.	NA
Do.		Christian Fletcher Ltda.	do.	NA
Do.		Eliás Echeverría Ltda.	do.	NA
Do.		Cía. Minera Cordillera Chile S.C.M.	do.	NA
Selenium	metric tons	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas smelter and refinery, noble metals plants, Region V (byproduct of copper production)	95
Silica, quartz		Cedric Fernández y Compañía Ltda.	Mine and plant near Calama, Region II	100
Do.		Antonio Zotti Rosetti y Cia. Sociedad Minera	La Confianza and San Jose Mines near Los Vilos, Region IV; Margarita and San Nicolas Mines, and a plant near Renca, Santiago Metropolitan Region	20
Do.		Minera Granos Industriales Ltda.	El Turco Mine and Migrin Plant near Cartagena, Region V	250
Do.		Productora Cuarzo El Peral Ltda.	El Peral Mine and plant near Cartagena, Region V	250
Do.		Minera Alfa Quintay Ltda.	Quarry and plant, Santiago Metropolitan Region	30
Do.		Minera Pacífico Ltda.	do.	NA
Do.		Sociedad Legal Minera Pedro Luis	Mine and plant near Copiapo, Region III	120
Do.		Minera San Pedro Ltda.	Natacha Mine and El Rulo plant at Til-Til, Santiago Metropolitan Region	30
Do.		SLM Santa Dorila de las Arenitas	Mine and plant at Constitucion, Region VII	250
Do.		Cristalerías Toro S.A.	Mine at Rancagua, Region VI	120
Do.		Vidrios Lirquén S.A.	Mine and glass plant at Lirquen, Region VIII	80
Do.		Minera Arsil S.A.	Mine and plant at Concepcion, Region VIII	50
Silver:				
Metal grains	kilograms	Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas refinery, Region V	220,000
Mine output	do.	do.	Andina, CODELCO Norte, El Teniente, and Salvador Divisions	300,000
Do.	do.	Compañía Minera Mantos de Oro (Kinross Gold Corp., 100%)	La Coipa Mine and plant, Region III, 140 kilometers north of Copiapo	200,000
Do.	do.	Cía. Minera Meridian S.A. (Yamana Gold Inc., 100%)	El Peñón Mine and concentration plant, Region II	320,000
Do.	do.	Minera Florida S.A. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	25,000
Do.	do.	Minera Escondida Ltda., 100%	Escondida copper mine and plants, Region II	180,000
Do.	do.	Empresa Nacional de Minería (ENAMI) (Government, 100%)	Manuel Antonio Matta plant, Paipote; Osvaldo Martínez plant, El Salado; Vallenar plant, Region III; and José Antonio Moreno plant, Taltal, Region II	6,000
Do.	do.	Compañía Minera Cerro Bayo Ltda. (Mandalay Resources Corp., 100%)	Cerro Bayo Mine and concentration plant, Region XI	60,000

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>c</sup>
Silver—Continued				
Mine output— Continued	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and plants, Region I	60,000
Do.	do.	Compañía Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Region IV	42,000
Do.	do.	Anglo American Sur S.A., 100%	Los Bronces Mine and plants, Santiago Metropolitan Region	35,000
Do.	do.	Cía. Contractual Minera Candelaria, 100%	Candelaria Mine and concentration plant, Region III	30,000
Do.	do.	Cía. Contractual Minera Ojos del Salado, 100%	Ojos del Salado copper mine and plant, Region III	4,500
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	11,000
Sodium sulfate	metric tons	SQM Químicos S.A. [Sociedad Química y Minera de Chile S.A. (SQM), 100%]	Nueva Victoria Mine, Region I, and Maria Elena Mine and Coya Sur plant, Region II	80,000
Do.	do.	Sociedad Legal Minera Santa Inés Uno de Antofagasta	Santa Ines Mine near Antofagasta, Region II	150
Steel, crude		Cía. Siderúrgica Huachipato S.A. (subsidiary of CAP S.A.) (private, 100%)	Primary plant in Talcahuano and plant in Rengo, Region VIII	1,450
Do.		Gerdau AZA S.A.	Steel plants in Renca and Colina, Santiago Metropolitan Region	520
Sulfuric acid		Xstrata Copper Chile S.A. (Xstrata plc, 100%)	Altonorte smelter, Region II	900 <sup>1</sup>
Do.		Anglo American Sur S.A. (Anglo American plc, 100%)	Chagres smelter, Region V	500
Do.		Corporación Nacional del Cobre (CODELCO) (Government, 100%)	Ventanas sulfuric acid plant, Region V	370
Do.		do.	Caletones plant, Region VI	1,000
Do.		do.	Chuquicamata plant, Region II	500
Do.		do.	Portrerillos plant, Region III	100
Do.		Empresa Nacional de Minería (ENAMI) (Government, 100%)	Hernán Videla Lira smelter, Paipote, Region III	290
Talc	metric tons	Sociedad Talco Eduardo Martín Abejón Ltda.	Mines near Constitucion, Region VII, and plant at Santiago, Santiago Metropolitan Region	1,000
Do.	do.	Minera Trucco Ltda.	Mine and plant near Santiago, Santiago Metropolitan Region	NA
Travertine, dimension stone	do.	Mármoles San Marino Chile S.A. (Grupo San Marino S.A., 100%)	Quarry near Calama, Region II, and plant in Til-Til, Santiago Metropolitan Region	7,000
Do.	do.	Andes Travertine & Stones S.A.	Quarry and plant in Region II	NA
Do.	do.	Canteras de Atacama S.A.	Quarry and plant at Calama, Region II	6,000
Zeolites	do.	Sociedad Legal Minera Serrín Tercera	Serrín Tercera Mine and Remulcao Plant at Talca, Region VII	300
Zinc in concentrate	do.	Sociedad Contractual Minera El Toqui Ltda. (Nyrstar NV, 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	35,000
Do.	do.	Minera Florida S.A. (Yamana Gold Inc., 100%)	Minera Florida Mine and concentration plant, Santiago Metropolitan Region	6,500

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Reported figure.

<sup>2</sup>Solvent-extraction/electrowinning.

<sup>3</sup>No production during 2011.

TABLE 3  
CHILE: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES<sup>1,2</sup>

(Thousand metric tons unless otherwise specified)

Commodity	Reserves	World ranking	World percentage
Boron materials (B <sub>2</sub> O <sub>3</sub> content)	35,000	NA	NA
Coal, all types <sup>3</sup>	million metric tons 155	NA	NA
Copper, metal content	185	1	27.0
Gold, metal content <sup>4</sup>	metric tons 3,900	4	7.6
Iodine <sup>5</sup>	1,800	2	23.0
Iron ore, Fe content <sup>6</sup>	720,000	NA	0.9
Lithium, metal content	7,500	1	58.0
Molybdenum	2,300	3	20.0
Natural gas <sup>7</sup>	million cubic meters 98,000	49	NA
Nitrates <sup>5</sup>	225,000	NA	NA
Petroleum <sup>7</sup>	thousand 42-gallon barrels 150,000	57	NA
Potash (K <sub>2</sub> O equivalent)	150,000	7	1.6
Rhenium	metric tons 1,300	1	52.0
Selenium	do. 20,000	1	22.0
Silver <sup>4</sup>	do. 77,000	3	14.0
Sulfate (SO <sub>4</sub> content)	47,500	NA	NA

do. Ditto. NA Not available.

<sup>1</sup>Combined proven plus probable reserves estimated from a combination of company, Government, and secondary sources.

<sup>2</sup>Reserves data at the end of the year, unless otherwise specified.

<sup>3</sup>Proved reserves at yearend 2007 only. Source: U.S. Energy Information Administration, Annual Energy Review 2009, August 19, 2010.

<sup>4</sup>Includes reserves estimated based on estimates of other metals contained in porphyry copper deposits  
Source: U.S. Geological Survey Open-File Report 2005–1060 (<http://pubs.usgs.gov/of/2005/1060/>).

<sup>5</sup>Data may include measured and indicated resources and are through 2008 only. Source: Servicio Nacional de Geología y Minería (SERNAGEOMIN), Anuario de la Minería de Chile 2009.

<sup>6</sup>Includes only the exploitable reserves of CAP S.A. in Chile. Source: CAP S.A., Memoria Anual, 2011.

<sup>7</sup>Proved reserves only—Source: International Energy Statistics, U.S. Energy Information Administration, undated.