



# 2006 Minerals Yearbook

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CHILE

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# THE MINERAL INDUSTRY OF CHILE

By Steven T. Anderson

In 2006, the Republic of Chile remained the world's leading copper producer and exporter, accounting for about 35% of the total world mine production of copper. Chile hosts the largest share of world reserves of lithium and rhenium and, in 2006, it was the world's leading producer of lithium (mostly in the form of lithium carbonate) and rhenium, accounting for about 39% and 45%, respectively, of global mine production. Although Chile was estimated to contain the highest proportion of global reserves of selenium in the world, it was only the fourth ranked producer of refined selenium and accounted for only 6% of global production. Chile was estimated to be the world's second ranked producer of arsenic (which was produced mostly as a byproduct of copper smelting) and was estimated to have accounted for about 19% of global production. Chile's reserves of molybdenum were estimated to be the third largest in the world (ranked behind only China and the United States); the country was also the world's third ranked producer of molybdenum, accounting for about 22% of global production (Brooks, 2007a; Edelstein, 2007; George, 2007b; Magyar, 2007a, b; Ober, 2007a).

Chile ranked fifth in the world in mine production of silver and accounted for about 7% of global mine output. In Chile, production of molybdenum, rhenium, selenium, and silver was either mostly or exclusively a byproduct of copper processing. In 2006, 53% of the country's production of silver was extracted as a byproduct from copper processing. The country also accounted for about 2.5% of the world's mine production of gold, and 37% of this production was as a byproduct of Chilean copper production (Brooks, 2007b; George, 2007a; Magyar, 2007a, b; Servicio Nacional de Geología y Minería, 2007, p. 21-22, 54-56, 58, 61-62).

Chile's globally significant production of industrial minerals is highly dependent on mining of the brines and caliche ores contained in the salars of the country. The salars of Chile have been estimated to contain the largest natural reserves of nitrates in the world, although the quantities of nitrates and specialty fertilizers produced in 2006 were only of regional significance. Chile's production of lithium is based on mining the country's salars, as is the country's production of iodine. Chile was the leading producer of iodine in the world and accounted for about 60% of global production; about 60% of identified global reserves of iodine were located in Chile. The country was the fourth ranked producer of boron and pumicite (mostly in the form of pozzolan) in the world, and had reserves of boron (ulexite) that were of global significance. Chile accounted for 10% of the world's mine production of both boron and pumicite. Chile accounted for about 3% of global production of sulfur, mostly in the form of sulfuric acid obtained as a byproduct of metallurgical processes in the country. In 2006, Chile was also estimated to have accounted for 2.6% of global production of phosphate rock ( $P_2O_5$  content), 2.5% of salt (NaCl), and between 1% and 2% of both diatomite and potash ( $K_2O$  content) (Founie, 2007a, b; Jasinski, 2007; Kostick, 2007a, b; Lyday, 2007a, b; Ober, 2007b).

In summary, Chile's position in the world mineral economy is as a leading supplier of many raw minerals, ores, and concentrates, especially those containing metals associated with the mining of copper and industrial minerals (including lithium carbonate) associated with mining the salars in the country. Although Chile was the leading mine producer of copper in 2006, only about 52% of the copper content of the country's mine output of ores and concentrates was further processed domestically to produce refined copper. Still, Chile accounted for about 16% of the world's production of refined copper, ranking second only to China. One apparent justification for the lack of construction of a new copper smelter or major copper refining facilities in Chile, even as production of copper ores and concentrates has increased and transportation costs for exporting the ore and concentrate have increased, is that the country has more limited reserves of mineral fuels than its continental neighbors and that no agreement on a South American network of natural gas pipelines that would include Chile has been approved. The country's recent economic development has increased demand for electricity, and Chile has had difficulty acquiring adequate supplies of mineral fuels to run the country's powerplants. Additionally, the Government is reluctant to expand hydropower infrastructure into the country's more environmentally sensitive areas, which has led to the country increasing its imports of mineral fuels from outside of the South American continent. Costs of mineral fuels and electricity have increased accordingly, and installing additional refining capacity has not been considered as profitable as continuing to ship ores and concentrates to be refined abroad (table 1; Petroleum Economist, 2006; U.S. Energy Information Administration, 2006; Comisión Chilena del Cobre, 2007, p. 123-124, 127-128).

## Minerals in the National Economy

In 2006, total mine production accounted for about 23% (\$33.6 billion<sup>1</sup>) of the country's gross domestic product (GDP). Of this total, copper mine production was valued at \$31.5 billion and accounted for about 22% of the country's GDP. The total value of copper exports (total copper contained in exported ores, concentrates, primary metal, and scrap) was valued at about \$33 billion. This accounted for about 87% of the total value of all mining exports (\$38 billion) and about 57% of the total value of all Chilean exports during the year. The annual average price of refined copper on the London Metals Exchange (LME) rose to about \$6.73 per kilogram (\$3.05 per pound) compared with about \$3.68 per kilogram (\$1.67 per pound) in 2005. In real<sup>2</sup> terms, the value of mine production of copper remained about the same (increased by 0.07%) as that of 2005. The value of all noncopper mine production decreased by about 0.01%, and

<sup>1</sup>Where necessary, nominal values have been converted from Chilean pesos (Ch\$) to U.S. dollars (US\$) at an annual average exchange rate of Ch\$530=US\$1.00 for 2006. All values are nominal, at current 2006 prices, unless otherwise stated.

<sup>2</sup>Real values are adjusted for inflation using constant 2003 prices.

the value of total mine production in Chile increased by about 0.05% during the same timeframe (Banco Central de Chile, 2007a, p. 30-31, 34; Comisión Chilena del Cobre, 2007, p. 27, 69, 137; International Monetary Fund, 2007).

Foreign direct investment (FDI) in the mining sector increased to \$1,159 million in 2006 compared with about \$775 million in 2005, about \$392 million in 2004, and \$350 million in 2003. Public investment in mining, including investment by the state-run copper mining company Corporación Nacional del Cobre (CODELCO), had been increasing annually from 1999 (\$369 million) through 2005 (\$1,854 million) and helped compensate for substantial decreases in mining FDI in both 2000 (which fell by 82.5% compared with the previous year) and in 2003 (80.4%). In 2006, however, public investment in mining decreased to \$1,234 million (or by about 33%), and total mining investment in the country decreased by 9% compared with that of 2005, despite the 50% increase in mining FDI (Comisión Chilena del Cobre, 2007, p. 71).

The mineral trade balance of Chile was \$30.1 billion (including crude petroleum and natural gas), and imports of mineral fuels (\$8.45 billion) accounted for 90.6% of the value of the country's total mineral imports. The value of imported mineral fuels also accounted for about 22% of the total value of all goods imported by Chile during the year. Chile spent about \$7.15 billion on imports of petroleum and petroleum refinery products; \$1.32 billion of this amount was spent on imports of crude petroleum from Angola (the leading supplier) and about \$1.16 billion was spent on refinery products from the United States (the leading supplier). Chile spent \$889 million on imports of natural gas, and 57.6% of this amount was spent on imports of natural gas from Argentina. In 2006, copper mining operations directly accounted for only about 5% of the country's total consumption of mineral fuels. Copper mining and processing operations also accounted for 31.2% of total electricity consumption in Chile, however, and about 80% of the total electricity provided to mining operations in the country was generated at mineral fuel-burning powerplants (mostly natural gas). This was primarily because the country's leading copper mines were located in the northern part of the country and obtained their electricity from the Sistema Interconectado del Norte Grande (SING) grid, which was entirely supplied by plants that burned mineral fuels. Most of the country, including the largest metropolitan centers, was supplied by the Sistema Interconectado Central (SIC) grid, which used about 50% mineral fuels and 50% hydropower to generate electricity (U.S. Energy Information Administration, 2006; Banco Central de Chile, 2007b, p. 31, 67, 160, 249; Comisión Chilena del Cobre, 2007, p. 27, 114; Hunt and Contreras, 2007, p. 3-5; Vidal, 2007, p. 3-6).

Total operating costs for the mineral industry of Chile continued to increase in 2006, especially with respect to energy expenditures. Many of Chile's leading mining companies signed long-term electricity provision agreements in the late 1990s, when natural gas was more readily available from Argentina and allowed electricity for the SING grid to be generated at less cost than in 2006. These electricity utilities companies lobbied to renegotiate rates with mining companies in 2006, and the Minister of Energy and Mining agreed that electricity prices

should be adjusted. Electricity rates for mining companies were not expected to be adjusted in 2006, however, and existing capacity to generate electricity by burning both diesel and coal was expected to substitute for gas-firing capacity to help satisfy the electricity demand of the mineral industry during the year. In 2006, the copper sector in Chile was estimated to be able to produce 1 metric ton (t) of electrolytic-refined copper cathodes with about 20,000 Megajoules (MJ) of energy, on average, but slightly more than 25,000 MJ was estimated to be required to produce 1 t of fire-refined cathodes, which require more direct use of mineral fuels in the production process (Azzopardi, 2006a; U.S. Energy Information Administration, 2006; Hunt and Contreras, 2007, p. 4-5).

Mining and the extraction of crude petroleum employed about 51,430 people in Chile, which accounted for 0.8% of the total number of employees in the country. The sector of the mineral industry that was mining primarily for metals employed 44,682, of which 39,850 were employed in mining primarily for copper. The industrial minerals mining sector employed 5,037. In the mineral fuels sector, petroleum extraction employed 1,066, and coal mining, 645. The average annual salary for all employees in the production of metals, industrial minerals, and mineral fuels was \$33,852 in 2006, compared with \$28,775 in 2005 and \$24,991 in 2004. In each of these years, the copper sector paid the highest annual salary per worker at \$38,389 in 2006, \$33,064 in 2005, and \$28,252 in 2004. In 2006, the employment level in the copper sector was 6.5% greater than that in 2005 (Servicio Nacional de Geología y Minería, 2005, p. 118-121; 2006, p. 16-19; 2007, p. 17-20).

## Government Policies and Programs

On June 16, 2005, the Government 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 new 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 t of copper during the year. The average annual price of 1 t of fine copper in 2006 was published by the Comisión Chilena del Cobre (COCHILCO) as approximately \$6,740 (based upon average values on the London Metals Exchange). Roughly, an estimate of the minimum value of a company's mine production of a single commodity that would have been necessary to incur the new tax would have had to have been 12,000 t × \$6,740 per metric ton = \$80.88 million in 2006, and the new tax imposed at this minimum level would have been approximately 0.5% × \$80.88 million = \$404,400. The tax rate (percent royalty) ranges were set at 0.5% on annual production (sales) of a single mineral by a single mining company (operating in Chile) that would be valued the same as an annual average value that would fall in the range of the values for annual production of 12,000 t to 14,999 t of fine copper during the same year. This royalty rate increases to a 1% tax on any annual value of production of mineral X by company Y that is equivalent to the annual average value of production of between 15,000 t and 19,999 t

of fine copper; to 1.5% if equivalent to a value between that of 20,000 t and 24,999 t of fine copper; 2% if equivalent to between 25,000 t and 29,999 t of fine copper; 2.5% if equivalent to between 30,000 t and 35,000 t of fine copper; 3% if equivalent to between 35,000 t and 40,000 t; 3.5% if equivalent to between 40,000 t and 45,000 t of fine copper; and then it jumps to 4.5% if the value equivalent falls in the range of between 45,000 t and 49,999 t of copper. If the annual value of production of mineral X by company Y equals or exceeds the annual average value of 50,000 t of copper during the same year, then the company must pay a 5% royalty on that annual mine production (sales) (Rojas and others, 2006, p. 360-362; Villablanca, 2007).

Foreign-owned mineral companies were allowed to continue paying taxes according to the terms of D.L. 600, but only Minera Escondida Ltd. [of which BHP Billiton Ltd. and BHP Billiton Plc of Australia and the United Kingdom (BHP Billiton) was the controlling owner] chose to do so. Under D.L. 600, a foreign investor may sign a contract with the Chilean Government, and the Comité de Inversiones Extranjeras (CIE) establishes the terms and conditions of the investment. Minera Escondida planned to wait until expiration of its existing D.L. 600 contracts; the new tax would be applied after those contracts expire, at which time Escondida's profits would be taxed at the current rates, which could be higher than those outlined above if rates are adjusted through passage of further mining royalty legislation in the meantime. In 2006, the net amount of additional Government revenue from imposition of the mining-specific tax was \$353 million. (Total revenue from the royalty was actually \$705 million, but mining companies credited a combined \$352 million of this amount toward their income tax payments for the year.) This new mining-tax revenue still amounted to only about 4% of CODELCO's annual net contribution to Government revenue of \$8,334 million, and CODELCO's net contribution was estimated to have accounted for about 22% of total Government revenue during the year. The funds from the mining royalty were earmarked for development of an Innovation and Competitiveness Fund that would be used to invest in diversifying the Chilean economy away from extractive industries, but plans for reinvestment were still being debated through the end of 2006 (table 2; Azzopardi, 2006b; Rojas and others, 2006, p. 348-349, 363; Comisión Chilena del Cobre, 2007, p. 75; Davis, 2007; Poniachik, 2007, p. 19).

Before the new mining-specific tax law, 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, but this law was supplemented on December 7, 2002, by approval of Decreto Supremo 95, a Government decree that requires environmental impact statements (EISs), for any new investment projects that involve either exploration for or exploitation of the country's natural resources. Decreto Supremo 95 is the primary statute for environmental regulation of mining concessions in Chile (Comisión Chilena del Cobre, undated).

The Government continued to develop policies to help control the potentially inflationary impacts of higher copper prices on the Chilean economy, but the country's rate of inflation in the annual average of consumer prices increased to 3.4% (compared

with 3.1% in 2005 and 1.1% in 2004). In 2006, the Government was estimated to have deposited about \$6 billion in offshore accounts from the profits of the state-run copper company CODELCO and surplus tax revenue from the new mining-specific tax. However, the Government had not yet decided how to reinvest these funds domestically in a way that would lead to economic diversification and development without causing inflation. The existing plan appears to be simply leaving what are estimated as windfall copper funds (transitory Government surpluses from the copper sector) in offshore accounts to cover future contingent liabilities, which has been described as establishing an "economic and social stabilization fund" abroad. This fund was reportedly being invested in foreign bonds and stock funds and was expected to reach the equivalent of about 10% of Chile's annual GDP by the end of 2007. The International Monetary Fund has suggested that Chile use at least some of the fund to recapitalize the Central Bank of Chile, although some Chilean Government officials have advocated reinvesting more of the fund in education and to create new technological and service-based industries in the country (International Monetary Fund, 2006a, b; Davis, 2007).

The Chilean Government, through the Ministerio de Minería, exercised control of the mineral industry through three state-owned companies and four regulatory agencies. The state-run companies that were important to the mineral industry included CODELCO, some subsidiaries of Corporación de Fomento de la Producción (CORFO), and Empresa Nacional de Minería (ENAMI). The specific subsidiaries of CORFO that were important to the mineral industry included Cía. Chilena de Electricidad S.A., Empresa Nacional del Carbón S.A. (ENACAR), and Empresa Nacional del Petróleo S.A. (ENAP). The four regulatory agencies were CIE, COCHILCO, the Comisión Nacional del Medio Ambiente (CONAMA), and the Servicio Nacional de Geología y Minería (SERNAGEOMIN).

## Production

In 2006, copper production in Chile did not increase by as much as expected compared with that of 2005, primarily because of labor and technical problems at various mines that included a 25-day strike at Minera Escondida Ltda. and a rockslide and tunnel collapse at CODELCO's Chuquicamata Mine. In 2006, a decrease in production of copper sulfate to about 5,000 t compared with 9,150 t in 2005 by Sulfatos del Norte S.A. appeared to account for most of the corresponding decrease in production in Chile. The iron content of iron ore production increased by about 11% during this timeframe, however, as a result of the processing of stockpiled low-grade ore by Compañía de Acero del Pacífico S.A. de Inversiones (CAP) at its El Romeral Mine, which was operated by CAP's subsidiary, Compañía Minera del Pacífico S.A. (CMP). Previous to 2006, all operations at El Romeral had been shut down since a landslide in the mine's open pit in 2003 (Harris, 2006; Platts Metals Week, 2007; Servicio Nacional de Geología y Minería, 2007, p. 111).

In 2006, the extraction of lead from mine output decreased by 23.5% compared with that of 2005, and was reported by SERNAGEOMIN as being exclusively from gold and zinc

concentrates. The decrease appeared to be mostly the result of much lower lead grades at El Toqui Mine, which was owned by Breakwater Resources Ltd. of Canada. SERNAGEOMIN lists El Toqui Mine as the only mine producer of lead in the Region XI, where about 56 t of lead from gold concentrates and 149 t from zinc concentrates was produced compared with 579 t and 299 t, respectively, in 2005. Manganesos Atacama S.A., another subsidiary of CAP, was primarily responsible for mine production of manganese in Chile and appeared to decrease production substantially during 2006 compared with a temporary peak in production in 2005. In 2006, the annual average price of manganese was about 5% lower than that of 2005, and this was cited by SERNAGEOMIN as the primary cause of the company's decrease in production (table 1; Servicio Nacional de Geología y Minería, 2006, p. 62; 2007, p. 47, 65; Breakwater Resources Ltd., 2007, p. 20-21).

Mine production of molybdenum was also below expectations in 2006, mostly because the molybdenum-producing divisions of CODELCO combined to produce only 27,203 t compared with 36,566 t in 2005. Production of ferromolybdenum was estimated to have increased, however, as evidenced by increased exports of ferromolybdenum during the year. Molibdenos y Metales S.A. (MOLYMET) was estimated to have produced less rhenium metal at its Nos plant because of less input of roasted and unroasted molybdenum concentrate from CODELCO (table 1; Servicio Nacional de Geología y Minería, 2007, p. 47; Comisión Chilena del Cobre, 2008, p. 17-18).

Estimated production of selenium was revised significantly downward in 2006 compared with that estimated in previous years owing to new data on selenium recovery capacity at the Ventanas noble metals plants. In addition, production of refined silver metal at Ventanas was reported to have decreased significantly because of restructuring at the refining complex. Mine production of silver, however, increased significantly, primarily because of greater content of silver in gold concentrates. In 2006, 47% (750 t) of the total silver content of mine production in Chile was extracted from gold concentrates compared with only 39% (540 t) in 2005. Mine production of zinc increased substantially during this same timeframe because of new production at the Florida Mine, which was purchased in July 2006 by Meridian Gold Inc. from Chilean private interests (table 1; Platts Metals Week, 2006; Servicio Nacional de Geología y Minería, 2006, p. 58; 2007, p. 61; Comisión Chilena del Cobre, 2007, p. 5, 21; Meridian Gold Inc., 2007, p. 2-3, 12, 17, 19-20).

In 2006, increased domestic demand from the construction sector helped to encourage increased production of barite (for paints), ball and plastic clays, calcium carbonate (for cement), gypsum (for wallboard and other construction materials), feldspar (for glass manufacturing), and ornamental dimension stone (such as lapis lazuli, marble, and travertine) in Chile. The increase in the domestic supply of these industrial minerals compared with that of 2005 was accomplished almost entirely by increased production at existing mines and quarries, except that Minera Lealtad Ltda. officially registered its first production of ball and plastic clays during the year with SERNAGEOMIN. Beginning in 2004, officially listed production of kaolin has been recorded by SERNAGEOMIN separately from that of

bauxitic or refractory clays. In 2006, SERNAGEOMIN reported that production of kaolin increased substantially compared with that of 2005 mostly owing to newly reported production of 28,000 t by producers in the Santiago metropolitan region (table 1; Servicio Nacional de Geología y Minería, 2007, p. 7, 14, 16, 70-81, 96, 114).

In 2006, production of industrial minerals from caliche ore deposits in Regions I and II mostly decreased compared with that of 2005, including an approximately 13% decrease in total production of nitrates (potassium and sodium nitrates, combined). Sociedad Química y Minera de Chile S.A. (SQM) stopped producing sodium sulfate at the beginning of 2006. An increase of 7.5% in the production of iodine took place, however, mostly because SQM continued to ramp up iodine production capacity at the company's Nueva Victoria facility. With respect to industrial minerals extracted from the brines and saline crusts of the Andean salars, SQM increased production of lithium carbonate to slightly above the listed annual capacity at its Salar del Carmen facilities near Antofagasta but still produced a greater quantity of excess lithium chloride concentrate (which it was unable to further process into lithium carbonate at the plant) than in 2005. Also from the Andean salars, SQM Salar S.A. decreased production of potassium chloride (KCl) to about 539,000 t (which was about 340,000 t  $K_2O$  or potash equivalent) compared with 632,000 t (400,000 t  $K_2O$ ) in 2005 because less excess KCl was available to be marketed directly after being used in SQM's production of potassium nitrate (table 1; Sociedad Química y Minera de Chile S.A., 2007, p. 13, 19-20, 27-28, 36).

Increased production of phosphate rock in Chile appeared to be owing to an increase of production to about 8,700 t of apatite compared with about 5,800 t in 2005 by César B. Formas Ortiz S.A. However, production of phosphorite at a plant near Bahía Inglesa decreased substantially during this timeframe. Minor (in terms of total value) production of some other industrial minerals decreased substantially in 2006 compared with that of 2005, including Chile's production of pumicite (primarily pozzolan), pyrophyllite, and talc. A substantial decrease in the production of rock salt (NaCl) in Region I of the country accounted for the decrease in production nationwide compared with that of 2006. Production of silica in the form of quartz also decreased, although production of silica sand increased (table 1; Servicio Nacional de Geología y Minería, 2007, p. 82-84, 99-106, 113).

Production of crude petroleum decreased by 12% owing to decreasing reserves, but production of petroleum refinery products increased, on average, compared with that of 2005. The separately identifiable increases in production of refinery products during this timeframe were an approximate 21% increase in the country's production of liquefied petroleum gas, a 14% increase in production of residual fuel oil, and a 10% increase in the combined production of various grades of gasoline. Increased production of refinery products was made possible through increased imports of crude petroleum (table 1; Servicio Nacional de Geología y Minería, 2006, p. 80-88, 92, 108, 112, 115-116; 2007, p. 119; Empresa Nacional del Petróleo, 2007, p. 109, 112, 133, 135).

## Structure of the Mineral Industry

In 2006, many of the world's leading private mining companies, which included Anglo American plc of the United Kingdom, Barrick Gold Corp. of Canada, BHP Billiton, Rio Tinto Ltd. and Rio Tinto plc of Australia and the United Kingdom (Rio Tinto), Xstrata plc of Switzerland, and Phelps Dodge Corp. of the United States, were deeply invested in the mineral industry of Chile. The leading Chilean-owned companies in the mineral industry were CODELCO and SQM, but CAP controlled most of the ferrous metals sector and MOLYMET controlled almost all the production of higher-end molybdenum-based mineral commodities. In 2006, the leading company in manufacturing cement in Chile was Cemento Polpaico S.A., which was controlled by Holcim Ltd. of Switzerland. During the year, Polpaico accounted for 34% of total cement sales in the country; Cemento Melón S.A., which was controlled by Lafarge S.A. of France, accounted for 33.8%; and Cementos Bío Bío S.A., which was 100% owned by Chilean private interests, accounted for 32.2% (table 2; Cementos Bío Bío S.A., 2007, p. 47).

In 2006, COCHILCO estimated that private firms invested about \$1,200 million in the copper sector, of which Antofagasta plc of the United Kingdom and BHP Billiton accounted for approximately \$1,100 million, and state-run CODELCO, about \$810 million. COCHILCO later estimated that CODELCO increased its investment in this sector of the mineral industry to about \$1,400 million in 2007 but that private companies invested only \$456 million. On August 15, 2006, Xstrata acquired Falconbridge Ltd. of Canada, which meant that Xstrata acquired a 100% interest in the Lomas Bayas copper mine and the Altonorte copper smelter, and a 44% interest in the Collahuasi copper mine. On November 18, 2006, Phelps Dodge and Freeport-McMoRan Copper & Gold Inc. agreed to an acquisition of Phelps Dodge by Freeport; the acquisition was expected to be finalized in March 2007 and would create the largest publicly traded copper company in the world. In June 2006, BHP Billiton completed a new sulfide-leaching facility to produce an additional 180,000 t/yr of copper cathodes at the company's majority-owned Escondida Mine. The company also expected to complete construction of the Spence copper mine by the end of the year, although the company did not expect production at Spence to ramp up to the listed capacity of 200,000 t/yr of copper cathodes until sometime during the second half of 2007 (table 2; BHP Billiton Ltd., 2006, p. 26-27; 2007, p. 33-35; Vidal, 2006, p. 4; 2008, p. 4; Phelps Dodge Corp., 2007, p. 1; Xstrata plc, 2007, p. 75).

Barrick acquired Placer Dome Inc. of Canada on March 8, 2006, and a 100% ownership interest in the Zaldivar copper mine as a result of this acquisition. In May, Barrick sold Placer Dome's interest (50%) in La Coipa gold and silver mine together with some other ownership interests of Placer Dome outside of Chile to Goldcorp Inc. of Canada. This transaction meant that Barrick entered the mineral industry of Chile as a relatively minor copper producer; Goldcorp, on the other hand, entered the mineral industry with a noncontrolling 50% ownership interest in the leading gold mine in the country. Kinross Gold Corp. of Canada held the controlling 50%

interest in Compañía Minera Mantos de Oro (which operates La Coipa), and announced an agreement on November 6, 2006, to acquire Bema Gold Corp. of Canada, which would be effective on February 27, 2007. This transaction made Kinross the 100% owner of El Refugio Mine. In the third quarter of 2006, Meridian Gold Inc. of Reno, Nevada, acquired Chilean-owned Minera Florida S.A. and changed the new subsidiary's company name to Minera Florida Ltda. Minera Florida operates the Minera Florida gold, silver, and zinc mine (table 2; Barrick Gold Corp., 2007, p. 12-13; Kinross Gold Corp., 2007, p. 1-5, 9; Meridian Gold Inc., 2007, p. 19).

In 2006, SQM was the world leader in the production of iodine, lithium carbonate (not contained in spodumene), and potassium nitrate. In January, SQM expanded iodine production capacity by acquiring DSM Minera S.A., which was a Chilean subsidiary of DSM N.V. of the Netherlands, and changed the new subsidiary's name to Minera Nueva Victoria S.A. This acquisition was in addition to the company completing a project to increase annual production of iodine to about 3,500 t/yr compared with 2,200 t in 2005 at its Nueva Victoria facilities. In fact, SQM closed the former DSM facilities during the second half of the year because demand conditions were not sufficient to justify continuing production of iodine there. Completion of a restructuring project at SQM (including establishment of a new drying facility for soluble potassium nitrate at the company's Coya Sur plant and replacement of the crushing circuit and development of a new mining area at its Maria Elena facilities) helped expand SQM's total production of nitrates by 25% in 2006 compared with that of 2005 (table 2; Sociedad Química y Minera de Chile S.A., 2007, p. 12-13, 52-53).

## Mineral Trade

Ranked by decreasing value, the top three metals exported by Chile in 2006 were fine copper (\$33,350 million), combined molybdenum (ferromolybdenum; molybdenum oxide and trioxide; and molybdenum in concentrate) (\$3,015 million), and gold (\$530 million). Although the value of the copper contained in Chile's exports increased by just slightly less than 88% compared with that of 2005, the annual quantity of copper exported actually decreased by about 2% [to 5.2 million metric tons (Mt)]. In 2006, China was the leading destination for Chilean copper exports, followed by Japan and the United States. China imported enough copper to account for 12.4% of the total value of Chile's copper exports during the year; Japan, 12%, and the United States, 10.3%. The leading importer of Chile's exports of ferromolybdenum was the Netherlands (44%); of gold, the United States (64.4%); iron ore, China (32.6%); molybdenum concentrates, the Netherlands (57.6%); molybdenum oxide, Japan (45.4%); silver, the United States (38.7%); and zinc, Japan (43.4%) (Comisión Chilena del Cobre, 2007, p. 24-29).

Chile's three leading exported industrial minerals were, in order of decreasing value of total exports in 2006, iodine (\$277 million), lithium carbonate (\$121 million), and combined (potassium and sodium) nitrates (\$83 million). The leading importers of Chile's main industrial mineral exports were, in order of the share in Chile's total exports, by value, the

United States for salt (66%), sodium nitrate (50%), and iodine (31%); Japan for lithium carbonate (31%); and Brazil for potassium nitrate (83%). By value, the countries of Asia purchased about 42.6% of Chile's total exports of metals; Europe, 33.7%; the Western Hemisphere, 22%; and other countries, including Australia and South Africa most prominently, the remainder. Combined, the countries of the Western Hemisphere were the leading purchasers of Chilean exports of industrial minerals, with a 43.6% share; Asia, 19%; Europe, 16.5%; and other countries, the remainder (Comisión Chilena del Cobre, 2007, p. 27, 31).

In June 2006, Chile signed a free trade agreement with Panama, and on August 21, 2006, the President of Chile signed a free trade agreement with China with respect to trade in goods, including copper and other mineral commodities. In November 2006, Chile also agreed on a bilateral free trade agreement with Japan but the agreement was not expected to be ratified until March 2007. Chile has also agreed to a partial free trade agreement with India, which was expected to be ratified sometime in 2007 (U.S. Commercial Service, 2007, p. 54-55).

## Commodity Review

### Metals

**Copper.**—BHP Billiton's Spence copper project appeared to be the last privately owned new copper mine that would achieve notable production until at least 2009. The mine and solvent-extraction/electrowinning (SX-EW) plant was expected to produce about 200,000 t/yr of copper cathodes by sometime in 2007. The only other new mine expected to achieve production before 2010 was CODELCO's and Minmetals Non-Ferrous Metals Co., Ltd.'s Gabriela Mistral (Gaby) project, which was expected eventually to produce about 150,000 t/yr of copper cathodes in 2009. Other copper mining projects expected to attain production before 2010 were extensions or expansions of existing mines, including CODELCO's project to eliminate processing bottlenecks at El Teniente Mine by sometime in 2007, but these projects were expected only to maintain 2006 production capacity levels, at best. For example, El Teniente project was expected to enable the mine just to maintain its production capacity of 430,000 t/yr of fine copper contained in fire-refined ingots and anodes. Two other notable copper projects that were expected just to maintain current production levels for an extended period of time were El Mauro tailings dam at Los Pelambres Mine and an extension of the Lomas Bayas Mine, which was expected to be completed by the end of 2008. Another was CODELCO's expansion of Andina Mine, including establishment of a new mining level, which was expected to be completed by the end of 2009 (tables 2, 3; Vidal, 2006, p. 7-9, 13; 2008, p. 4, 7-10; Corporación Nacional del Cobre, 2007a, p. 36-37).

High copper prices during 2006 encouraged the startup of copper reprocessing projects and extended the expected mine life of some smaller mines. During the year, BHP Billiton began heap leaching of existing run-of-mine stockpiles of copper ore that had been evaluated to be of subeconomic grades prior to 2006 at both Escondida Mine and the company's

Cerro Colorado Mine. At the end of 2006, CODELCO decided to continue mining copper oxides until at least 2011 at mines in the company's Salvador Division, which were scheduled to shut down their oxide lines of production in 2008 until higher-than-expected copper prices were realized throughout 2006 (BHP Billiton Ltd., 2007, p. 34-35; Corporación Nacional del Cobre, 2007b).

A strike by contractual workers at CODELCO mines and processing facilities, who were requesting a bonus payment as a share of the company's record profits in 2005 and better working conditions, carried over from the previous year. In 2006, the copper miners at the Escondida Mine struck from August 7 until August 31 and then agreed to return to work for a 5% pay raise, a \$17,000 bonus, and additional nonwage benefits. Workers at the Altonorte copper smelter also struck from December 18 until December 20 until a new 3-year labor agreement was reached. Despite greater compensation per worker and a greater number of employees (on average) in the copper sector in 2006, ongoing negotiations during 2007 were expected to result in additional increases in compensation for workers at all major copper mines and processing facilities (including those of CODELCO) similar to those approved at Altonorte and Escondida (Barry and Kassakovich, 2006; De Klerk, 2006; Jonson and Azzopardi, 2006; Metal Bulletin, 2006b).

Chile's unit production cost for copper cathode averaged about \$1.69 per kilogram in 2006 compared with \$1.57 per kilogram in 2005. In 2006, the unit production cost for copper cathode still compared favorably with that of the Latin America region as a whole (\$1.64 per kilogram) and was lower than the regional averages for Asia (\$1.94), North America (\$2.09), Western Europe (\$2.17), Eastern Europe (members of the Commonwealth of Independent States plus any other former members of the Council for Mutual Economic Assistance, as of 1990) (\$2.25), Oceania (\$2.49), and Africa (\$2.64). This relative ranking of Chile's unit production cost for copper cathode was substantially altered compared with that of 2005, when Asia was the lowest-cost region (\$1.35 per kilogram) followed by North America (\$1.44), Latin America (\$1.47), Eastern Europe (\$2.10), Western Europe (\$2.18), Oceania (\$2.34), and Africa (\$2.77) (Comisión Chilena del Cobre, 2007, p. 73, 154).

**Gold.**—In 2006, Breakwater decided to stockpile ore mined from the Aserradero gold skarn deposit at El Toqui Mine until completion of the company's Gekko intense leach reactor (expected sometime in 2007). The reactor was expected to enable the company to produce metal doré from a gold-silver concentrate. In 2006, Breakwater produced 1,144 kg of gold contained in both gold and zinc concentrates at El Toqui, which was less than the 1,294 kg produced there in 2005. In 2007, the company expected to produce only about 810 kg of gold in Chile because the new deposits (Concordia and Estatuas), which would be the primary sources of ore for El Toqui during the year, contain much lower gold grades than the deposits that have been mined there in recent years (Breakwater Resources Ltd., 2007, p. 6, 20-21).

Although Barrick did not have any share in gold mine production in Chile in 2006, it did obtain environmental approval for its Pascua-Lama gold project from the Chilean Government in the form of a resolution concerning the company's environmental impact assessment, which was issued

to the company on February 17, 2006. The project straddles the Chilean border with Argentina, however, and Barrick was still negotiating for approval by the Government of Argentina through the end of 2006. Barrick expected to be allowed to proceed with the project eventually and also expected that the proposed mine would produce about 2,400 kilograms per year (kg/yr) of gold, on average, during the first 10 years of production. The company expected to start production at Pascua-Lama sometime in 2011 after extensive preparation of the mine site is accomplished, including moving a portion of the glaciers that cover a portion of the mine site (Barrick Gold Corp., 2007, p. 49-52).

On October 26, 2005, Placer Dome agreed to sell its 51% share in the Cerro Casale gold project to the company's partners in the joint venture, Arizona Star Resource Corp. and Bema Gold, but completion of this transaction was delayed until June 30, 2006, because of Barrick's acquisition of Placer Dome. After completion of the transaction, however, Arizona Star owned 51% of Cerro Casale and Bema owned 49%. On November 6, 2006, Kinross announced that it would acquire Bema and the transaction was to be completed by February 27, 2007, making Kinross Arizona Star's new minority partner in Cerro Casale. Because of the uncertainty concerning ownership of the project, exploration at Cerro Casale remained on hold throughout 2006, and the expected startup date of initial production was postponed until at least 2013 (table 3; Arizona Star Resource Corp., 2007, p. 1; Barrick Gold Corp., 2007, p. 13; Kinross Gold Corp., 2007, p. 5, 26, 99).

**Iron and Steel.**—In 2006, CMP continued to account for about 90% (7.7 Mt) of the total gross weight of marketable iron ore (concentrate, fines, lumps, pellets, and pellets feed) produced in Chile, and the company's annual production increased in comparison with about 7.2 Mt in 2005. This increased production was almost entirely owing to increased processing of the low-grade stockpiles at El Romeral Mine after construction of a plant to produce pellet feed from lower-grade ore in Region IV. Production from the company's main facilities in Region III (including El Algarrobo and Los Colorados Mines and the Huasco pellet plant) increased to about 5.4 Mt (gross weight) of marketable iron ore compared with 5.3 Mt in 2005. Compañía Minera Huasco S.A. (CMH) owned Los Colorados Mine, which was the leading iron ore mine in the country; CMH was owned by CMP and M.C. Inversiones Ltda. (which was controlled by Mitsubishi Corp.) (50% each). The ore and concentrate produced at Los Colorados provided feed for the Huasco pellet plant (100% owned by CMP), which then sold the pellets and other products from the plant back to CMH. CMH exported most of this marketable iron ore, although a small proportion was sold to Compañía Siderúrgica Huachipato S.A. (CSH) to be used in the domestic production of primary iron and crude steel (table 2; Comisión Chilena del Cobre, 2006, p. 18-21; Harris, 2006; CAP S.A., 2007, p. 18-21; Compañía Minera del Pacífico S.A., 2007, p. 15-17).

In 2006, 22% of CMP's total production of iron ore was retained for use within the country and this was the same proportion as in 2005. Of the approximate 6 Mt of marketable iron ore exported by CMP (CMH) during the year, about 45% was shipped to China, 22% to Japan, 10% to Malaysia, 9.5%

to Indonesia, 8% to South Korea, 4.6% to the United States, and the remainder to Australia. During 2006, CAP continued to expand production of iron ore for export (primarily owing to continuing high prices for iron ore) but did not expect to expand domestic capacity for production of primary iron and crude steel owing to the high costs of this production in Chile. In 2006, CAP began construction on Phase I of its Hierro Atacama project in the Copiapo Valley in Region II. This project was expected to produce about 3 Mt/yr of pellet feed from the magnetite-rich tailings of the Candelaria copper mine and to export all of it through the Port at Punta Totoralillo, which is located north of Caldera (Comisión Chilena del Cobre, 2006, p. 22, 25; Harris, 2006; CAP S.A., 2007, p. 3, 20, 22, 36, 49, 101; Compañía Minera del Pacífico S.A., 2007, p. 3, 20-21).

**Lead, Silver, and Zinc.**—In 2006, Breakwater produced 31,725 t of zinc contained in concentrate compared with 28,347 t in 2005 at the company's El Toqui Mine because of the startup of mining of the Estatuas deposit. Zinc production was expected to decrease to about 27,800 t in 2007, however, because of lower expected production out of both the Doña Rosa and the Estatuas deposits; production from these deposits was not expected to be completely replaced by the startup of mining at the newly developed Concordia deposit. Production of silver contained in concentrate was expected to increase to 3,140 kg in 2007 compared with 2,230 kg in 2006, however, owing to higher expected silver grades in the Concordia deposit compared with those in the Doña Rosa and Estatuas deposits. In 2006, El Toqui Mine accounted for approximately 88% of total zinc mine production and about 31% of the mine production of lead in the country. Breakwater expected to increase production of lead in 2007 as a result of completing the development of the Concordia deposit at El Toqui Mine. Minera Florida was the only other company listed by SERNAGEOMIN as a mine producer of either lead or zinc (table 1; Breakwater Resources Ltd., 2007, p. 6, 20-21; Servicio Nacional de Geología y Minería, 2007, p. 65-67).

Production of refined silver decreased during the year at the Ventanas smelter and refinery in Puchuncavi in Region V, owing to renovations at its noble metals plant. CODELCO announced that it would add a fifth furnace at this plant, however, which could result in greater production of refined silver by the end of 2007 at Ventanas (depending, of course, on the amount of feed available). ENAMI controlled the Hernán Videla Lira smelter and refinery in Paipote and reported production of about 81,600 kg of refined silver. It appeared, however, that this production was actually part of the production at Ventanas, which was acquired by CODELCO from ENAMI in May 2005. Therefore, tables 1 and 2 list no production of refined silver at the Hernán Videla Lira refinery. The country exported about 250 t of refined silver metal in 2006 compared with 116 t in 2005 despite the reported decrease in production at Ventanas (tables 1, 2; Platts Metals Week, 2006; Comisión Chilena del Cobre, 2007, p. 23; Corporación Nacional del Cobre, 2007a, p. 16, 36; Empresa Nacional de Minería, 2007, p. 24).

**Molybdenum and Rhenium.**—In 2006, mine production of molybdenum in Chile was entirely as a byproduct of copper mining and processing. Minera Doña Inés de Collahuasi SCM ramped up production to 3,362 t of molybdenum contained

in concentrate compared with 349 t in 2005 at the company's new facility to extract molybdenum from copper ores mined at the Collahuasi copper mine. During the same timeframe, the average annual price of molybdenum decreased to \$44.7 per kg compared with about \$69.90 per kg. By far, the leading producer of molybdenum in Chile was CODELCO, which decreased total production from all four mining divisions to 27,203 t of molybdenum content compared with 36,566 t in 2005. The second ranked producer was Minera Los Pelambres S.A., which produced 9,847 t of molybdenum contained in concentrate at the Los Pelambres Mine compared with 8,710 t in 2005. In June 2006, BHP Billiton indefinitely postponed plans to construct a molybdenum recovery plant at the Escondida copper mine owing to uncertainty in the price of molybdenum during the year. Since mid-2005, when the price of molybdenum oxide was at record levels, BHP Billiton had planned to build the processing plant at the company's Puerto Coloso copper concentrate terminal near Antofagasta and had already submitted an environmental impact assessment to CONAMA for approval of construction during the early part of 2006 (Metal Bulletin, 2006a; Comisión Chilena del Cobre, 2008, p. 11, 17).

Molibdenos y Metales S.A. (MOLYMET) accounted for all of the rhenium produced in the country, and increased its capacity to be able to roast an estimated 24,600 t/yr of molybdenum contained in concentrate in 2006 compared with about 21,300 t/yr in 2005, although this expansion was not completed until the final quarter of the year. According to the Bank of Chile, MOLYMET was estimated to have exported about 23,500 kg of rhenium metal in 2005 (the latest year for which reliable data were available). This is above the estimated production in table 1, but it is unclear if MOLYMET delved into inventories to supply this amount of rhenium metal for export. CODELCO owned and operated a molybdenum roasting facility at the company's Chuquicamata Mine, but it uninstalled the circuit to recover rhenium from the flue dust at this plant in 1986. Annually, some undisclosed proportion of MOLYMET's production of molybdenum products and rhenium in Chile originates from imports of concentrate into the country. In 2006, both Antofagasta plc and CODELCO exported molybdenum concentrate directly and also supplied concentrate to MOLYMET to be processed in Chile (Lippman, 2006; Comisión Chilena del Cobre, 2008, p. 11, 18).

### *Industrial Minerals*

**Boron and Lithium.**—A project, which was started at the end of 2005, would increase SQM's capacity to produce lithium carbonate to 40,000 t/yr by 2008. Boron products, such as boric acid and ulexite, and lithium carbonate are produced mostly from brines extracted from underground deposits in a salt-encrusted depression called the Atacama Salar, which is located within the Atacama Desert in northern Chile. These brines contain reserves of boron, lithium, potassium, and sulfates, which were processed to produce various industrial mineral commodities that included boric acid, lithium carbonate, lithium hydroxide, potassium chloride, and potassium sulfate. Most of the boron was left in its natural form, as ulexite, and then used in the production of specialty fertilizers rather than processed

to produce boric acid. Although Chile has other salars, most of the country's production of these minerals comes from the Atacama Salar. Boron that was left as ulexite, however, was mined mostly from another salar called the Salar de Ascotan and then processed in a boron processing facility located at the Salar del Carmen, which was nearer to the company's lithium processing facility and the city of Antofagasta. The Atacama Salar is located about 250 km east of Antofagasta. Considering only proven reserves in the Atacama Salar brines, SQM slightly increased its reserves of boron to 1.2 Mt in 2006 compared with 1.1 Mt in 2005; the company's reserves of lithium also increased slightly to 2.1 Mt compared with 2.0 Mt during the same timeframe (Sociedad Química y Minera de Chile S.A., 2007, p. 19, 26-27, 38).

**Iodine, Nitrates, and Sodium Sulfate.**—In Chile, iodine, nitrates, and sodium sulfate are produced mostly from open pit mining of the caliche ore deposits that are located in northern Chile. These deposits are typically only 0.5 to 1.5 meters below the surface. SQM produced sodium nitrate at plants located at both the María Elena and the Pedro de Valdivia Mines, although most of the company's capacity to produce potassium nitrate and sodium sulfate was through different processes at the separate Coya Sur plant. SQM produced iodine at plants located at the company's Nueva Victoria and Pedro de Valdivia Mines from ores mined at these two mines and at SQM's two other caliche ore mines, María Elena and Pampa Blanca. The company's combined proven reserves of iodine and nitrates in the caliche ore at the Pedro de Valdivia Mine increased to about 159 Mt in 2006 compared with about 144 Mt in 2005, but proven reserves decreased to about 137 Mt compared with 147 Mt at the María Elena Mine. In 2006, proven reserves of caliche ore remained about the same at 94 Mt compared with about 95 Mt in 2005 at the Nueva Victoria Mine, and were about 78 Mt compared with about 81 Mt at the Pampa Blanca Mine (Sociedad Química y Minera de Chile S.A., 2007, p. 15-17, 37).

### *Mineral Fuels*

**Coal.**—In 2006, ENACAR continued to proceed with closing down its mines in Region VIII and total production of coal (all types) decreased to about 100,000 t compared with 138,000 t in 2005. Production of coal at the Bish Mine in the Magallanes region (Region XII) accounted for the remainder of coal production in the country in 2006. BHP Billiton acquired at least one exploration concession on the island of Isla Riesco and had entered bids in auctions for at least one other coal mining exploration concession on the island. It appeared as if CORFO was managing all of these auctions and all of the coal exploration and exploitation concessions in Magallanes (table 2; La Prensa Austral, 2006; Servicio Nacional de Geología y Minería, 2007, p. 14, 118).

**Natural Gas.**—In 2006, the Government continued to promote plans to develop cross-border pipelines that might provide the country with a secure supply of natural gas from other South American countries. The design of this natural gas pipeline network was most commonly proposed as a gigantic ring around Bolivia, which has not been willing to agree to a new natural gas supply arrangement with Chile. Such a design

to circumvent Bolivia was also reportedly growing in popularity with the Governments of some other countries in South America as perceived uncertainty concerning Bolivian natural gas supplies grew during the year. By the end of the year, however, an agreement on a plan for the hydrocarbons ring did not appear imminent and the Chilean Government began new plans for increasing the country's capacity to regasify liquefied natural gas, which it could import from countries external to the South American continent (Petroleum Economist, 2006; U.S. Energy Information Administration, 2006).

## Reserves and Resources

In 2006, almost all the reserves of copper in Chile were concentrated in Regions I, II, III, IV, V, Metropolitan (around Santiago) and VI. Reserves in Chile accounted for about 40% of global reserves of copper (Servicio Nacional de Geología y Minería, 2007, p. 48).

## Outlook

Increasing operating costs combined with implementation of the new mining royalty delayed some private investment in exploration and development of new copper deposits in 2006, and CODELCO expected to account for at least a majority of total investment in this sector of the mineral industry through at least 2011. If high prices for copper are maintained and sufficient technological developments for more cost-effective mining of low-grade high-impurity copper deposits are forthcoming, however, then Chile's world-leading reserves of copper are expected eventually to attract substantial private and foreign direct investment to the copper sector again. Although many copper deposits had already been discovered by 2006, these projects were still mostly in the conceptual stages and reliable timelines were not expected to be established until about 2008.

On a macroeconomic level, the Government expects to continue to have large budget surpluses based mostly on revenues from the copper mining sector. The most pressing mineral industrial issue is considered to be the establishment of a secure supply of mineral fuels (especially natural gas) into Chile to help continue economic development in the country. The outlook for a substantial domestic discovery or development of mineral fuels production capacity or for establishing a network of pipelines to import sufficient quantities of natural gas from other countries in South America does not appear very likely for the next 5 years. Imports of liquefied natural gas are expected to account for a larger proportion of Chile's consumption of mineral fuels until at least 2012.

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2002	2003	2004	2005	2006
<b>METALS</b>					
Arsenic trioxide <sup>e</sup>	11,400	11,600	11,500	11,700	11,700
Copper:					
Mine output, Cu content <sup>3</sup>	4,581	4,904	5,413	5,321	5,361
Metal:					
Smelter, primary	1,439	1,542	1,518	1,558	1,565
Refined:					
Electrowon	1,602	1,653	1,636	1,585	1,692
Primary, other	1,248	1,249	1,201	1,239	1,119
Total	2,850	2,902	2,837	2,824	2,811
Gold, mine output, Au content	38,688	38,954	39,986	40,447	42,100
Iron and steel:					
Ore and concentrate:					
Gross weight	7,269	8,011	8,004	7,862	8,629
Fe content	4,398	4,865	4,850	4,707	5,235
Metal:					
Pig iron	964 <sup>r</sup>	988	1,137	1,074 <sup>r</sup>	1,133 <sup>p</sup>
Ferromolybdenum <sup>e, 4</sup>	3,160	4,070	5,760	9,250 <sup>r</sup>	14,000
Steel, crude	1,279 <sup>r</sup>	1,377	1,579	1,537 <sup>r</sup>	1,627 <sup>p</sup>
Semimanufactures	1,150	1,197	1,356	1,293 <sup>r</sup>	1,300 <sup>c</sup>
Lead, mine output, Pb content	2,895	1,697	2,286	878	672
Manganese ore and concentrate:					
Gross weight	12,195	19,641	25,801	39,786	37,169
Mn content	3,190	5,824	7,188	12,324	9,771
Molybdenum:					
Mine output, Mo content	29,466	33,374 <sup>r</sup>	41,883	48,041 <sup>r</sup>	43,278 <sup>p</sup>
Oxides	7,716	5,398	8,339	8,971	7,197 <sup>p</sup>
Rhenium, mine output, Re content <sup>e, 5</sup>	15,400 <sup>6</sup>	16,000	18,900	21,500	19,400
Selenium <sup>c</sup>	80,000	83,000	82,000	84,000	74,000
Silver:					
Mine output, Ag content	1,210	1,313	1,360	1,400	1,607
Metal, Ag content <sup>7</sup>	194,251	185,375	158,678	171,445	150,952
Zinc, mine output, Zn content	36,161	33,051	27,635	28,841	36,238
<b>INDUSTRIAL MINERALS</b>					
Barite	384	229	31	91	375
Boron compounds:					
Boric acid (H <sub>3</sub> BO <sub>3</sub> )	9,000	8,690	8,545	8,774	8,446
Ulexite, natural	431,293	400,603	594,191	460,683	459,645
Total	440,293	409,293	602,736	469,457	468,091
Cement, hydraulic	3,461	3,622	3,798	3,999	4,112
Clays:					
Bentonite	632	748	101	--	--
Kaolin	6,164	9,000 <sup>r</sup>	7,133	15,183	44,642
Refractory <sup>8</sup>	NA	NA	44,636	35,271	34,594
Other, including ball and plastic clays	35,091	51,622	50,250 <sup>r</sup>	54,301 <sup>r</sup>	84,846
Total	41,887	61,370 <sup>r</sup>	102,120	104,755 <sup>r</sup>	164,082
Copper sulfate	--	--	5,871	9,659	5,124
Diatomite	30,274	25,594	30,015	27,091	28,900
Dolomite	31,439	17,308	27,436	24,903	24,006
Feldspar	3,069	6,690	4,838	5,820	5,847
Gypsum:					
Crude	610	662	630	661	845
Calcined	229	190	304	310	197
Iodine, elemental	11,648	15,580	14,931	15,346	16,494
Lime, hydraulic <sup>c</sup>	380 <sup>r</sup>	440 <sup>r</sup>	525 <sup>r</sup>	575 <sup>r</sup>	620

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>	2002	2003	2004	2005	2006	
INDUSTRIAL MINERALS—Continued						
Lithium compounds, natural:						
Lithium carbonate	35,242	41,667	43,971	43,595	50,035	
Lithium chloride	--	--	494	681	1,166	
Nitrates, crude, natural	thousand metric tons	1,174	1,134	1,402	1,283	1,112
Phosphate rock (apatite):						
Gross weight	11,066	9,389	11,695	10,311	12,236	
P <sub>2</sub> O <sub>5</sub> content	3,411	2,894	3,604	3,178	3,770 <sup>c</sup>	
Phosphorite	8,475	11,911	9,770	10,052	1,600	
Potash, natural:						
Potassium chloride, KCl	770,599	764,065	742,709	733,814	647,449	
Of which, K <sub>2</sub> O equivalent <sup>9</sup>	486,800	482,700	469,200	463,600	409,000	
Potassium sulfate, K <sub>2</sub> SO <sub>4</sub>	173,209	157,174	177,325	162,102	170,406	
Of which, K <sub>2</sub> O equivalent <sup>e,10</sup>	88,000	80,000	90,000	83,000	87,000	
Pozzolan, including pumice	thousand metric tons	826	1,242	1,535	1,620	1,423
Pyrophyllite	2,974	3,534	2,271	3,315	1,257	
Salt (NaCl)	thousand metric tons	3,503	6,213	4,939	6,068	4,580
Siliceous sand and gravel (silica):						
Quartz, common	do.	420	428	453	589	444
Silica sand	do.	459	487	632	562	638
Total	do.	879	916	1,085	1,151	1,082
Sodium compounds, n.e.s., sulfate <sup>11</sup>	70,776	44,011	30,622	15,730	100	
Stone:						
Limestone, calcium carbonate	thousand metric tons	5,888	5,905	6,516	6,783	7,145
Of which:						
Coquina	324	179	195	215	330	
Ground calcium carbonate, white	23	20	25	41	16	
Lapis lazuli	--	129	43	130	400	
Marble	633	828	845	31	169	
Travertine <sup>c</sup>	--	--	--	4,680 <sup>5</sup>	12,020 <sup>5</sup>	
Sulfur, byproduct <sup>12</sup>	thousand metric tons	1,254 <sup>r</sup>	1,462 <sup>r</sup>	1,508	1,654 <sup>r</sup>	1,660 <sup>c</sup>
Talc	563	840	722	886	704	
Zeolites	839	--	203	298	280	
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous and lignite, marketable	thousand metric tons	452	347	238	732	674
Coke, coke oven <sup>c</sup>	do.	440 <sup>5</sup>	470	540	530	560
Methanol	do.	2,932	2,704	2,692	3,029	3,186
Natural gas, marketable	million cubic meters	2,543	2,181	2,106	2,294	2,199
Natural gas liquids: <sup>c</sup>						
Natural gasoline	thousand 42-gallon barrels	1,000	1,000	1,000	1,000	1,000
Liquefied natural gas	do.	2,500	2,500	2,500	2,500	2,500
Total	do.	3,500	3,500	3,500	3,500	3,500
Petroleum:						
Crude and condensate <sup>13</sup>	do.	2,116	1,319	1,292	1,208	1,061
Refinery products: <sup>14</sup>						
Liquefied petroleum gas	do.	7,914	7,534	7,793	7,101	8,623
Gasoline, including for aviation	do.	18,464	19,809	20,861	19,767	21,668
Kerosene, including for jet fuel	do.	6,239	5,322	6,042	5,564	5,548
Diesel and distillate fuel oil	do.	29,345	30,297	27,658	26,282	25,600
Residual fuel oil	do.	9,210	12,332	13,581	15,421	17,523
Other, including asphalt, ethylene, naphtha, propylene, solvents, and so forth	do.	2,124	2,119	2,055	1,744	9,108
Total	do.	73,296	77,413	77,990	75,879	88,070

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>p</sup>Preliminary. <sup>r</sup>Revised. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through October 2007.

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

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

(Metric tons unless otherwise specified)

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<sup>3</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>4</sup>Estimated from reported exports.

<sup>5</sup>Rhenium content of mine output in Chile (whether processed in Chile or elsewhere) was estimated based on information from COCHILCO; the reported production figure for 2002 may include some rhenium content from Mexico processed at Molibdenos y Metales S.A. in Chile.

<sup>6</sup>Reported figure.

<sup>7</sup>Production of refined silver metal (granular) only from the Ventanas smelter and refinery.

<sup>8</sup>Figures included as part of kaolin or other clays production in U.S. Geological Survey Minerals Yearbook 2002 through 2005.

<sup>9</sup>Based on 63.17% potassium oxide equivalent for potassium chloride in Chile, as reported by SERNAGEOMIN, and rounded to four significant digits.

<sup>10</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: Ober, J.A., 2006, Potash, *in* Metals and minerals, v. 1 of U.S. Geological Survey Minerals Yearbook 2006, p. 58.1-58.9. (Accessed November 1, 2007, at <http://minerals.usgs.gov/minerals/pubs/commodity/potash/myb1-2006-potas.pdf>.)

<sup>11</sup>Includes production of natural sodium sulfate and anhydrous sodium sulfate, which are coproducts of the nitrate industry.

<sup>12</sup>Sulfur content of sulfuric acid as a byproduct of metallurgy and processing of mineral fuels, as reported by COCHILCO.

<sup>13</sup>Includes natural gasoline.

<sup>14</sup>Includes production from both imported and domestic petroleum, as reported by SERNAGEOMIN up to 2006 and by Empresa Nacional del Petróleo (ENAP) for 2006 .

TABLE 2  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Barite	Sociedad Minera Godoy Schwenger y Cia.	La Calera, Region V	400 <sup>e</sup>
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 I	12 <sup>e</sup>
Do.	S.Q.M. Boratos S.C.M. (Sociedad Química y Minera de Chile S.A., 100%)	Mine brines of Atacama Salar, and boric acid plant at Antofagasta, Region II	4 <sup>e</sup>
Do.	S.Q.M. Salar S.A. (do.)	Plant in Santiago Metropolitan Region	NA
Calcium carbonate, natural	Industria Nacional de Cemento S.A. (INACESA) (Cementos Bío Bío S.A., 100%)	Quarries and plant near Copiapo, Region III	NA
Do.	Empresas El Melón S.A. (Cemento Melón S.A., 100%)	Quarries and plant, Region V	NA
Do.	Alfredo Villalobos Román Tarsicio S.A.	Plant at Illapel, Region IV	NA
Do.	Cal Hur S.A.	Plant at Copiapo, Region III	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.	Sociedad Minera e Industrial Las Palmas Ltda.	Quarry and plant near La Serena, Region IV	NA
Do.	Mario Alberto Pizarro A. S.A.	Plant at Los Vilos, Region IV	NA
Do.	Minera del Fierro S.A.	Mine and plant at Teno, Region VII	NA
Do.	Minera Río Colorado S.A.	Mine and plant near Melipilla, Santiago Metropolitan Region	NA
Do.	Minera Trucco Ltda.	Mine and plant near Santiago, Santiago Metropolitan Region	NA
Do.	Sociedad Minera El Cristo Una de la Qda. De Pajonales	Quarry and plant near Copiapo, Region III	NA
Do.	Sociedad Minera Godoy Schwenger y Cia.	Mine and plant near La Calera, Region V	NA
Do.	Sociedad Minera Las Abuelitas Ltda.	Mine and plant near Melipilla, Santiago Metropolitan Region	NA
Do.	Sociedad Contractual Minera Farellones	Mine and plant near Illapel, Region IV	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.	2,300
Do.	Cemento Melón S.A. (Lafarge S.A., 82%, and other private, 18%)	La Calera plant, Region V	1,600
Do.	Cementos Bío Bío S.A. (private, 100%)	Talcahuano Plant, Region VIII	750
Do.	Industria Nacional de Cemento S.A. (INACESA)	Plant near Antofagasta City, Region II	500
Do.	do.	Plant near Curico City, Region VII	1,000
Clays, unspecified	Minera Pacífico Ltda.	Quarries and plants in Region VI, and plant in Santiago Metropolitan Region.	80 <sup>e</sup>
Do.	Compañía Minera Soledad Ltda.	Quarry and plant in Region VIII.	10 <sup>e</sup>
Do.	Sociedad Minera Casablanca S.A.	Quarry and plant in Santiago Metropolitan Region	NA
Do.	Sociedad Minera Godoy Schwenger y Cia.	Quarry and plant near La Calera, 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	100 <sup>e</sup>
Do.	Carbonífera Victoria de Lebu S.A. (Empresa Nacional del Carbón S.A., 99.99%, and other private 0.01%)	La Fortuna Mine near Lebu, Region VIII	NA
Do.	Inmobiliaria e. Inversiones Valle Hermoso Ltda.	Santa Fe 2 Mine near Curanilahue, Region VIII	NA
Do.	Chabunco S.A.	Bish Mine, Magallanes, Region XII	600 <sup>e</sup>
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>1</sup> ), and a sulfide-leach plant for cathode production, Region II	1,430
Do.	Compañía Minera Cerro Colorado (BHP Billiton Plc, 100%)	Cerro Colorado Mine and SX-EW <sup>1</sup> plant	120
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>1</sup> plant, at Ujina, Region I	460 <sup>e</sup>

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Copper, Cu content— Continued	Corporación Nacional del Cobre de Chile (CODELCO) (Government, 100%)	CODELCO Norte Division, including Chuquicamata, Mina Sur, and Radomiro Tomic Mines; and Chuquicamata SX-EW <sup>1</sup> plant (oxide), smelter, and refinery (oxide and sulfide), and Radomiro Tomic SX-EW <sup>1</sup> plant, Region II	970	
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 Río Blanco and Sur Sur Mines (concentrates), Region V	260	
Do.	do.	Salvador Division, including Campamento Antiguo, Damiana Norte, and Inca Mines (concentrates), and Potrerillos SX-EW <sup>1</sup> plant and refinery (cathodes), Region III	85	
Do.	Minera Los Pelambres S.A. (Antofagasta plc, 60%, and Japanese consortia, 40%)	Los Pelambres open pit mine and concentration plant, Region IV	360	
Do.	Minera El Tesoro S.A. (Antofagasta plc, 100%)	El Tesoro open pit mine and SX-EW <sup>1</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>1</sup> /sulfide leaching plant, Region II	55	
Do.	Empresa Nacional de Minería (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.	Minera Sur Andes Ltda. (Anglo American plc, 100%)	Los Bronces Mine (concentrates) and Tortolas SX-EW <sup>1</sup> plant (cathodes), Santiago Metropolitan Region	300	
Do.	do.	Chagres smelter (anodes and blister), Region V	162	
Do.	do.	El Soldado Mine (concentrates), Region V	70	
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>1</sup> plant, Region II	90	
Do.	do.	Mantoverde open pit mine and SX-EW <sup>1</sup> plant, Region III	60	
Do.	Xstrata Copper Chile S.A. (Xstrata plc, 100%)	Altonorte smelter (anodes and blister), La Negra, Region II	290	
Do.	Compañía Minera Xstrata Lomas Bayas (do.)	Lomas Bayas Mine and SX-EW <sup>1</sup> plant, Region II	65	
Do.	Sociedad Contractual Minera El Abra (Phelps Dodge Corp., 51%, and Corporación Nacional del Cobre de Chile, 49%)	El Abra Mine and SX-EW <sup>1</sup> plant, near Calama, Region II	248	
Do.	Cía. Contractual Minera Candelaria (Phelps Dodge Corp., 80%, and SMMA Candelaria Inc., 20%)	Candelaria open pit mine, underground mine, and concentration plant, near Copiapo, Region III	230	
Do.	Cía. Contractual Minera Ojos del Salado (Phelps Dodge Corp., 80%, and SMMA Candelaria Inc., 20%)	Ojos del Salado Mine and concentration plant, near Copiapo, Region III	15	
Do.	Compañía Minera Zaldívar (Barrick Gold Corp., 100%)	Zaldívar open pit mine and SX-EW <sup>1</sup> plant, Region II	150	
Do.	Compañía Minera Quebrada Blanca (Aur Resources Inc., 76.5%; Inversiones Mineras S.A., 13.5%; Empresa Nacional de Minería, 10%)	Quebrada Blanca open pit mine and SX-EW <sup>1</sup> plant, Region I	80	
Do.	Compañía Minera Carmen de Andacollo (Aur Resources Inc., 90%, and Empresa Nacional de Minería, 10%)	Andacollo Mine and SX-EW <sup>1</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.	Sulfatos del Norte S.A. (Sulfanor S.A.)	Santa Rosa and Isidora Mines and a plant at Calama, Region II	10,000
Diatomite		Celite Chile Ltda. (IMERYS S.A., 100%)	Plant at Port of Arica, Region I	30 <sup>e</sup>
Dolomite		Industrias Nacional de Cemento S.A. (INACESA)	Quarries and plant near Copiapo, Region III	30 <sup>e</sup>
Feldspar		Minera Alfa Quintay Ltda.	Quarry and plant, Santiago Metropolitan Region	10 <sup>e</sup>
Do.		Minera Pacífico Ltda.	Quarries and plants in Region VI, and plant in Santiago Metropolitan Region.	NA

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold:				
Metal ingots	kilograms	Corporación Nacional del Cobre de Chile, 100%	Ventanas refinery, Region V	6,000
Mine output	do.	Corporación Nacional del Cobre de Chile, 100% (byproduct of copper production)	Andina, CODELCO Norte, El Teniente, and Salvador Divisions	2,000 <sup>c</sup>
Do.	do.	Minera Escondida Ltda., 100%	Escondida copper mine and plants, Region II	5,600
Do.	do.	Cía. Contractual Minera Candelaria, 100%	Candelaria copper mine and plant, Region III	3,000 <sup>c</sup>
Do.	do.	Cía. Contractual Minera Ojos del Salado, 100%	Ojos del Salado copper mine and plant, Region III	470
Do.	do.	Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Region IV	1,200 <sup>c</sup>
Do.	do.	Empresa Nacional de Minería, 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 Mantos de Oro (Goldcorp Inc., 50%, and Kinross Gold Corp., 50%)	La Coipa Mine and plant, Region III, 140 kilometers north of Copiapo	8,000
Do.	do.	Sociedad Contractual Minera Purén (Compañía Minera Mantos de Oro, 65%, and Corporación Nacional del Cobre de Chile, 35%)	Purén extension of La Coipa Mine, Region III	17,000
Do.	do.	Compañía Minera Maricunga (Kinross Gold Corp., 50%, and Bema Gold Corp., 50%)	El Refugio open pit, heap-leach mine, Region III, 100 kilometers east of Copiapo	7,700
Do.	do.	Minera Meridian Ltda. (Meridian Gold Inc., 100%)	El Peñón Mine and concentration plant, Region I	7,500
Do.	do.	Minera Florida Ltda. (Meridian Gold Inc., 100%)	Minera Florida Mine and concentration plant, Region II	2,500
Do.	do.	Cerro Bayo Ltda. (Coeur d'Alene Mines Corp., 100%)	Cerro Bayo Mine and concentration plant, Laguna Verde, Region XI	1,300
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Breakwater Resources Ltd., 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	850
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 Lafarge S.A., 40.2%)	El Romeral quarry near Santiago, Santiago Metropolitan Region	50
Do.		Industria Nacional de Cemento S.A.	Mantos verdes quarry near Antofagasta City, Region II	17 <sup>c</sup>
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	5 <sup>c</sup>
Iodine	metric tons	SQM Químicos S.A. (Sociedad Química y Minera de Chile S.A., 100%)	Nueva Victoria Mine and plant, Region I; María Elena, Pampa Blanca, and Pedro de Valdivia Mines and plants, Region II	11,000
Do.	do.	Sociedad Contractual Minera Cosayach (Inverraz S.A., 100%)	Mine and plant near Iquique, Region I	4,000 <sup>c</sup>
Do.	do.	Atacama Minerals Chile Sociedad Contractual Minera (Atacama Minerals Corp., 100%)	Mine and plant in Aguas Blancas, Region II	1,500
Iron ore		Cía. Minera Santa Bárbara S.A. (Wyndham Explorations S.A. and Leonardo J. Farkas Klein, 51%, and Admiralty Resources NL, 49%)	Japonesa Mine, near Vallenar, Region III	1,500
Do.		Cía. Minera del Pacífico S.A. (subsidiary of CAP S.A.)	El Algarrobo Mine, El Algarrobito and Huasco concentration plants, and Huasco pellets plant, Region III; El Romeral and El Tofo Mines, and El Romeral concentration and pellets-feed plants, Region IV; and El Laco concentration plant, Region II	8,500
Do.		Cía. Minera Huasco S.A. (Cía. Minera del Pacífico S.A., 50%, and MC Inversiones Ltda., 50%)	Los Colorados Mine and concentration plant, Region III	NA
Kaolin		Minera Pacífico Ltda.	Quarries and plants in Region VI and plant in Santiago Metropolitan Region	20 <sup>c</sup>
Do.		Minera Trucco Ltda.	Quarry and plant in Santiago Metropolitan Region	NA
Do.	metric tons	Mario Alberto Pizarro A. S.A.	Plant at Los Vilos, Region IV	600 <sup>c</sup>
Lapis lazuli	do.	Las Flores de los Andes S.A.	Mine near Ovalle, Region IV	400 <sup>c</sup>

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Lead, mine output	metric tons	Minera Florida Ltda. (Meridian Gold Inc., 100%)	Minera Florida Mine and concentration plant, Region II	480 <sup>c</sup>
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Breakwater Resources Ltd., 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	250 <sup>c</sup>
Lime, hydraulic		Industria Nacional de Cemento S.A. (Cementos Bío Bío S.A., 100%)	Plants near Antofagasta City, Region II, and near Copiapo City, Region III	520
Do.		Soprocal Calerías e Industrias S.A.	Plant at Melipilla, Santiago Metropolitan Region	190 <sup>c</sup>
Lithium carbonate	metric tons	SQM Salar S.A. (subsidiary of Sociedad Química y Minera de Chile S.A.) (private, 100%)	Plant at Salar del Carmen, near the city of Antofagasta, Region II	30,000
Do.	do.	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	25,000 <sup>c</sup>
Manganese	do.	Manganesos Atacama S.A. (subsidiary of CAP S.A.)	Plant in Coquimbo city and mines in Region IV	15,000
Marble, dimension stone	do.	Pier Luigi Indri S.A.	Quarry at Cerrillos, Region III	200 <sup>c</sup>
Molybdenum, mine output	do.	Minera Sur Andes Ltda., 100%	Los Bronces Mine and Tortolas molybdenum flotation plant, Santiago Metropolitan Region	2,600
Do.	do.	Corporación Nacional del Cobre de Chile, 100%	CODELCO Norte Division, Region II	27,000
Do.	do.	do.	El Teniente Mine and Plant, Region VI	5,500
Do.	do.	do.	Andina Division, Region III	3,400
Do.	do.	do.	El Salvador Division, Region III	1,400
Do.	do.	Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Region IV	11,000
Do.	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and molybdenum plant, Region I	4,000
Natural gas	million cubic meters	Empresa Nacional del Petróleo S.A. (Government, 100%)	About 23 oilfields, including Costa Auera, in the Magallanes basin, Region XII	2,200 <sup>c</sup>
Petroleum	thousand 42-gallon barrels	do.	do.	6,500
Nitrates:				
Primarily sodium nitrate		SQM Nitratos S.A. (subsidiary of Sociedad Química y Minera de Chile S.A.) (private, 100%)	Maria Elena, Pampa Blanca, and Pedro de Valdivia Mines and plants, and Coya Sur plant, Region II	770
Primarily potassium nitrate		do.	do.	650
In fertilizer		Cosayach Nitratos S.A. (Inverraz S.A., 100%)	Mine and plant near Iquique, Region I	200 <sup>c</sup>
Do.		SQM Industrial S.A., 100%	Mine and plant near Santiago, in Region II	100 <sup>c</sup>
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
Phosphate rock, apatite		César B. Formas Ortiz S.A.	Mine near Chanaral, Region II	10 <sup>c</sup>
Do.		Compañía Minera El Sauce Ltda.	Mine near La Serena, Region IV	4 <sup>c</sup>
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	12 <sup>c</sup>
Do.		Sociedad Contractual Minera Bahía Inglesa	Seláqueos Mine near Bahía Inglesa, Region III	NA
Potash (KCL and K <sub>2</sub> SO <sub>4</sub> ), K <sub>2</sub> O content	metric tons	SQM Salar S.A. (subsidiary of Sociedad Química y Minera de Chile S.A.) (private, 100%)	Plant at Salar del Carmen, near the city of Antofagasta, Region II.	500 <sup>c</sup>
Do.	do.	Sociedad Chilena del Litio Ltda. (Chemetall GmbH, 100%) (Chemetall owned by Rockwood Holdings Inc., 100%)	Chemetalle Foote plant at La Negra, near the city of Antofagasta, Region II	NA
Pumicite, including pozzolan		Industrias Nacional de Cemento S.A. (INACESA)	Quarries and plant near Antofagasta, Region II, and near Curico, Region VII	200 <sup>c</sup>
Do.		Cemento Polpaico S.A.	Quarries and plant in Santiago Metropolitan Region	200 <sup>c</sup>
Do.		Compañía Minera Soledad Ltda.	Quarry and plant in Region VIII	NA
Do.		Empresas El Melón S.A.	Quarry at Rinconada Lo Vial near Maipu, and plant at Santiago, Santiago Metropolitan Region	1,200
Do.		Harborlite Chile Ltda. (IMERYS S.A., 100%)	Laguna del Maule Mine at Talca, Region VII, and plant at Santiago, Santiago Metropolitan Region	NA
Do.		Sociedad Minera Puzolana Maipú Ltda.	Quarry and plant near Maipu, Santiago Metropolitan Region	NA

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Pyrophyllite	metric tons	Sociedad Minera Godoy Schwenger y Cia.	Mine and plant near La Calera, Region V	1,800 <sup>c</sup>
Do.	do.	José Orrego Bugeño S.A.	Mine and plant near Chincolco, Region V	1,000 <sup>c</sup>
Do.	do.	Mario Alberto Pizarro A. S.A.	Plant at Los Vilos, Region IV	1,000 <sup>c</sup>
Rhenium, metal	kilograms	Molibdenos y Metales S.A. (private, 100%)	Nos plant, San Bernardo, 30 kilometers south of Santiago, Santiago Metropolitan Region	22,000 <sup>c</sup>
Salt, NaCl		Sociedad Minera Punta de Lobos Ltda. (Sociedad Minera Sal de América S.A., 100%)	Santiago	6,000
Do.		Empresa Cristina Guerra Leiva S.A.	California Mine near Iquique, Region I	NA
Do.		Inversiones Alpina Ltda.	Plant at Iquique, Region I	NA
Do.		José Iván Zabaleta Andrade Ltda.	Mine and plant near Iquique, Region I	NA
Do.		Sal Gema S.A.	do.	NA
Selenium	metric tons	Corporación Nacional del Cobre de Chile, 100% (byproduct of copper production)	Ventanas smelter and refinery, noble metals plants, Region V	720
Silica, quartz		Cedric Fernández y Compañía Ltda.	Mine and plant near Calama, Region II	100 <sup>c</sup>
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	20 <sup>c</sup>
Do.		Minera Alfa Quintay Ltda.	Quarry and plant, Santiago Metropolitan Region	30 <sup>c</sup>
Do.		Minera Pacífico Ltda.	do.	NA
Do.		Minera San Pedro Ltda.	Natacha Mine and El Rulo plant at Til-Til, Santiago Metropolitan Region	30 <sup>c</sup>
Do.		SLM Santa Dorila de las Arenitas	Mine and plant at Constitucion, Region VII	250 <sup>c</sup>
Do.		Vidrios Lirquén S.A.	Mine and glass plant at Lirquen, Region VIII	80 <sup>c</sup>
Do.		Minera Arsil S.A.	Mine and plant at Concepcion, Region VIII	50 <sup>c</sup>
Do.		Cristalerías Toro S.A.	Mine at Rancagua, Region VI	120 <sup>c</sup>
Do.		Minera Granos Industriales Ltda.	El Turco Mine and Migrin Plant near Cartagena, Region V	250 <sup>c</sup>
Do.		Productora Cuarzo El Peral Ltda.	El Peral Mine and plant near Cartagena, Region V	250 <sup>c</sup>
Do.		Sociedad Legal Minera Pedro Luís	Mine and plant near Copiapo, Region III	120 <sup>c</sup>
Silver:				
Metal grains	kilograms	Corporación Nacional del Cobre de Chile, 100%	Ventanas refinery, Region V	160,000
Mine output	do.	do.	Andina, CODELCO Norte, El Teniente, and Salvador Divisions	330,000 <sup>c</sup>
Do.	do.	Sociedad Contractual Minera Purén, 100%	Puren extension of La Coipa Mine, Region III	300,000 <sup>c</sup>
Do.	do.	Minera Meridian Ltda. (Meridian Gold Inc., 100%)	El Peñón Mine and concentration plant, Region I	200,000
Do.	do.	Minera Florida Ltda. (do.)	Minera Florida Mine and concentration plant, Region II	10,000
Do.	do.	Minera Escondida Ltda., 100%	Escondida copper mine and plants, Region II	185,000 <sup>c</sup>
Do.	do.	Compañía Minera Mantos de Oro, 100%,	La Coipa Mine and plant, Region III	140,000
Do.	do.	Empresa Nacional de Minería, 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.	Cerro Bayo Ltda. (Coeur d'Alene Mines Corp., 100%)	Cerro Bayo Mine and concentration plant, Region XI	72,000 <sup>c</sup>
Do.	do.	Compañía Minera Doña Inés de Collahuasi SCM, 100%	Collahuasi Mine and plants, Region I	60,000 <sup>c</sup>
Do.	do.	Minera Los Pelambres S.A., 100%	Los Pelambres Mine and plant, Region IV	42,000 <sup>c</sup>
Do.	do.	Minera Sur Andes Ltda., 100%	Los Bronces Mine and plants, Santiago Metropolitan Region	40,000 <sup>c</sup>
Do.	do.	Cía. Contractual Minera Candelaria, 100%	Candelaria Mine and concentration plant, Region III	30,000 <sup>c</sup>
Do.	do.	Cía. Contractual Minera Ojos del Salado, 100%	Ojos del Salado copper mine and plant, Region III	4,500 <sup>c</sup>
Do.	do.	Sociedad Contractual Minera El Toqui Ltda. (Breakwater Resources Ltd., 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	2,500
Sodium sulfate		SQM Químicos S.A. (Sociedad Química y Minera de Chile S.A., 100%)	Nueva Victoria Mine, Region I, and Maria Elena Mine and Coya Sur plant, Region II	80
Do.		Luís Rojas Guerra y Compañía Ltda.	Plant at Antofagasta, Region II	NA
Do.		Sociedad Legal Minera Santa Inés Uno de Antofagasta	Santa Ines Mine near Antofagasta, Region II.	NA

See footnotes at end of table.

TABLE 2—Continued  
CHILE: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Steel, crude	Cía. Siderúrgica Huachipato S.A. (subsidiary of CAP S.A.) (private, 100%)	Primary plant in Talcahuano and plant in Rengo, Region VIII	1,100
Do.	Gerdau AZA S.A. of Brazil	Steel plants in Renca and Colina, Santiago Metropolitan Region	420
Sulfuric acid	Xstrata Copper Chile S.A. (Xstrata plc, 100%)	Altonorte Smelter, Region II	700
Do.	Minera Sur Andes Ltda. (Anglo American plc, 100%)	Chagres Smelter, Region V	500
Do.	Corporación Nacional del Cobre de Chile, 100%	Ventanas sulfuric acid plant, Region V	360
Do.	do.	Caletones Plant, Region VI	1,000 <sup>e</sup>
Do.	do.	Chuquicamata Plant, Region II	500 <sup>e</sup>
Do.	do.	Portrerillos Plant, Region III	100 <sup>e</sup>
Do.	Empresa Nacional de Minería, 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 <sup>e</sup>
Do.	do. Standard Uno S.A.	Quarry and plant at Calama, Region II	6,000 <sup>e</sup>
Zeolites	do. Sociedad Legal Minera Serrín Tercera	Serrín Tercera Mine and Remulcao Plant at Talca, Region VII	300 <sup>e</sup>
Zinc in concentrate	do. Sociedad Contractual Minera El Toqui Ltda. (Breakwater Resources Ltd., 100%)	El Toqui Mine and Doña Rosa concentration plant, Region XI, 120 kilometers north of Coyhaique	35,000
Do.	do. Minera Florida Ltda. (Meridian Gold Inc., 100%)	Minera Florida Mine and concentration plant, Region II	2,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. NA Not available.

<sup>1</sup>Solvent-extraction/electrowinning.

TABLE 3  
CHILE: ESTIMATED MAJOR MINERAL INVESTMENTS ONGOING OR BUDGETED IN 2006<sup>1</sup>

(Million dollars)

Region	Project name	Commodity	Ownership	Total investment	Planned startup date
I	Arica ulexite treatment plant (expansion and modernization)	Boron compounds	Quimica e Industrial del Borax Ltda. (Quiborax), 100%	25	Mid-2007.
I	Choquelimpie Mine (exploration for potential restart)	Gold, silver	Compañía Minera Can Can S.A. (Empresas Copec S.A., 100%), 100%	NA	NA.
I	Collahuasi (extension, Rosario West)	Copper	Compañía Minera Doña Inés de Collahuasi SCM (Anglo American plc, 44%, Xstrata plc, 44%, and companies led by Mitsui & Co. Ltd., 12%)	500	2010.
I	Copaquire (exploration)	Copper, molybdenum	PBX Ventures Ltd. (on 100% earn-in option from Compañía Minera Huatacondo S.C.M. and S.L.M. Macate Primera de Huatacondo)	2 <sup>2</sup>	NA.
I	El Peñón Mine extension (including Fortuna deposit) and mill expansion	Gold, silver	Meridian Gold Inc., 100%	36 <sup>2</sup>	End of 2007.
I	María Elena Mine and plant (expansion)	Iodine, sodium nitrate	Sociedad Química y Minera de Chile S.A., 100%	177 <sup>2</sup>	2008.
I	Nueva Victoria Plant (expansion)	Iodine	do.	NA	2006.
I	Puerta Patillos (expansion of salt export terminal)	Salt	Sociedad Punta de Lobos S.A. (K+S Aktiengesellschaft, 100%)	11	2008.
II	Antofagasta Plant (expansion)	Lithium carbonate	Sociedad Química y Minera de Chile S.A., 100%	NA	Mid-2008.
II	Coya Sur Plant (expansion)	Potassium nitrate	do.	NA	2009.
II	Salar del Carmen Plant	Lithium hydroxide	do.	NA	2006.
II	El Abra sulfide leach, potentially including bioleaching (extension, in feasibility)	Copper cathodes	Sociedad Contractual Minera El Abra (Phelps Dodge Corp., 51%, and Corporación Nacional del Cobre de Chile, 49%)	350	2010.
II	Aguas Blancas Mine and Plant expansion (feasibility)	Iodine, potassium nitrate	Atacama Minerals Chile SCM (Atacama Minerals Corp., 100%)	100 <sup>3</sup>	Mid-2008.
II	Antucoya-Buey Muerto extension of Michilla Mine (prefeasibility)	Copper	Antofagasta Minerals S.A. (Antofagasta plc., 60%; Nippon Mining and Metals Company Ltd., 15%; Mitsubishi Materials Corp., 10%; Marubeni Corp., 8.75%; Mitsubishi Corp., 5%; Mitsui & Co., Ltd., 1.25%)	300 <sup>3</sup>	NA.
II	Cachinal (exploration)	Gold, silver	Valencia Ventures Inc., 100%	2 <sup>2</sup>	NA.
II	Esperanza (feasibility)	Copper, molybdenum	do.	1,100	2010.
II	Alejandro Hales (prefeasibility)	Copper	Corporación Nacional del Cobre de Chile, 100%	340 <sup>3</sup>	2011.
II	Chuquicamata underground sulfides extension (prefeasibility)	do.	do.	728 <sup>3</sup>	2011.
II	Chuquicamata smelter (expansion)	Copper anodes	do.	250	2007-10.
II	Bioleaching technology (for potential use in various mining operations)	Copper (bioleach)	BioSigma S.A. (Corporación Nacional del Cobre de Chile, 67%, and Nippon Mining & Metals Co., Ltd., 33%)	20 <sup>2</sup>	2011.
II	Gabriela Mistral ("Gaby")	Copper cathodes	(Corporación Nacional del Cobre de Chile, 100%, initially, and Minmetals Non-Ferrous Metals Co. Ltd. through 25% earn-in option)	874	End of 2008.
II	Escondida demonstration molybdenum recovery plant	Molybdenum from copper concentrate	Minera Escondida Ltd. (BHP Billiton Plc, 57.5%; Rio Tinto plc, 30%; Japan Escondida Corp., 10%; International Finance Corp., 2.5%)	12 <sup>3</sup>	NA.
II	Escondida sulfide leach, including bioleaching	Copper cathodes	do.	868	Mid-2006.
II	Spence	do.	do.	990	End of 2006.
II	Mejillones molybdenum concentrate processing plant	Ferromolybdenum, molybdenum oxides, rhenium metal	Molibdenos y Metales S.A. (MOLYMET), 100%	94 <sup>3</sup>	2010. <sup>4</sup>
II	Minera Florida Mine extension (feasibility)	Gold, silver, zinc	Meridian Gold Inc., 100%	4 <sup>2</sup>	2009.
II	Sierra Gorda (exploration)	Copper, molybdenum	Quadra Mining Ltd., 100%	4 <sup>2</sup>	NA.

See footnotes at end of table.

TABLE 3—Continued  
CHILE: ESTIMATED MAJOR MINERAL INVESTMENTS ONGOING OR BUDGETED IN 2006<sup>1</sup>

(Million dollars)

Region	Project name	Commodity	Ownership	Total investment	Planned startup date
III	Caserones (restart of Regalito Mine)	Copper	Minera Lumina Copper Chile S.A. [Pan Pacific Copper Company Ltd., 100% (Nippon Mining and Metals Company Ltd., 64%; Mitsui Mining and Smelting Company Ltd., 36%)]	700 <sup>3</sup>	2010.
III	Cerro Casale	Copper, gold	Minera Estrella de Oro Ltda. (Arizona Star Resources, 51%, and Bema Gold Corp., 49%)	1,960 <sup>3</sup>	2013.
III	El Morro/La Fortuna (prefeasibility)	do.	Xstrata plc, 70%, and Metallica Resources Inc., 30%	40	2012. <sup>4</sup>
III	Cerro Blanco (prefeasibility)	Titanium, rutile	Compañía Minera Rutile Resources Ltda. (White Mountain Titanium Corp., 100%)	2 <sup>2</sup>	NA.
III	Japonesa and Cerro Iman	Iron ore	Compañía Minera Santa Barbara (Admiralty Resources NL, 50%, and Farkas Klein family, 50%)	45	End of 2006.
III	Jeronimo (prefeasibility)	Gold	Agua de la Falda S.A. (Meridian Gold Inc., 56.7%, and Corporación Nacional del Cobre de Chile, 43.3%)	NA <sup>2</sup>	NA.
III	Pampa Austral tailings dam construction (CODELCO's Salvador Division)	Copper from tailings	Corporación Nacional del Cobre de Chile (CODELCO) (Government, 100%)	120	2007.
III	Pascua-Lama	Gold-silver	Barrick Gold Corp., 100%	1,750	2010.
III	Hernán Videla Lira Smelter (expansion)	Copper anodes	Empresa Nacional de Minería, 100%	28	2007.
III	Hierro Atacama I	Magnetite, from copper mine tailings	Cía. Minera del Pacífico S.A. (subsidiary of CAP S.A.) (private, 100%)	174	Mid-2008.
III	Hierro Atacama II, Cerro Negro Norte	Iron ore	do.	163 <sup>3</sup>	NA.
III	Tabaco (exploration)	Copper, gold	PBX Ventures Ltd. (on 100% earn-in option from Pora and Associates)	2 <sup>2</sup>	2009. <sup>4</sup>
III	Regalito (exploration and feasibility study on SX-EW <sup>5</sup> plant)	Copper cathodes	Pan Pacific Copper Ltd. (Nippon Mining & Metals Co. Ltd., 64%, and Mitsui Mining & Smelting Co. Ltd., 36%)	60	2009.
III	Relincho (exploration)	Copper, molybdenum	Global Copper Corp., 100%	2	NA.
III	Salado refinery (expansion)	Copper cathodes	Empresa Nacional de Minería (Government, 100%)	11	2007.
III	San Antonio (exploration to extend Salvador Mine)	Copper, gold	Corporación Nacional del Cobre de Chile (CODELCO) (Government, 100%)	NA	NA.
III	Santo Domingo (exploration)	Copper, gold	Far West Mining Ltd., 100%	7 <sup>2</sup>	NA.
III	Vallenar SX-EW <sup>5</sup> plant	Copper cathodes	do.	4	End of 2007.
III	Volcan (exploration)	Gold	Andina Minerals Inc., 100%	7 <sup>2</sup>	2009.
IV	Andacollo (restart)	Gold	Compañía Minera Dayton (Private, 100%)	5 <sup>2</sup>	2007.
IV	Andacollo Mine hypogene deposit (underground extension)	Copper, gold	Compañía Minera Carmen de Andacollo (Aur Resources Inc., 90%; Empresa Nacional de Minería, 10%)	336	2009. <sup>4</sup>
IV	Colihues El Teniente tailings launder (restart and modernization)	Copper sulfides, molybdenum	Minera Valle Central S.A. (Amerigo Resources Ltd., 100%)	30	2007.
IV	La Corona de Cobre (exploration)	Copper	Global Hunter Corp., 100%	1 <sup>2</sup>	NA.
IV	El Espino (exploration)	Copper, gold	Explorator Resource Inc., 100%	NA	NA.
IV	Delta concentration plant	Copper cathodes	Empresa Nacional de Minería (Government, 100%)	14	2008.
IV	El Mauro tailings dam	Copper	Antofagasta Minerals S.A. (Antofagasta plc., 60%; Nippon Mining & Metals Co. Ltd., 15%; Mitsubishi Materials Corp., 10%; Marubeni Corp., 8.75%; Mitsubishi Corp., 5%; Mitsui Mining & Smelting Co., Ltd., 1.25%)	535	End of 2007.
IV	Los Pelambres Mine (extension)	do.	do.	716	2009. <sup>4</sup>
IV	Punitaqui (mill expansion/upgrade; exploration near Cinabrio Mine)	Copper, gold	SMC Gold Limited, 100%	3 <sup>3</sup>	2007.
IV	El Romeral Mine low-grade ore processing	Iron ore	Cía. Minera del Pacífico S.A., 50%, and Jinan Iron & Steel Group Corp., 50%	40	2006.
V	Andina underground (expansion)	do.	Corporación Nacional del Cobre de Chile, 100%	578	End of 2009.
V	Nueva andina plant (prefeasibility)	Copper concentrate	do.	NA	2014.
V	Chagres Smelter (expansion)	Blister copper, anodes	do.	50	2006.
V	El Soldado Mine (extension)	Copper	do.	73	2007.

See footnotes at end of table.

TABLE 3—Continued  
CHILE: ESTIMATED MAJOR MINERAL INVESTMENTS ONGOING OR BUDGETED IN 2006<sup>1</sup>

(Million dollars)

Region	Project name	Commodity	Ownership	Total investment	Planned startup date
V	Puerto Montt (grinding plant)	Cement	Cementos Melon S.A. (LaFarge S.A., 84%, and other private, 16%)	20	Mid-2007.
V	New grinding plant	do.	do.	30 <sup>3</sup>	End of 2008.
V	Quintero Bay regasification plant	Natural gas	GNL Quintero S.A. [BG Group plc, 40%; Endesa S.A., 20%; Empresa Nacional del Petróleo (Government, 100%), 20%; Metrogas S.A., 20%]	940	2009.
V	Ventanas prototype plant to treat flue dust and recover metals	Arsenic, copper, lead, and zinc	New Energy and Industrial Technology Development Organization (Japanese Government), 75%, and Corporación Nacional del Cobre de Chile, 25%	4	2007.
V	Ventanas Smelter and Refinery (expansion)	Copper cathodes, gold and silver metal, selenium	Corporación Nacional del Cobre de Chile, 100%	75 <sup>3</sup>	2012-14.
V	Vizcachitas (exploration)	Copper, molybdenum	Global Copper Corp., 100%	1	NA.
Met.	Los Bronces Mine (expansion)	do.	Minera Sur Andes Ltda. (Anglo American plc., 100%)	1,200 <sup>3</sup>	2011. <sup>4</sup>
Met.	Central grinding plant	Cement	Cementos Bio Bio S.A., 100%	50	2008.
Met.	Colina plant (expansion)	Crude steel	Gerdau AZA S.A. of Brazil, 100%	50 <sup>3</sup>	2010. <sup>4</sup>
Met.	Nos molybdenum plant and smelter (expansion and modernization)	Ferromolybdenum, molybdenum oxides, rhenium metal	Molibdenos y Metales S.A. (MOLYMET), 100%	78	Mid-2007.
VI	Caletones Smelter (expansion)	Blister copper, anodes	Corporación Nacional del Cobre de Chile, 100%	249 <sup>3</sup>	2012. <sup>4</sup>
VI	El Teniente new mine level and concentration plant expansion	Copper concentrate	do.	846	End of 2007.
VI	Pilar norte (underground extension of El Teniente Mine)	Copper	do.	88	Mid-2009.
VIII	Talcahuano plant (expansion)	Crude steel, steel semimanufactures	Cía. Siderúrgica Huachipato S.A. (subsidiary of CAP S.A.), 100%	85	2008.
XI	Carrera and Colina (exploration)	Gold	Pacific Rim Mining Corp., 100%	NA	NA.
XI	Concordia (extension of El Toqui Mine)	Copper, gold, lead, silver, zinc	Breakwater Resources Ltd., 100%	9 <sup>2</sup>	Mid-2007.
XI	El Toqui milling plant (prefeasibility)	do.	do.	11 <sup>3</sup>	NA.
XII	Lago Mercedes	Natural gas	Empresa Nacional del Petróleo (Government, 100%)	70	2007. <sup>4</sup>
XII	Magallanes (exploration)	do.	do.	50	NA.

NA Not available. -- Zero.

<sup>1</sup>Estimated data are rounded to no more than three significant digits.

<sup>2</sup>Includes only project-specific capital expenditures budgeted for 2006.

<sup>3</sup>If approved.

<sup>4</sup>Not before this date.

<sup>5</sup>Solvent-extraction/electrowinning.