

# THE MINERAL INDUSTRY OF BOLIVIA

By Steven T. Anderson and Pablo Velasco

The Republic of Bolivia, which is located in central South America southwest of Brazil, has an area of about 1,098,580 square kilometers. In 2003, the population was about 8.6 million (U.S. Central Intelligence Agency, 2003§<sup>1</sup>). The gross domestic product (GDP) was about \$8.2 billion, which was about the same as that of 2002 (International Monetary Fund, 2003a§). The GDP per capita was about \$1,010 in terms of current (2003) prices, which was also about the same as that of 2002 (International Monetary Fund, 2003b§).

A shift within the Bolivian mineral industry toward more hydrocarbon production and away from the production of other minerals, as a percentage of the GDP, has been consistent during the past 6 years. The production of metallic and nonmetallic minerals contributed only 4.6% of the value of the real GDP in Bolivia in 2003 compared with 5.8% in 1997. The production of hydrocarbons, however, contributed about 6.0% of the value of real GDP in 2003 compared with only 4.8% in 1997 (Instituto Nacional de Estadística, 2004a§).

According to the American Chamber of Commerce in Bolivia, the country was traditionally a mining country that produced antimony, bismuth, copper, gold, lead, silver, tin, tungsten, and zinc. Bolivia has large reserves of gold, iron ore, lithium, natural gas, and petroleum. According to local experts, Bolivia was estimated to have untouched reserves of antimony, gold, iron, lead, lithium, silver, tin, and zinc (Barrau, Saenz, and Cronkhite, 2004, p. 11; Amcham Bolivia, 2004§).

## Government Policies and Programs

The President of Bolivia, whose family founded the most successful private mining company in Bolivia Compañía Minera del Sur S.A. (COMSUR), attracted only 22.5% of the popular vote before he was voted into office by Congress in August 2002. Officially, he occupied the office for less than a year before resigning in mid-October 2003. At that time, the presidency was taken over by his former vice president, who had been an independent candidate in the 2002 elections (Fox, 2003). The resignation took place amidst protests primarily voicing opposition to the Government's economic policies, which were perceived to favor the hydrocarbons sector over more-traditional labor-intensive sectors of the Bolivian economy, such as metals mining. The new president appointed a new cabinet that was popularly regarded as being more independent of the political establishment with which the former president was primarily associated (International Monetary Fund, 2004, p. 5).

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

## Structure of the Mineral Industry

In 2003, shortly after being appointed, the new Government began to propose changing the structure of the mining industry in Bolivia. The Viceministerio de Minería y Metalurgia (VMM), which is legally responsible for formulating mining policy for the development of the more-traditional mining sector, had been converted from a full ministry into a branch of the Ministerio de Desarrollo Económico (MDE) by the former president. The new Government planned to transfer the VMM to become a part of a new Ministerio de Minería e Hidrocarburos (MMH) and to shorten the VMM's name to Viceministerio de Minería but still maintain the same acronym VMM at the beginning of 2004. In 2003, the role of the VMM was largely unchanged from that of 2002. The VMM still controlled and participated in the mineral industry mainly through the state-run mining company Corporación Minera de Bolivia (COMIBOL) and through most of the same autonomous Government agencies (Barrau, Saenz, and Cronkhite, 2004, p. 4-5).

In 2003, the Viceministerio de Energía e Hidrocarburos (VEH) was also expected to be transferred from the MDE to the new MMH in 2004 to form the second main branch of the new Ministry. The name of the VEH was also scheduled to be shortened to just Viceministerio de Hidrocarburos, and the roles of the Government entities, which included those of the Superintendencia de Hidrocarburos and the state oil company Yacimientos Petrolíferos Fiscales Bolivianos, were basically unchanged from 2002 through 2003 (U.S. Energy Information Administration, 2004§).

COMSUR was considered to be a medium-scale mining company in Bolivia and was affiliated with 11 other medium-scale mining companies through the Asociación Nacional de Mineros Medianos (ANMM). These 12 companies employed 3,549 people. The company membership in ANMM remained basically the same in 2003 as it was in 2002 except that Cía. Minera Concepción S.A., which had produced metallic silver in the Department of Potosi, was replaced by Empresa Minera Paititi S.A. (Asociación Nacional de Mineros Medianos, 2004, p. 49, 57). Empresa Minera Paititi operated the Don Mario gold mine in the Chiquitania region of eastern Bolivia (Orvana Minerals, 2004, p. 3).

An extremely important component of the Bolivian mineral industry in 2003 (and historically) was made up of the small-scale mines, mining cooperatives, and artisanal miners. The mining cooperatives were grouped under the Federación Nacional de Cooperativas Mineras, and membership continued to grow steadily in 2003. In contrast, the number of noncooperative small-scale mines has been steadily decreasing since the 1970s. Many small-scale miners were previously employed by COMIBOL, but they have been steadily released into the private sector since about 1985. Officially, small-scale miners who do not belong to a cooperative are associated under the Bolivian Government's Cámara Nacional de Minería, but

a great many more may be independent of any association (Barrau, Saenz, and Cronkhite, 2004, p. 4).

## Production

At least partially owing to the recovery of most metal prices on the London Metal Exchange (LME) towards the end of 2003, the value of metals and minerals production in Bolivia increased to \$408.77 million, which was an increase of 10.24% compared with that of 2002 (Asociación Nacional de Mineros Medianos, 2004, p. 88). As gold production continued to wane in 2003, zinc production again dominated the Bolivian nonhydrocarbon mineral industry in terms of value and volume (Barrau, Saenz, and Cronkhite, 2004, p. 7-8). Zinc also dominated the nonhydrocarbon mineral export sector for Bolivia as it has since 1997 (Instituto Nacional de Estadística, 2004b§).

In 2003, Bolivian mine production of ulexite (a boron mineral) increased by slightly more than 170% compared with that of 2002. Copper became a significant product for the medium-scale Empresa Minera Unificada S.A. (EMUSA), which had traditionally produced antimony but has been in the process of diversifying its interests into copper, silver, and zinc since antimony prices fell at the end of the 1990s. In 2003, EMUSA did restart some antimony production as well, and Bolivian production of antimony increased by 24.6% compared with that of 2002. Bolivian production of many other metals, which included tungsten (10.5%), tin (9.9%), silver (3.3%), and zinc (2.4%), increased significantly as well. In 2003, gold experienced the biggest decrease in production owing to the closure of the Kori Kollo gold mine. The decrease in gold production amounted to 16.8% compared with that of 2002. Bolivian lead production decreased by about 1.5% (Asociación Nacional de Mineros Medianos, 2004, p. 20, 63).

## Trade

In 2003, the external economy continued to be a strong driving force in a trend toward increased production of hydrocarbons and decreased production of metallic and nonmetallic minerals as percentages of Bolivia's GDP and exports (Fox, 2003). In 1997, the entire mineral industry contributed almost one-half of the total value of Bolivia's exports; those of metallic and nonmetallic minerals accounted for \$499.6 million, and those of hydrocarbons, \$107 million. In 2003, the entire mineral industry still contributed about the same proportion of the total value of exports; exports of metallic and nonmetallic minerals, however, were valued at only about \$367.3 million, which was still an increase of 6% compared with that of 2002. Hydrocarbon exports totaled slightly more than \$496.5 million, which was an increase of more than 43% compared with that of 2002. This trend continued to reflect the growing dominance of natural gas exports, which were valued at \$381.8 million in 2003 (Instituto Nacional de Estadística, 2004b§).

At the beginning of 2003, Bolivia had a limited trade agreement and a large trade deficit with Chile. In an effort to reverse the negative trade figures with Chile, the Governments of both countries began negotiating a new bilateral free trade

agreement (FTA). Hydrocarbons, sodium borates, and tin were among the products that were to have benefited the most from a new agreement. Shortly after October 2003, however, the new Bolivian Government put a hold on FTA negotiations with Chile because the Bolivian public appeared to be extremely concerned that Chile would benefit more from an FTA and demonstrated strongly against such an agreement (U.S. Embassy, La Paz, Bolivia, 2003§).

In November 2003, the U.S. Trade Representative announced plans to begin negotiations for an FTA with Colombia and Peru and expressed interest in including Bolivia and Ecuador. Negotiations were set to begin in mid-2004. In 2003, trade between Bolivia and the United States was conducted under the Andean Trade Preference Act, which will expire in 2006 (U.S. Trade Representative, 2003§).

A significant problem for the mining industry of Bolivia in 2003 was the drastic decrease in foreign direct investment (FDI). Amidst the civic unrest and political uncertainty in Bolivia, total FDI fell to about \$566.9 million in 2003 from about \$999 million in 2002. In 2003, the nonhydrocarbon mining sector remained a proportionally small recipient of total FDI in the Bolivian economy with only \$20.46 million in FDI. This still represented somewhat of a recovery in FDI for this sector of the minerals industry, which had already suffered a 66.5% decrease in 2002 compared to that of 2001. In 2003, FDI in the Bolivian metallic and nonmetallic minerals sector was still only about 59% of what it had been in 2001. U.S.-based companies continued to decrease their participation in global FDI into this sector of the Bolivian economy as Panama-based companies became newly dominant. Although companies based in the Cayman Islands and in the United Kingdom were also significant contributors to global FDI, this sector still only attracted about 8% as much FDI to the Bolivian economy in 2003 as the hydrocarbons sector in spite of the sharp decrease of global FDI in the hydrocarbons sector in 2003 (Instituto Nacional de Estadística, 2005a§, b§).

In 2003, total FDI for exploration and exploitation of Bolivian petroleum and natural gas totaled about \$247.8 million, which was a decrease of 46.5% compared with that of 2002; this was 43.7% of all FDI in the Bolivian economy in 2003, which was similar to that of 2002. The FDI in the hydrocarbons sector decreased proportionally with the decrease of total FDI in Bolivia in 2003 (Instituto Nacional de Estadística, 2005a§). In 2003, U.S. FDI in Bolivia was concentrated primarily in the hydrocarbons and construction sectors, which followed a similar pattern to that of 2002 (U.S. Embassy, La Paz, Bolivia, 2003§).

## Commodity Review

### Metals

**Antimony.**—Antimony prices more than doubled on the LME during 2002, and the average price was even higher in 2003 compared with that of 2002 despite an eventual decrease towards the end of 2003. Higher prices encouraged an increase in Bolivian antimony mine output. The approximate 25% increase in production compared with that of 2002 was mostly the result of EMUSA restarting some of its antimony production

in 2003. Small-scale mining operations still produced 89% of total Bolivian mine output of antimony, which was mostly in the form of antimony concentrates (Asociación Nacional de Mineros Medianos, 2004, p. 75, 80, 85).

In 2003, the Vinto antimony smelter produced no antimony metal, just as it had not produced antimony metal in 2002. This smelting plant was owned by Cía. Minera Colquiri S.A. (CMC), which was a joint venture between COMSUR (51%) and Commonwealth Development Corp. Capital Partners plc of London, United Kingdom (49%). Most antimony mine output was exported for smelting outside of Bolivia, even as far away as China (Mining Journal, 2003). The small amount of metallic antimony produced in Bolivia appeared to have been the exclusive output of small private smelting operations (Asociación Nacional de Mineros Medianos, 2004, p. 65).

**Gold.**—In 2003, reported gold production was substantially lower than that of 2002. The closure of the Kori Kollo open pit gold mine in October 2003 was the primary cause of this decrease in Bolivian mine output of gold (Asociación Nacional de Mineros Medianos, 2004, p. 10). The mine was owned by Empresa Minera Inti Raymi S.A., in which Newmont Mining Corporation of Denver, Colorado, had an 88% interest. After closing the mine, Newmont maintained its presence in Bolivia to conduct further exploration at its nearby Kori Chaka gold project (Newmont Mining Corporation, 2005§). Such exploration and new gold projects became more favorable from an investment perspective in 2003 owing to the increase in the annual average price of gold of almost 17% above that of 2002 on the LME. About 66% of Bolivian gold production came from the medium-scale mining sector, and the remaining 34%, from small-scale mining cooperatives (Asociación Nacional de Mineros Medianos, 2004, p. 76, 88).

Because the Kori Kollo Mine had accounted for about 75% of Bolivia's annual gold production during the previous 15 years, its closure could have had an even larger impact in 2003 if it were not for new gold production elsewhere in Bolivia. The Don Mario gold project in the Chiquitania region of eastern Bolivia started commercial production on July 1, 2003, and produced about 535.3 kilograms (kg) of gold during the last 6 months of 2003. In 2003, the operator of this mine, Empresa Minera Paititi, was a wholly owned subsidiary of Toronto, Ontario, Canada-based Orvana Minerals Corp.; Orvana's controlling shareholder was COMSUR (Orvana Minerals, 2004, p. 3-4). Golden Eagle International Inc. of Salt Lake City, Utah, had its first full year of gold production out of its Cangalli properties in the Tipuani Gold Mining District and produced about 173 kg of gold in 2003 (Simpson, 2004§).

**Lead, Silver, and Zinc.**—In 2003, 77% of Bolivia's total mine output of zinc was produced by COMSUR or CMC, and 18% was produced by the small-scale mining sector; the remainder was produced by medium-scale mining firms. Reported Bolivian production of silver and zinc increased significantly in 2003 compared with that of 2002; production of lead decreased slightly. In 2003, COMSUR produced about 56% of the lead in Bolivia and almost 50% of the silver. Small-scale mines and cooperatives produced about 35% of the lead and 42% of the silver. The remainder of Bolivian lead and silver

was produced by other medium-scale mining firms (Asociación Nacional de Mineros Medianos, 2004, p. 20, 77-79).

The San Bartolome silver project, which was located on the flanks of Cerro Rico near Potosí and owned by Cía. Minera Manquiri S.A. (a subsidiary of Coeur d'Alene Mines Corporation of the United States), was expected to begin production of silver in mid-2004. The San Cristobal mining project was expected to begin production of, in order of expected value, silver, zinc, and lead by the end of 2004. In 2003, the San Cristobal project was owned by Apex Silver Mines Limited of the Cayman Islands and was considered to be Bolivia's largest pending mining project (Barrau, Saenz, and Cronkhite, 2004, p. 10).

**Tin.**—In 2003, small-scale mines and cooperatives produced 57% of the total amount of mine output of tin in Bolivia, and the medium-scale mining sector officially produced 43%. COMIBOL stopped its official tin production in 2000 and still did not report any official production of tin during 2003, although it managed mining operations at the Huanuni tin mine after taking over the administration and direction of Empresa Minera Huanuni S.A. in 2002. Empresa Minera Huanuni operated the Huanuni tin mine in 2003 (Asociación Nacional de Mineros Medianos, 2004, p. 21, 76).

### **Mineral Fuels**

Bolivia produced more petroleum and more natural gas in 2003 than in 2002. Bolivia had about 957 million barrels in proven and probable petroleum reserves and more than 1.55 trillion cubic meters in proven and probable natural gas reserves (Instituto Nacional de Estadística, 2005a§).

The natural gas industry was predominantly export oriented in 2003, and almost 83% of natural gas sales was to consumers in foreign countries, primarily Argentina and Brazil (Instituto Nacional de Estadística, 2005a§). Reorganization of this industry to placate domestic consumption needs was under review by the new Bolivian Government. Enron Corp. of Houston, Texas, was a major investor in much of the pipeline network to export natural gas from Bolivia, especially the pipelines that exported natural gas to Brazil. After undergoing further corporate restructuring in 2003, Enron's interests in these and other Bolivian projects were turned over to an independent company, Prisma Energy International Inc. (GasOriente Boliviano Ltda., undated§).

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## Major Sources of Information

### Asociación Nacional de Mineros Medianos (ANMM)

Calle Pedro Salazar No. 600  
Casilla 6190  
La Paz, Bolivia  
Telephone: (591-2) 417522

### Instituto Nacional de Estadística - Bolivia (INE)

Calle José Carrasco N° 1391  
Casilla Postal 6129  
La Paz, Bolivia  
Telephone: (591-2) 222333  
Internet: <http://www.ine.gov.bo>

### Vice Ministerio de Minería y Metalúrgia

Ave. Mariscal Santa Cruz  
Palacio de Comunicaciones Piso 14  
La Paz, Bolivia  
Telephone: (591-2) 371165  
Fax: (591-2) 359998

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	1999	2000	2001	2002	2003	
<b>METALS<sup>3</sup></b>						
<b>Antimony:</b>						
Mine output, Sb content	2,790	1,907	2,264	2,336	2,911	
Metal, including Sb content of trioxide	2,241	1,285	1,992	195	195 <sup>P</sup>	
Arsenic, mine output, arsenic trioxide, arsenic sulfide	437	318	846	237	276	
<b>Bismuth:</b>						
Mine output, Bi content	57 <sup>r</sup>	6 <sup>r</sup>	8 <sup>r</sup>	20 <sup>r</sup>	72	
Metal, smelter	19 <sup>r</sup>	14 <sup>r</sup>	66	88 <sup>r</sup>	88 <sup>P</sup>	
Copper, mine output, Cu content	252	110	18	3	182	
Gold, mine output, Au content <sup>4</sup>	kilograms	11,788	12,001	12,395	11,256	9,362
<b>Lead:</b>						
Mine output, Pb content	10,153	9,523	8,857	9,893	9,740	
Metal, smelter, primary	kilograms	45	251	106	947	947 <sup>P</sup>
<b>Silver:</b>						
Mine output, Ag content	do.	422,492	433,592	411,000 <sup>r</sup>	450,311	465,309
Refined <sup>5</sup>	do.	72,195	55,720	32,603	31,871	31,871 <sup>P</sup>
Tantalum, tantalite	do.	8,808	9,443	11,992	10,823	10,070
<b>Tin:</b>						
Mine output, Sn content	12,417	12,464	12,352 <sup>r</sup>	15,242	16,755	
Metal, smelter	11,166	9,353	11,292	10,976 <sup>r</sup>	10,976 <sup>P</sup>	
Alloys	75	217	139	257	257 <sup>P</sup>	
Tungsten, mine output, W content	421 <sup>r</sup>	496 <sup>r</sup>	671 <sup>r</sup>	503 <sup>r</sup>	556	
Zinc, mine output, Zn content	146,316	149,134	145,306 <sup>r</sup>	141,558	144,985	
<b>INDUSTRIAL MINERALS</b>						
Amethyst (gemstones, rough)	kilograms	314	320	65	--	144
Barite	6,005	3,050	6,253	15,556 <sup>r</sup>	1,851	
Bentonite	50 <sup>e</sup>	--	159	216	227	
Cement, hydraulic	thousand metric tons	1,201	1,072	983	1,010	1,138 <sup>P</sup>
Marble	468	673	374	374	281	
Quartz	kilograms	36	--	7	3	11,422
Salt	688	732 <sup>r</sup>	308	3,834	2,271	
Slate, pizarra	198	269	246	306	228	
Ulexite	25,918 <sup>r</sup>	43,289 <sup>r</sup>	32,477	40,479 <sup>r</sup>	109,545	
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
<b>Gas, natural:</b>						
Gross	million cubic meters	5,004 <sup>r</sup>	5,703 <sup>r</sup>	7,155 <sup>r</sup>	8,901 <sup>r</sup>	10,202 <sup>P</sup>
Marketed	do.	2,612 <sup>r</sup>	3,598 <sup>r</sup>	5,275 <sup>r</sup>	6,421 <sup>r</sup>	7,398 <sup>P</sup>
<b>Petroleum:</b>						
Crude	thousand 42-gallon barrels	10,680	10,107	11,424	11,338	12,223 <sup>P</sup>
<b>Refinery products:</b>						
Liquefied petroleum gas	do.	594 <sup>r</sup>	528 <sup>r</sup>	528 <sup>r</sup>	612 <sup>r</sup>	695 <sup>P</sup>
Gasoline	do.	4,024 <sup>r</sup>	3,853 <sup>r</sup>	3,439 <sup>r</sup>	3,449 <sup>r</sup>	3,450 <sup>P</sup>
Jet fuel	do.	1,044 <sup>r</sup>	945 <sup>r</sup>	854 <sup>r</sup>	909 <sup>r</sup>	944 <sup>P</sup>
Kerosene	do.	211 <sup>r</sup>	221 <sup>r</sup>	156 <sup>r</sup>	162 <sup>r</sup>	166 <sup>P</sup>
Distillate fuel oil	do.	2,979 <sup>r</sup>	2,738 <sup>r</sup>	2,923 <sup>r</sup>	3,018 <sup>r</sup>	3,186 <sup>P</sup>
Other <sup>6</sup>	do.	48 <sup>r</sup>	49 <sup>r</sup>	74 <sup>r</sup>	82 <sup>r</sup>	83 <sup>P</sup>
Total <sup>e</sup>	do.	8,900 <sup>r</sup>	8,334 <sup>r</sup>	7,974 <sup>r</sup>	8,232 <sup>r</sup>	8,524 <sup>P</sup>

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

<sup>1</sup>Table includes data available through February 3, 2005.

<sup>2</sup>In addition to the commodities listed, a variety of industrial minerals (clays, crushed and broken stone, dimension stone, and sand and gravel) are produced, but available information is inadequate to make reliable estimates of output levels.

<sup>3</sup>Unless otherwise specified, data represent actual production by Corporación Minera de Bolivia and small- and medium-scale mines.

<sup>4</sup>Includes production of metallic gold.

<sup>5</sup>Includes production of metallic silver.

<sup>6</sup>Includes sums of reported figures for asphalt, greases, motor oil, and paraffin that are converted from metric tons to equivalent barrels.