

# THE MINERAL INDUSTRY OF CHILE

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In 2003, the real gross domestic product of the Republic of Chile increased by 3.3% in constant 1996 Chilean pesos compared with the revised increase of 2.2% in 2002. Production of the mining sector increased by 5.4% owing to a recovery in the copper production level compared with that of 2002. This recovery of copper was mainly driven by increased demand from Asian countries, the coming onstream of new public and private projects, and resumption of the mining of higher grade ore and less stockpiling by some of the larger copper producers in the country (Central Bank of Chile, 2004, p. 13, 27-28).

## Government Policies and Programs

During the sale of the integrated Chilean copper producer Compañía Minera Disputada de Las Condes Ltda. to Anglo American plc. by Exxon Mobil Corp. in 2002, it was revealed that ExxonMobil had paid virtually no tax on the property during the preceding 25 years. This was mainly because Chile's 1974 investment law was designed to favor mining investment with big loopholes in the profit tax plan for mining companies and no royalty charges. This spurred the Chilean Government to draft legislation for a new mining royalty payment of up to 3%, which was being debated and modified throughout 2003. A vote was expected sometime in the latter half of 2004 (Economist, The, 2004).

## Structure of the Mineral Industry

The Chilean Government, through the Ministerio de Minería, exercised control of the mineral industry through three large state-owned mining companies and four regulatory agencies. The mining companies were the world's leading copper-producing company Corporación Nacional del Cobre (CODELCO), Corporación de Fomento de la Producción (CORFO), and Empresa Nacional de Minería (ENAMI). The subsidiaries of CORFO included Cía. Chilena de Electricidad S.A., Cía. de Acero del Pacífico S.A. de Inversiones, Empresa Nacional del Carbón S.A., and the state-owned oil company Empresa Nacional del Petróleo S.A. (ENAP). Sociedad Química y Minera de Chile S.A. (SQM) (formerly a subsidiary of CORFO) was privatized in 1988 (Sociedad Química y Minera, 2003<sup>1</sup>). The four regulatory agencies were the Comisión Chilena del Cobre, the Comisión Nacional del Medio Ambiente, the Comité de Inversiones Extranjeras, and the Servicio Nacional de Geología y Minería.

ENAMI processed, smelted, and refined minerals for small- and medium-scale mining companies. In 2002, ENAMI controlled concentrators at Matta, Ovalle, Taltal, and Vallenar in addition to the Paipote smelter and Las Ventanas smelter and

refinery. Las Ventanas smelter and refinery, which was located 8 kilometers from Quinteros in Region V, had an installed smelting capacity of 400 metric tons per year (t/yr) and a refining capacity of 315 t/yr.

CODELCO had four mining divisions (Andina, Codelco Norte, El Teniente, and Salvador) and one metal-mechanic division (Talleres); all were located in northern and central Chile. In 2003, CODELCO began a process of privatizing Fundación Talleres S.A. (a subsidiary foundry within its Talleres Division) by turning it into an independent company Sociedad Fundación Talleres S.A. In December 2003, 60% of the shares in Sociedad Fundación Talleres was sold to the private company Compañía Electro Metalúrgica S.A. in a public offering. Elecmetal sold some of the shares to other private interests and reduced its ownership share to 40% as of January 2004; CODELCO retained its 40% interest during the same timeframe (Corporación Nacional del Cobre, 2004, p. 14, 70).

SQM was the world's leading producer of specialty fertilizers, iodine, and lithium in 2003. The favorable atmospheric conditions of the Atacama Desert and the quality of the brines and caliche ore there allow SQM to be one of the lowest cost producers worldwide of, in order of economic importance, potassium chloride, lithium carbonate, potassium sulfate, and boric acid (Sociedad Química y Minera, 2004, p. 13).

In 2003, the mineral industry employed 95,222 people in Chile. This number included administrators, office personnel, mining personnel, and staff (Servicio Nacional de Geología y Minería, 2004, p. 134). All these employees worked directly in the mineral industry and included mining company workers and mining contractors' personnel. These workers were employed by either state or private firms in the metals, industrial minerals, and mineral fuels sectors.

## Production

In 2003, Chilean copper production increased by about 7% compared with that of 2002. Chile's copper production accounted for about 36% of global mine output of copper in 2003 (Comisión Chilena del Cobre, 2004, p. 83). By the end of 2003, CODELCO terminated its policy of stockpiling, which significantly reduced the company's sales, after the copper price recovered sufficiently. This policy left CODELCO with a stockpile of approximately 200,000 metric tons (t) at the end of the year (Corporación Nacional del Cobre, 2004, p. 7).

In 2003, copper prices averaged slightly below \$0.81 per pound on the London Metal Exchange; this was substantially higher than the 5-year low annual average price of less than \$0.71 per pound in 2002 (Comisión Chilena del Cobre, 2004, p. 92). In addition to reduced copper production from CODELCO during 2003, another significant producer, BHP Billiton plc., also reduced production (through selectively mining lower grades at its majority owned Escondida Mine) but also planned to terminate this policy by the end of 2003 in

<sup>1</sup>References that include a section mark (§) are found in the Internet References Cited section.

response to the recovery of copper prices towards the end of the year. The Escondida Mine remained one of the largest copper mines in the world with a copper production capacity of about 1.25 million metric tons per year (BHP Billiton plc., 2003, p. 27, 68).

## Trade

In 2003, exports of primary refined copper made up 35.4% of the total value of Chilean exports (Comisión Chilena del Cobre, 2004, p. 18). Chile had free trade agreements with Canada, Colombia, Costa Rica, Ecuador, the European Union, Mexico, the Republic of Korea, and Venezuela that provided for progressively more duty-free trade in most products. Chile was also an associate member of the Mercado Común del Cono Sur (MERCOSUR) (Argentina, Brazil, Paraguay, and Uruguay) and had a trade liberalization agreement with Bolivia. On June 9, 2003, Chile and the United States officially signed the U.S.-Chile Free Trade Agreement, which was expected to come into full effect in 2004 (U.S. Commercial Service, 2004§).

## Outlook

Copper prices are not the only mineral commodity prices that experienced a recovery by the end of 2003. Many firms in Chile have engaged in exploration and development of additional capacity during the previous 2 to 3 years, to be ready to increase the production of copper, gold, iodine, molybdenum, nitrates, silver, sodium sulfate, and zinc rapidly in 2004 and during the subsequent 2 to 3 years. Other mineral commodities, such as manganese, also appear to have been stockpiled while prices were low and may also be rapidly brought to market if prices continue to increase substantially.

The energy sector in Chile, however, has limited indigenous resources; Chile relies on imports for most of its hydrocarbon needs. Therefore, increased reliance upon hydropower for Chile's electricity needs does not appear to be avoidable any time soon, but strategies to smooth electricity provision by diversifying the backup technologies, which include a requirement for more oil-burning capability, appear to be important steps in a revised energy strategy (U.S. Energy Information Administration, 2004§).

## References Cited

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- Sociedad Química y Minera, 2004, Annual report 2003: Santiago, Chile, Sociedad Química y Minera de Chile, 128 p.

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- U.S. Commercial Service, 2004, U.S. exporter's guide to the U.S.-Chile Free Trade Agreement, accessed December 2004, at URL <http://www.buyusa.gov/chile/en/ftaguide.html>.
- U.S. Energy Information Administration, 2004 (September 1), Chile, Country Analysis Brief, accessed December 2004, at URL <http://www.eia.doe.gov/emeu/cabs/chile.html>.

## Major Sources of Information

- Ministerio de Minería (Ministry of Mines)  
Teatinos 120, Piso 7  
Santiago, Chile  
Telephone: (56-2)-671-2481  
Fax: (56-2)-698-9262  
Internet: [www.minmineria.cl](http://www.minmineria.cl)
- Comisión Chilena del Cobre (COCHILCO)  
Agustinas 1161 Piso 4  
Casilla 9493  
Santiago, Chile  
Telephone: (56-2)-672-6219  
Fax: (56-2)-672-3584  
Internet: <http://www.cochilco.cl>
- Instituto Nacional de Estadísticas (INE)  
Av. Presidente Bulnes 418  
Santiago, Chile  
Telephone: (56-2)-366-7777  
Fax: (56-2)-671-2169
- Servicio Nacional de Geología y Minería (SERNAGEOMIN)  
Avda. Santa María 0104  
Casilla 10465  
Santiago, Chile  
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## Major Publications

- Comisión Chilena del Cobre: Estadísticas del Cobre y otros Minerales, 1994-2003.
- Corporación Nacional del Cobre de Chile: Annual Report, 2003.
- Servicio Nacional de Geología y Minería: Anuario de la Minería de Chile, 2003.

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	1999	2000	2001	2002	2003
METALS					
Arsenic trioxide <sup>e</sup>	8,000	8,000	8,000	8,000	8,000
Copper:					
Mine output, Cu content <sup>3</sup>	4,391	4,602	4,739	4,581	4,904
Metal:					
Smelter, primary	1,474	1,460	1,503	1,439	1,542
Refined:					
Electrowon	1,362	1,373	1,538	1,602	1,653
Primary, other	1,304	1,296	1,344	1,248	1,249
Total	2,666	2,669	2,882	2,850	2,902
Gold, mine output, Au content	48,069	54,143	42,673	38,688	38,954
Iron and steel:					
Ore and concentrate:					
Gross weight	8,345	8,729	8,834	7,269	8,011
Fe content	5,215	5,455	5,437	4,398	4,500
Metal:					
Pig iron	1,030	1,024	897	934 <sup>r</sup>	988
Ferrous alloys: <sup>4</sup>					
Ferromanganese	2,833	4,011	2,213	-- <sup>r</sup>	-- <sup>e</sup>
Ferromolybdenum	2,079	1,454	1,784	1,784 <sup>r</sup>	3,170 <sup>e</sup>
Ferrosilicomanganese	2,048	1,800	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>e</sup>
Ferrosilicon	1,000	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>e</sup>
Total	7,960 <sup>r</sup>	7,265 <sup>r</sup>	3,997 <sup>r</sup>	1,784 <sup>r</sup>	3,170 <sup>e</sup>
Steel, crude	1,291	1,352	1,247	1,280	1,377
Semimanufactures	1,303	1,300 <sup>e</sup>	1,067	1,150	1,197
Lead, mine output, Pb content	608	785	1,193	2,895	1,697
Manganese ore and concentrate:					
Gross weight	40,505	41,716	31,320	12,195	19,641
Mn content <sup>e</sup>	11,915 <sup>s</sup>	12,271 <sup>s</sup>	9,130	3,190	3,200
Molybdenum:					
Mine output, Mo content	27,270 <sup>r</sup>	33,639 <sup>r</sup>	33,492	29,467 <sup>r</sup>	33,375
Oxides	9,699 <sup>r</sup>	9,724 <sup>r</sup>	8,813	7,716 <sup>r</sup>	5,398
Rhenium, mine output, Re content <sup>e,6</sup>	14,000	17,100	17,800	15,400 <sup>s</sup>	15,400
Selenium <sup>e</sup>	49,000	40,000	40,000	40,000	40,000
Silver	1,381	1,242	1,349	1,210	1,313
Zinc, mine output, Zn content	32,263	31,403	32,762	36,161	33,051
INDUSTRIAL MINERALS					
Barite	823	1,026	584	384	229
Borates, crude, natural, ulexite	324,691	337,966	327,743	431,293	400,603
Cement, hydraulic	3,036	3,377	3,513	3,522	3,600 <sup>e</sup>
Clays:					
Bentonite	1,104	1,314	1,695	632 <sup>r</sup>	748
Kaolin	4,361	6,445	5,300	6,164	11,500
Other, unspecified	53,721	23,387	28,330	35,091	51,622
Diatomite	14,477	13,384	22,705	30,274	25,594
Dolomite	20,016	12,506	29,940	31,439	17,308
Feldspar	1,346	2,311	2,867	3,069	6,690
Gypsum:					
Crude	886	376	517	610	662
Calcined	188	176	175	229	190
Iodine, elemental	9,317	10,474	11,355	11,648	15,580
Lime, hydraulic <sup>e</sup>	1,000	1,000	1,000	1,000	1,000
Lithium carbonate	30,231	35,869	31,320	35,242	41,667
Nitrogen, natural, crude nitrates:					
Sodium, NaNO <sub>3</sub>	751	800	868 <sup>e</sup>	951	919
Potassium, KNO <sub>3</sub>	165	188	204 <sup>e</sup>	223	215
Total	916	988	1,072	1,174	1,134

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>	1999	2000	2001	2002	2003
<b>INDUSTRIAL MINERALS--Continued</b>					
Phosphate rock (apatite):					
Gross weight	12,074	12,474	11,511	11,066 <sup>r</sup>	9,389
P <sub>2</sub> O <sub>5</sub> content	3,139	3,889	3,589	3,411	2,894
Phosphorite	8,334	6,050	7,466	8,475	11,911
Pigments, mineral, natural, iron oxide	9,992	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>e</sup>
Potash, K <sub>2</sub> O equivalent <sup>c</sup>	312,000 <sup>5</sup>	330,000	390,000	350,000	370,000
Potassium chloride, KCl thousand tons	600	550	648 <sup>e</sup>	665	680
Pozzolan do.	958	830	785	826	825
Pumice	--	--	--	354	417,023
Quartz, common thousand tons	577	576	538	879	765
Salt, all types do.	6,074	5,083	5,989	3,503	6,213
Sodium compounds, n.e.s. <sup>7</sup> , sulfate <sup>8</sup>	58,026	56,501	67,760	70,776	44,011
Sand and gravel, silica <sup>c</sup> thousand tons	300	300	300	300	300
Stone:					
Limestone, calcium carbonate do.	5,618	5,395	5,563	5,888	5,901
Marble	828	812	782	633	828
Sulfur, byproduct, from smelters and oil refineries	1,040,000	1,100,000	1,160,000	1,275,000	1,300,000 <sup>e</sup>
Talc	2,231	2,421	4,177	3,537	4,374
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal, bituminous and lignite thousand tons	508	509	578	452	359
Coke, coke oven do.	511	500 <sup>e</sup>	500	440	400 <sup>e</sup>
Gas, natural:					
Gross million cubic meters	2,957	2,702	2,684	2,543	2,181
Marketed <sup>c</sup> do.	1,900	1,900	1,900	1,800	1,700
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.	2,000	2,500	2,500	2,500	2,500
Total do.	3,000	3,500	3,500	3,500	3,500
Petroleum:					
Crude do.	2,314	2,050	2,425	2,116	1,319
Refinery products: <sup>9</sup>					
Liquefied petroleum gas do.	7,516 <sup>r</sup>	7,040 <sup>r</sup>	7,768 <sup>r</sup>	7,914 <sup>r</sup>	7,534
Gasoline:					
Aviation do.	119 <sup>r</sup>	116 <sup>r</sup>	5,381 <sup>r</sup>	68 <sup>r</sup>	97
Motor do.	18,611 <sup>r</sup>	19,008 <sup>r</sup>	17,808 <sup>r</sup>	18,396 <sup>r</sup>	19,712
Jet fuel do.	2,221 <sup>r</sup>	1,508 <sup>r</sup>	5,852 <sup>r</sup>	5,054 <sup>r</sup>	4,641
Kerosene do.	4,683 <sup>r</sup>	4,409 <sup>r</sup>	1,281 <sup>r</sup>	1,185 <sup>r</sup>	681
Distillate fuel oil do.	26,411 <sup>r</sup>	28,776 <sup>r</sup>	29,295 <sup>r</sup>	29,345 <sup>r</sup>	30,297
Residual fuel oil do.	8,843 <sup>r</sup>	10,457 <sup>r</sup>	10,207 <sup>r</sup>	9,210 <sup>r</sup>	12,332
Unspecified do.	5,007 <sup>r</sup>	6,368 <sup>r</sup>	1,898 <sup>r</sup>	2,124 <sup>r</sup>	2,119
Total do.	73,411 <sup>r</sup>	77,682 <sup>r</sup>	79,490 <sup>r</sup>	73,296 <sup>r</sup>	77,413

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised.

<sup>1</sup>Table includes data available through November 2004.

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

<sup>3</sup>Figures are the nonduplicate copper content of concentrates, blister and refined copper, measured at the last stage of commercial production, as reported by Comisión Chilena del Cobre. Mine production reported by Servicio Nacional de Geología y Minería for the same years was only slightly higher (0.01% to 0.95% higher).

<sup>4</sup>Source: Instituto Latinoamericano del Fierro y el Acero.

<sup>5</sup>Reported figure.

<sup>6</sup>Rhenium output based on information from Comisión Chilena del Cobre and includes rhenium content from Molymex S.A. de C.V. (Mexico) processed at Molibdenos y Metales S.A. (Chile).

<sup>7</sup>Not elsewhere specified.

<sup>8</sup>Includes production of natural sodium sulfate and anhydrous sodium sulfate, coproducts of the nitrate industry (salitre).

<sup>9</sup>Includes production from both imported and domestic petroleum, as reported by Servicio Nacional de Geología y Minería.