



2006 Minerals Yearbook

BOLIVIA

THE MINERAL INDUSTRY OF BOLIVIA

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The mineral industry has a long history in the Republic of Bolivia, where, during different periods, the country has been a globally significant producer of antimony, cadmium, gold, lead, silver, tin, tungsten, and zinc. In the mid-1980s, however, international tin prices decreased precipitously, and the prices of Bolivia's other important metal export commodities also declined. Natural gas replaced combined metals and industrial minerals as the country's leading export. In 2006, Bolivia produced about 6% of the world's total mine output of tin; 5%, of antimony; 2%, of zinc; slightly greater than 1%, of bismuth and boron; and approximately 1%, of tungsten. Bolivia's proven reserves of natural gas were second only to those of Venezuela among South American countries. Tin, some antimony, and small amounts of some other mined minerals were refined or further processed into mill products in the country, but most were exported in crude form via rail to ports on the coasts of Argentina, Brazil, Chile, or Peru and then shipped further on to processing facilities located mostly in Europe. Natural gas, however, was exported mostly to Brazil, in accordance with longstanding supply contracts; most of the remainder of natural gas production was exported to Argentina, although the supply contracts with Argentina have a clause that promises delivery of natural gas up to a certain amount only if it is available. Bolivia produced mainly ores, concentrates, and mineral fuels in crude form, which were shipped to foreign countries for further processing and consumption (Petroleum Economist, 2006; U.S. Library of Congress, Federal Research Division, 2006, p. 9-10, 12-13; Banco Central de Bolivia, 2007, p. 8; BP p.l.c., 2007, p. 22; U.S. Commercial Service, 2007, p. 7).

Minerals in the National Economy

In 2006, the output of the mineral industry of Bolivia accounted for about 11% (\$1,240 million¹) of the country's gross domestic product (GDP) compared with about 10% (\$947 million) in 2005. The mineral fuels sector accounted for about 6.5% (\$730 million) of the GDP and the mining sector accounted for about 4.5% (\$614 million) compared with 6.5% (\$510 million) and 3.5% (\$333 million), respectively, in 2005. An estimated 41,800 small-scale, cooperative, and artisanal (SMACA) miners were officially registered with a cooperative in 2006, and it was thought that many more SMACA miners in Bolivia were not officially accounted for. In contrast, only about 7,000 people were employed by medium-scale mining operations that used modern mining methods, and this figure included administrative staff, executives, mine workers, and technicians (Ministerio de Minería y Metalurgia, Bolivia, 2006; Instituto Nacional de Estadística, Bolivia, 2007a; International Monetary Fund, 2007).

¹Where necessary, nominal values have been converted from Bolivian bolivianos (Bs) to U.S. dollars (US\$) at an annual average exchange rate of Bs7.97=US\$1.00 for 2006. All values are nominal, at current 2006 prices, unless otherwise stated.

Total foreign direct investment (FDI) in Bolivia's oil and gas sector was about \$463 million in 2002 but decreased to \$248 million in 2003, \$184 million in 2004, \$139 million in 2005, and an estimated \$105 million in 2006. Although there was some concern that increased political risk in the mineral fuels sector might affect FDI in the mining sector as well, there was no apparent spillover through 2006. In 2002, annual FDI in the mining sector was already at its lowest level (\$11.56 million) since at least 1996, but in 2003, FDI in the mining sector nearly doubled to \$20.46 million; it increased again to \$44 million in 2004; to about \$183 million in 2005; and to an estimated \$251 million in 2006. Thus, investment by foreign-based private mining companies increased by about 37% in 2006 compared with that of 2005 despite various Government announcements in favor of nationalization of the mining sector during the year, including an announcement of a new national mining policy in October 2006 (Instituto Nacional de Estadística, Bolivia, 2006; Banco Central de Bolivia, 2007, p. 17; Metal Bulletin, 2007; Mining Journal, 2007a; Cámara Boliviana de Hidrocarburos, 2008, p. 53-57).

Government Policies and Programs

On May 2, 2006, the Government officially nationalized the petroleum and natural gas sector. This meant that the state-owned mineral fuels company Yacimientos Petrolíferos Fiscales Bolivianos (YPFB) was expected to acquire at least 51% of approximately five subsidiaries of private foreign-based mineral fuels companies and to occupy at least four out of the seven seats on the boards of directors for these five Bolivian subsidiaries. Also, 44 joint-venture contracts between about 14 private oil and gas companies and YPFB were (re)negotiated through the end of October 2006 and signed by the end of the year. These contracts represented agreements on tax and royalty rates to be paid to the Government, and on how much of the net transaction costs would be paid in cash, in stock, or by future sales of production. The details of these contracts were not available at the time of this writing, but they reportedly varied from company to company, mostly owing to the size of the deposits being exploited (Ministerio de Hidrocarburos y Energía, Bolivia, 2006; Olson, 2006; Petroleum Economist, 2006).

In 2006, Glencore International AG of Switzerland, Newmont Mining Corp. of Denver, Colorado, and Orvana Minerals Corp. of Canada, together accounted for about 60% of the total value of mining sector exports in Bolivia, which generated about \$630 million in export revenue from combined exports of gold, lead, silver, tin, and zinc. During the year, the Government reportedly collected only about \$45 million in taxes from the entire private mining sector, which was cited as evidence in favor of the (re)nationalization of mining in the country. During the year, various Government announcements were made concerning higher mining taxes, limited expropriations, and

even nationalization of the entire metals sector (Mining Journal, 2007a; Platts Metals Week, 2007a).

Production

Data on mineral production are provided in table 1. Mine and metals production data from the Ministerio de Minería y Metalurgia (MMM), Bolivia, were publically available only for the first 6 months of 2006, and more-reliable data were not available. Therefore, most of the production figures for 2006 in table 1 are estimated, and changes in production may not have been as volatile as they appear. In 2006, production of natural gas increased compared with that of 2005 because investment in immediate exploitation of the oil and gas deposits (investment in production during 2006, but not necessarily beyond that) accounted for a growing percentage of total annual investment by private foreign-based mineral fuel companies; investment in exploration, development, and future production accounted for an ever smaller share of the total FDI in the oil and gas sector (table 1; Instituto Nacional de Estadística, Bolivia, 2006; Banco Central de Bolivia, 2007, p. 17; Ministerio de Minería y Metalurgia, Bolivia, 2007, p. 1; Cámara Boliviana de Hidrocarburos, 2008, p. 53-57).

Mine production of bismuth increased substantially in percentage terms, but the volume of production remained very small and could have been the result of test sampling performed by Mining and Chemical Products Ltd. of the United Kingdom at the former Aramayo bismuth mine, which was closed in the 1970s. Reliable data concerning the estimated increase in copper production were not available, although Orvana reported that a prefeasibility study at the Don Mario Mine indicated the possibility of being able to mine some copper there. The increase in gold production may be understated in table 1 because Newmont reported that the Kori Kollo (Kori Chaca) Mine produced about 1,067 more kilograms (kg) of gold compared with 2005, and Orvana reported that the Don Mario Mine produced about 350 kg more gold. However, reliable data concerning gold production by SMACA miners in 2006 were not available. The estimated percentage increase in the production of lead metal appears to be substantial, but the volume of the increase is very small, and reliable information concerning the source of this increase was not available. The increases in mine output of silver and in refined silver (mostly contained in gold-silver doré) were primarily owing to increased production at the Don Mario and the Kori Kollo Mines and plants. The percentage changes in the production of tantalite and tungsten were also large, but the levels of production were not globally significant. Mine output of zinc continued to increase significantly, although Glencore controlled the majority of production and was faced with repeated challenges by the Government concerning the company's ownership rights to its mining and metallurgical properties in Bolivia (table 1; Orvana Minerals Corp., 2006a, p. 3-4, 9, 14; Mining Journal, 2007b; Ministerio de Minería y Metalurgia, Bolivia, 2007, p. 2, 7; Newmont Mining Corp., 2007, p. 24, 65; O'Connell and Azzopardi, 2007).

Since June 2004, mine production of ulexite (a boron mineral) and salt had continued to decrease since the Government retracted the licenses to mining concessions in the Salar de

Uyuni, Potosi Department, from Quimica e Industrial del Borax Limitada (Quiborax) of Santiago, Chile. Production of amethyst was estimated to have increased substantially, although this may have resulted from some change in classification (because production of all other gemstones decreased). Cement production increased significantly, and this helped satisfy the increased demand for construction materials by mining and metallurgical projects, including construction of the San Cristobal and the San Bartolome Mines, and renovation of the Karachipampa smelting complex (table 1; Industrial Minerals, 2006; Apex Silver Mines Ltd., 2007, p. 3-6, 17; Atlas Precious Metals Inc., 2007; Coeur d'Alene Mines Corp., 2007, p. 4, 9, 31; Instituto Nacional de Estadística, Bolivia, 2007b, p. 31; Ministerio de Minería y Metalurgia, Bolivia, 2007, p. 2).

Structure of the Mineral Industry

By the Presidential Decree of May 1, 2006, state-run YPFB nominally owned at least 51% of Empresa Petrolera Andina S.A., Empresa Petrolera Chaco S.A., and three other petroleum refining or transportation [of natural gas and (or) petroleum] companies in Bolivia. However, to reconstitute the state-run company as an oil and gas company capable of controlling exploration, development, and production operations, new revenue would need to be reinvested in it; negotiations concerning compensation (through royalties, taxes, and so forth) to the Government were ongoing through October. During 2006, it was unclear whether the Government or YPFB actually owned any real shares in the five companies or whether the 51% "ownership" was merely representative of the new percentage compensation that would be owed to the Government as a royalty or additional tax to be paid by the private foreign-based companies. YPFB has been basically a holding company and administrator of pipeline and export agreements since the state-run company was privatized (including the selling of Chaco and Andina) as a result of Bolivia's Hydrocarbons Law of 1996. From 1998 through 2006, YPFB was not officially listed as having had any real part in the (upstream) production of natural gas or petroleum in the country. For this reason, the ownership structures of the Bolivian subsidiaries of foreign oil and gas companies are listed in table 2 just as they were immediately before nationalization, and the actual ownership structure with respect to share capital in these companies has been left unchanged for all of 2006 (Cauclanis, 2006; Instituto Nacional de Estadística, Bolivia, 2007c; U.S. Commercial Service, 2007, p. 1, 10).

Table 2 is a listing of the major mineral industry facilities, together with the major owners and (or) operators. The vast majority of the mining workforce in Bolivia consists of SMACA miners, and these small-scale operations often manage to combine to produce more of many mined mineral commodities than the few medium-scale mines. This is despite the low level of technology and artisanal mining methods used by the SMACA miners. In 2006, SMACA miners accounted for 100% of the country's mine production of tungsten; about 84%, of antimony; 62%, of tin; 59%, of silver; 50%, of lead; 35%, of zinc; and 32%, of gold. (SMACA miners also accounted for 100% of mine production of copper, although this production

did not significantly contribute to the total revenue generated by the mining sector) (Asociación Nacional de Mineros Medianos, 2006, p. 102-106).

With respect to medium-scale mining in the country in 2006, Sinchi Wayra S.A. (a 100% owned subsidiary of Glencore) was the leading mining company (in terms of revenues from mining, mineral processing operations, and exports), and its leading product was zinc in concentrate. Glencore also controlled a majority interest in the medium-scale tin and antimony smelting complex Complejo Metalúrgico de Vinto S.A. (Vinto) through its interest in another medium-scale mining company, Compañía Minera Colquiri S.A. The country's leading miner of gold was Empresa Minera Paititi S.A., which was a 100% owned subsidiary of Orvana. The second ranked mine producer of gold was Empresa Minera Inti Raymi S.A. (Inti Raymi). Newmont held an 88% ownership share in Inti Raymi. On May 17, Apogee Minerals Ltd. of Canada, acquired the remaining share capital to become the 100% owner of Empresa Minera La Solución S.A., which mined lead, silver, and zinc in Bolivia. This acquisition represented the only notable change in ownership among medium-scale mining companies during the year (table 2; Apogee Minerals Ltd., 2006; Glencore International AG, 2006; Newmont Mining Corp., 2006; Orvana Minerals Corp., 2006b; Mining Journal, 2007a).

Commodity Review

Metals

Gold.—Inti Raymi produced some gold and silver at its plant associated with the closed Kori Kollo Mine. The majority of material feed for this plant was mined at the Kori Chaca Mine, which was located adjacent to Kori Kollo. The plant also continued to process some tailings recovered from material left over from the Kori Kollo Mine. Paititi completed the construction of the mine shaft to access the lower mineralized zone at the Don Mario Mine, but did not expect to complete all other construction until sometime in 2007. The company also completed a prefeasibility study on developing the upper mineralized zone of Don Mario, and Orvana planned to proceed with a full feasibility study (Newmont Mining Corp., 2006; Orvana Minerals Corp., 2006a, p. 3-4).

Golden Eagle International Inc. of Salt Lake City, Utah, Franklin Mining Inc., of San Antonio, Texas, and Eaglecrest Explorations Ltd. of Canada conducted exploration for gold and associated metals in the Santa Cruz Department, the Potosi Department, and the Beni Department, respectively. Golden Eagle focused on the Buen Futuro property, Franklin on properties in the area near Cerro Rico, and Eaglecrest on the San Simon property (Eaglecrest Explorations Ltd., 2007; Franklin Mining Inc., 2007, p. 11; Golden Eagle International Inc., 2007, p. 20).

Iron and Steel.—Jindal Steel & Power Ltd. of India reached agreement with the Government to enter into a joint-venture contract with the state-run mining company Corporación Minera de Bolivia (COMIBOL) to develop El Mutun iron ore deposit and to build a steel plant there. As part of the contract, Jindal will be required to develop El Mutun within 5 years after final

congressional approval, including construction of the iron ore mine, an iron pellet plant with a capacity of 10 million metric tons per year (Mt/yr), a steel mill, and a 450-megawatt powerplant. The company also agreed to hire Bolivian nationals to fill at least 95% of the jobs at the iron and steel complex, to begin producing steel by the end of the fifth year of construction, and to achieve production of 1.7 Mt/yr of steel by 2014 (Jindal Steel & Power Ltd., 2006; Kosich, 2007).

Lead, Silver, and Zinc.—In 2006, the continuing increase in FDI in the metal mining sector was led by Apex Silver Mines Ltd. (incorporated in Grand Cayman) through the company's investment in the San Cristobal lead, silver, and zinc project. During the year, the construction of this mining project was conducted by Apex's subsidiary Minera San Cristobal S.A., in which Sumitomo Corp. of Japan acquired a 35% ownership interest on September 25. Apex expected the joint-venture agreement with Sumitomo Corp. to help lower the company's risk exposure with respect to the project. Apex also reported receiving assurance from the Bolivian Government that new mining legislation would be limited to increased taxation instead of full nationalization; this assurance was deemed sufficient for Apex and Sumitomo to continue with the development of San Cristobal. The majority of the mine's expected production was already designated to be processed in Asia, Australia, and Europe according to terms of supply contracts that Apex had with 13 smelters there, and the company planned to export the concentrates by rail to the Chilean Port of Mejillones, where the concentrates would then be shipped overseas (Apex Silver Mines Ltd., 2007, p. 6-11; Sumitomo Corp., 2007, p. 37, 63).

On May 11, Atlas Precious Metals Inc. of Tucson, Arizona, signed a joint-venture agreement with COMIBOL to install a zinc circuit and start up the Karachipampa silver and lead smelter. Atlas estimated that the project would cost about \$100 million after refurbishment of the existing facility. Karachipampa was initially constructed in the mid-1980s and designed to process concentrates from the San Cristobal deposit. After the new upgrades were completed, however, the smelter was expected to process concentrates produced by mining cooperatives located in the areas around Cerro Rico (Atlas Precious Metals Inc., 2007; Kosich, 2008).

The second ranked foreign investment project in the mining sector was the San Bartolome silver project, which was owned by Coeur d'Alene Mines Corp. During 2006, the construction of the project was being carried out by Coeur d'Alene's wholly owned Bolivian subsidiary Empresa Minera Manquiri S.A., which Coeur d'Alene acquired in 1999. Owing to political unrest in Bolivia in 2005, full-scale construction and development was delayed until the second half of 2006. The company also obtained a political risk insurance policy from the Overseas Private Insurance Corporation and an unnamed private insurer. The mine output of San Bartolome was expected to be processed further by refiners outside of the company; the refined silver was expected to be returned to the company under a tolling agreement with these refiners and eventually sold by Coeur d'Alene (Coeur d'Alene Mines Corp., 2007, p. 4, 30-32).

Tin.—In October, the Government allowed COMIBOL to move into the Huanuni tin mine to work the mine alongside private SMACA miners and provide technical and other

assistance. Tensions involved in this organizational situation flared shortly thereafter, however, and violent clashes between employees of mining cooperatives and COMIBOL resulted in at least 12 deaths. As a result, the Government appointed a new Minister of Mining and Metallurgy and COMIBOL hired approximately 5,000 additional SMACA miners who had already been working the mine for the private mining cooperatives (Platts Metals Week, 2007b).

Industrial Minerals

Boron and Salt.—In 2006, Quimica e Industrial del Borax Limitada (Quiborax) of Santiago, Chile, was still not able to regain control of its former (since June 2004) mining concessions in the Salar de Uyuni, Potosi Department. It was not clear what companies were responsible for the production of boron compounds (including ulexite), salt, or any of the other mineral commodities believed to be mined from this salar. Complejo Industrial de Recursos Evaporíticos del Salar de Uyuni (CIRESU) was the company formed by the Government in 1985 to form joint ventures to explore the Salar de Uyuni and develop greater mining production capacity there. In 2006, no new information concerning any mining projects or joint ventures to mine the Salar de Uyuni were available (Industrial Minerals, 2006)

Mineral Fuels

Natural Gas.—From January through October 2006, private investment in immediate production accounted for approximately 64% of total private investment in the sector, and investment in exploration and development of additional production capacity accounted for only 36%. Although the annual production level of natural gas during 2007 was still expected to be close to that of 2006, public investment in exploration and development through the state-run mineral fuels company YPFB was expected to have to increase substantially during 2007 to maintain production levels of natural gas after 2007 (Instituto Nacional de Estadística, Bolivia, 2006; Banco Central de Bolivia, 2007, p. 17; Cámara Boliviana de Hidrocarburos, 2008, p. 53-57)

Outlook

First production from the San Cristobal Mine was expected to take place by the fourth quarter of 2007. By sometime in early 2008, the mine was expected to ramp up to an annual average production capacity of about 166,000 metric tons per year (t/yr) of zinc, 59,000 t/yr of lead, and 488,000 t/yr of recoverable silver contained in separate zinc-silver and lead-silver concentrates. The planned San Bartolome Mine and plant was expected to produce at a capacity of about 280,000 t/yr of silver contained in a doré after production is ramped up during 2008. Jindal planned to invest \$ 2.3 billion in El Mutun from 2007 through 2014, but it was not clear how much iron and steel the company would be able to produce during this construction phase. Atlas Precious Metals estimated that Karachipampa could be operational by 2009. It was also estimated that the plant

would have a capacity to produce about 250,000 t/yr of silver metal, 40,000 t/yr of zinc metal, and 30,000 t/yr of lead metal (Jindal Steel & Power Ltd., 2006; Apex Silver Mines Ltd., 2007, p. 7; Atlas Precious Metals Inc., 2007; Coeur d'Alene Mines Corp., 2007, p. 30-32).

A number of foreign-based companies had plans to invest in gold mining projects, including Orvana. Owing to political uncertainty, however, Glencore was expected to delay most of the company's planned investment in expansion of its mining and metallurgical operations in Bolivia, and mine production of zinc and production of tin metal at the Vinto smelting complex could decrease in 2007 and 2008 until new projects start up or sufficient Governmental assurances are provided to Glencore. Concerns of foreign mining companies with respect to political risk in Bolivia could be overcome by high prices of gold, iron ore, lead, silver, tin, and zinc, but the price levels required to continue the trend of increased FDI in the metals mining sector was expected to have to rise above the record levels of 2006 to keep up with the level of uncertainty in the country (Kosich, 2006; McMahon and Melham, 2007, p. 6, 8; Mining Journal, 2007a).

With respect to Bolivia's production of crude petroleum and natural gas, however, total FDI continued to decrease, especially with respect to exploration and development of production capacity. Because YPFB has not had recent experience in actually conducting extractive operations, exploration, or development projects in the mineral fuels sector, the state-run company is likely going to have to hire new employees with that expertise or provide adequate incentives to the remaining private companies that have a profound knowledge of Bolivia's deposits to reinvest in exploration, development, and extension of new and existing mineral fuel properties in Bolivia. State-run Petróleos de Venezuela S.A. (PDVSA) of Venezuela agreed to form joint ventures with YPFB to provide both investment and expertise to help expand natural gas and petroleum reserves in Bolivia. If investment in Bolivia's natural gas sector lags during the process of nationalization, the country's production of natural gas will likely begin to decrease noticeably starting sometime in early 2008. Production of crude petroleum is expected to begin decreasing in 2006 and to continue to decrease through 2008 (Angevine and Cameron, 2007; García, 2008).

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TABLE 1
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2002	2003	2004	2005	2006 ^c
METALS³					
Antimony:					
Mine output, Sb content	2,346	2,585	2,633	5,204 ^r	5,460 ⁴
Metal, including Sb content of trioxide	195	310	386	2,941	2,320
Arsenic, mine output, arsenic trioxide, arsenic sulfide	237	276	168	120	240
Bismuth:					
Mine output, Bi content	20	72	62	44	82
Metal, smelter	88	51	33	--	40
Copper:					
Mine output, Cu content	120	182	576	35 ^r	218 ⁴
Metal, smelter, primary	--	--	441	--	--
Gold, mine output, Au content ⁵	11,256	9,362	6,951	8,871 ^r	9,628 ⁴
Lead:					
Mine output, Pb content	9,893	9,740	10,267	11,231	11,955 ⁴
Metal, smelter, primary	100 ^c	50	84	33	85
Silver:					
Mine output, Ag content	450,311	465,309	406,925	420,300 ^r	472,210 ⁴
Refined ⁶	31,871	28,045	10,768	18,221	22,600
Tantalum, tantalite	10,823	10,070	--	4,080	2,000
Tin:					
Mine output, Sn content	15,242	16,755	17,569	18,640 ^r	17,669 ⁴
Metal, smelter	10,976	12,836	13,627	13,841	14,100
Alloys, Sn-Pb alloyed metal	257	471	480	498	1,030
Tungsten, mine output, W content	399	441	403	531	868 ⁴
Zinc, mine output, Zn content	141,558	144,985	145,906	159,502 ^r	172,747 ⁴
INDUSTRIAL MINERALS					
Barite	1,556 ^r	1,851	5,774	11,379	7,300
Bentonite	216	227	548	590	600
Borax	940	--	--	--	56
Boric acid	6,486	--	--	13,584	9,800
Cement, hydraulic	1,010	1,138	1,276	1,440	1,636 ⁴
Gemstones, rough					
Amethyst	3,789	144,354	199,615	89,092	2,000,000
Ametrine	--	6	5	20,011	5,200
Quartz, pink	2,764	11,422	49,323	49,210	50,000
Emerald	--	--	--	7,742	450
Gypsum, crude	--	--	28	26	325
Salt, natural, all types ^c	45,000	45,000	45,000	45,000	45,000
Of which, rock salt	3,834	2,271	869	552	400
Stone, natural:					
Flint	(7)	--	2	4	10
Granite	126	58	--	368	200
Limestone as dimension stone	--	--	21	--	--
Marble	374	281	327	102	40
Slate, pizarra	306	228	314	297	100
Sulfur, native	2	--	--	--	--
Ulexite	40,479	109,545	68,031	62,604	48,400
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural:					
Gross	8,901	10,202	12,673	14,672 ⁸	16,000
Marketable	6,421	7,398	10,257	12,536 ⁸	13,700
Natural gas liquids ^c	3,900	4,100	4,500	4,600	5,000
Petroleum:					
Crude	11,338	12,223	14,192	15,417 ⁸	15,100

See footnotes at end of table.

TABLE 1—Continued
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2002	2003	2004	2005	2006 ^c	
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum--Continued:						
Refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	612	695	791	864 ⁸	845
Gasoline:						
Aviation	do.	16	21	23	25	24
Motor	do.	3,449	3,450	3,867	3,726 ⁸	3,600
Jet fuel	do.	909	944	946	1,104 ⁸	1,080
Kerosene	do.	162	166	150	151 ⁸	148
Distillate fuel oil	do.	3,198	3,488	4,419	4,450 ⁸	4,400
Lubricants:						
Oil, automotive	do.	61	62	78	80 ^c	78
Oil, industrial	do.	2	2	5	5 ^e	5
Greases ⁹	do.	2	2	3	3 ^e	3
Asphalt ⁹	do.	13	13	14	14 ^e	14
Paraffin oil ⁹	do.	6	6	5	5 ^e	5
Other ^c	do.	28	--	--	-- ^e	--
Total	do.	8,458	8,849	10,301	10,400 ^e	10,200

^cEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^pPreliminary. ^rRevised. -- Zero.

¹Table includes data available through October 2007.

²In 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.

³Unless otherwise specified, data represent actual production by Corporación Minera de Bolivia and small- and medium-size mines.

⁴Reported figure.

⁵Includes production of metallic gold.

⁶Includes production of metallic silver.

⁷Less than 1/2 unit.

⁸Reported as preliminary by Instituto Nacional de Estadística, Bolivia.

⁹Reported figures were converted from metric tons to equivalent barrels.

TABLE 2
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
Antimony		Empresa Minera Unificada S.A. (EMUSA) (private, 100%)	Caracota, Chilcobija, and Espiritu Santo Mines, Potosi Department	1,100.
Do.		Small-scale mining operations and cooperatives (private, 100%)	San Jose Mine, Oruro Department; Mines in Caracota District, Nor Chichas, Quijarro, and Sud Chichas Provinces, Potosi Department	4,300.
Antimony, refined		Complejo Metalúrgica Vinto S.A. (Compañía Minera Colquiri S.A., 100%)	Vinto antimony smelter, Carretera Vinto, Oruro Department (no official production in 2005)	60.
Do.		Fundestano de Oruro S.A. (Empresa Minera Unificada S.A., 100%)	City of Oruro, Oruro Department	1,100.
Antimony trioxide		Empresa Minera Bernal Hermanos S.A. (private, 100%)	Palala smelter, Tupiza, Potosi Department	1,900.
Bismuth, refined		Complejo Metalúrgica Vinto S.A. (Compañía Minera Colquiri S.A., 100%)	Vinto smelting complex on the Carretera Vinto, Oruro Department	35.
Cement	thousand metric tons	Sociedad Boliviana de Cemento S.A. (SOBOCE) (Grupo Cementos de Chihuahua S.A. de C.V., 47.02%, and other private, 52.98%)	El Puente (near city of Tarija), EMISA (near city of Oruro), VIACHA (near city of La Paz), and WARNES (near city of Santa Cruz) plants.	865 cement; 640 clinker.
Do.	do.	Fábrica Nacional de Cemento S.A. (Sociedad Boliviana de Cemento S.A., 33.34%; Municipal Government of Sucre, 33.33%; Universidad San Francisco Xavier de Chuquisaca, 33.33%)	Cal Orcko industrial complex near city of Sucre, including grinding plant, and FANCESA cement plant near city of Chuquisaca	375 cement; 360 clinker.
Do.	do.	Cooperativa Boliviana de Cemento Ltda. (COBOCE)	Irpa Irpa Plant, near city of Cochabamba	330 clinker.
Gold	kilograms	Empresa Minera Paititi S.A. (Orvana Minerals Corp. [Fabulosa Mines Limited (Minera S.A., 100%), 52.5%, and other private, 47.5%], 100%)	Don Mario Mine, Chiquitos Province, Santa Cruz Department	2,500.
Do.	do.	Golden Eagle International Inc. (private, 100%)	Cangalli Mine, Santa Cruz Department	150.
Do.	do.	Grupo Minero La Roca S.A. (private, 100%)	La Paz Department	200.
Do.	do.	Mining Cooperatives (private, 100%)	Tipuani, Guanay, Mapiri, Huayta, Kaka and Teoponte Rivers, La Paz Department	4,350.
Gold-silver doré, bullion	do. do.	Empresa Minera Inti Raymi S.A. (Newmont Mining Corp., 88%, and Empresa Minera Unificada S.A., 12%)	Kori Chaca open pit mine and Kori Kollo leaching plant, near city of Oruro	3,200 gold; 4,500 silver.
Lead		Sinchi Wayra S.A. (Glencore International AG, 100%)	Bolivar, Colquechaquita, Don Diego, Porco, and San Lorenzo Mines, Oruro and Potosi Departments	15,000.
Do.		Empresa Minera La Solución S.A. (Apogee Minerals Ltd., 100%)	Asientos and Monserrate lead-silver-zinc mines, Cochabamba Department	610.
Do.		Small-scale mining operations and cooperatives (private, 100%)	Cerro Rico Mine and in the areas immediately surrounding the San Cristobal Mine (under construction), Potosi Department	4,700.
Lead, metal		Complejo Metalúrgica Vinto S.A. (Compañía Minera Colquiri S.A., 100%)	Vinto smelting complex on the Carretera Vinto, Oruro Department	35.
Do.		Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%)	Karachipampa lead-silver smelter, and zinc refinery, Potosi Department (inactive since completion in 1984)	30,000.
Natural gas	million cubic meters	Operated by Empresa Petrolera Andina S.A. (Repsol YPF, S.A., 50%; Previsión and Futuro Pension Funds, 24.46% each; other Bolivian Pension Funds, 1.08%), and owned by Empresa Petrolera Andina, S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Los Sauces, Rio Grande, Sirari, Vibora, and Yapacani Fields, Santa Cruz Department	2,700.
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%, and private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Sabalo Field, San Antonio Block; San Alberto Field and Block, Tarija Department	7,200.

See footnote at end of table.

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

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
Natural gas—Continued	million cubic meters	Operated by Empresa Petrolera Chaco S.A. (Pan American Energy LLC [BP p.l.c., 60%, and BRIDAS Corporation, 40%] 100%), and owned by Empresa Petrolera Chaco S.A., 50%, and BBVA and Futuro de Bolivia pension funds, 50%	Vuelta Grande Field, Chuquisaca Department; Bulo Bulo, Carrasco and Kanata Fields, on the border of Cochabamba and Santa Cruz Departments	2,200.
Do.	do.	Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%; Repsol YPF S.A., 37.5%; Pan American Energy LLC, 25%	Margarita Field, Caipipendi Block, Tarija Department; Paloma Field, Mamore Block, Cochabamba and Santa Cruz Departments	1,300.
Do.	do.	Operated and owned by BG Group plc., 100%	La Vertiente, Escondido and Taiguati fields, La Vertiente Block; Los Suris field and block, all in Tarija Department	630.
Do.	do.	Operated by Pluspetrol Bolivia Corporation S.A. (owned by Pluspetrol S.A., 100%)	Bermejo and Madrejones fields, Tarija Department; Tacobo field, Santa Cruz Department	520.
Petroleum	thousand 42-gallon barrels	Operated by Empresa Petrolera Andina S.A. (Repsol YPF, S.A., 50%; Previsión and Futuro Pension Funds, 24.46% each; other Bolivian Pension Funds, 1.08%), and owned by Empresa Petrolera Andina, S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Los Sauces, Rio Grande, Sirari, Vibora, and Yapacani Fields, Santa Cruz Department	2,100.
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%, and private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Sabalo Field, San Antonio Block; San Alberto Field and Block, Tarija Department	7,500.
Do.	do.	Operated by Empresa Petrolera Chaco S.A. [Pan American Energy LLC (BP p.l.c., 60%, and BRIDAS Corporation, 40%) 100%], and owned by Empresa Petrolera Chaco S.A., 50%, and BBVA and Futuro de Bolivia pension funds, 50%	Vuelta Grande Field, Chuquisaca Department; Bulo Bulo, Carrasco and Kanata Fields, on the border of Cochabamba and Santa Cruz Departments	2,900.
Do.	do.	Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%; Repsol YPF S.A., 37.5%; Pan American Energy LLC, 25%	Margarita Field, Caipipendi Block, Tarija Department; Paloma Field, Mamore Block, Cochabamba and Santa Cruz Departments	5,000.
Do.	do.	Operated and owned by BG Group plc., 100%	La Vertiente, Escondido and Taiguati fields, La Vertiente Block; Los Suris field and block, all in Tarija Department	610.
Do.	do.	Operated by Pluspetrol Bolivia Corporation S.A. (owned by Pluspetrol S.A., 100%)	Bermejo and Madrejones fields, Tarija Department; Tacobo field, Santa Cruz Department	160.
Silver		Small-scale mining operations and cooperatives (private, 100%)	Candelaria and other mines, Cerro Rico deposit, as well as in areas immediately surrounding the San Bartolome Mine (under construction), Oruro and Potosi Departments.	220.
Do.		Sinchi Wayra S.A. (Glencore International AG, 100%)	Bolivar, Colquechaquita, Don Diego, Porco, and San Lorenzo Mines, Oruro and Potosi Departments	200.
Do.		Empresa Minera La Solución S.A. (Apogee Minerals Ltd., 100%)	Asientos and Monserrate lead-silver-zinc mines, Cochabamba Department	2.
Silver, metal		Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%).	Karachipampa lead-silver smelter, and zinc refinery, Potosi Department (inactive since completion in 1984)	2,500.
Do.	kilograms	Complejo Metalúrgica Vinto S.A. (Compañía Minera Colquiri S.A., 100%)	Vinto smelting complex on the Carretera Vinto, Oruro Department	150.

See footnote at end of table.

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

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Tin	Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Huanuni Mine, Dalcence Province, Oruro Department	3,000.
Do.	Compañía Minera Colquiri S.A. (Glencore International AG, 51%, and Actis Capital LLP, 49%)	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	3,000.
Do.	Empresa Minera Barrosquira Ltda. (private, 100%)	Caracoles Mine, Inquisivi Province, La Paz Department	500.
Do.	Small-scale mining operations and cooperatives (private, 100%)	Caracoles, Huanuni, Viloco, and other current or former COMIBOL mines, in Oruro, Potosi, and La Paz Departments	11,100.
Tin, refined	Fundestano de Oruro S.A. (Empresa Minera Unificada S.A., 100%)	City of Oruro, Oruro Department	3,000.
Do.	Complejo Metalúrgica Vinto S.A. (Compañía Minera Colquiri S.A., 100%)	Vinto smelting complex on the Carretera Vinto, Oruro Department	12,000.
Tin-lead alloys	do.	do.	200.
Tungsten, W content	Small-scale mining operations and cooperatives (private, 100%)	Bolsa Negra, Enramada, Reconquistada Mines, near the former International Mining Company's Chojilla Mine, Sud Yungas Province; Chambilaya and Chicote Grande Mines, Inquisivi Province; Mercedes, San Antonio, Ucumarini Mines, Larecaja Province, La Paz Department	580.
Zinc	Sinchi Wayra S.A. (Glencore International AG, 100%)	Bolivar, Colquechaquita, Don Diego, Porco, and San Lorenzo Mines, Oruro and Potosi Departments	230,000.
Do.	Small-scale mining operations and cooperatives (private, 100%)	Cerro Rico Mine and in the areas immediately surrounding the San Cristobal Mine (under construction), Potosi Department	36,100.
Do.	Compañía Minera Colquiri S.A. (Glencore International AG, 51%, and Actis Capital LLP, 49%)	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	14,000.
Do.	Empresa Minera La Solución S.A. (Apogee Minerals Ltd., 100%)	Asientos and Monserrate lead-silver-zinc mines, Cochabamba Department	1,300.
Zinc, refined	Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%).	Karachipampa lead-silver smelter, and zinc refinery, Potosi Department (inactive since completion in 1984)	40,000.

^cEstimated; estimated data are rounded to no more than three significant digits.