



2008 Minerals Yearbook

BOLIVIA

THE MINERAL INDUSTRY OF BOLIVIA

By Steven T. Anderson

In 2008, Bolivia produced about 5% of the world's total mine output of tin and silver; 3%, of zinc; 2%, of antimony, bismuth, lead, and tungsten; and approximately 1%, of boron. Bolivia's proven reserves of natural gas (about 711 billion cubic meters) 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 by rail to ports on the coasts of Argentina, Brazil, Chile, and (or) Peru and then shipped further on to processing facilities located in Asia, Europe, and North America. On average, 31 million cubic meters per day of Bolivia's production of natural gas was exported to Brazil during 2008 compared with about 27 million cubic meters per day during 2007; 2.3 million cubic meters per day, on average, of Bolivia's natural gas production was exported to Argentina compared with about 4.6 million cubic meters per day during 2007. The supply contract with Argentina had a clause that promised deliveries of natural gas up to about 7.7 million cubic meters per day (equal to the listed capacity of the Yabog natural gas pipeline from Bolivia to Argentina), subject to availability of natural gas for export after first fulfilling Bolivia's domestic demand requirements and allocating necessary volumes for export to Brazil (table 1; Cauclanis, 2008b; BP p.l.c., 2009, p. 22; Brooks, 2009; Carlin, 2009a-c; Guberman, 2009; López and Ferrufino, 2009, p. 34-39, 63-71; Polyak, 2009; Shedd, 2009; Tolcin, 2009).

Minerals in the National Economy

In 2008, the value of output of the mineral industry of Bolivia accounted for about 14.2% (\$2,360 million¹) of the country's gross domestic product (GDP) compared with about 12.3% (\$1,630 million) in 2007. The mining sector accounted for about 8.55% (\$1,420 million) of the GDP and the mineral fuels sector accounted for about 5.7% (\$940 million) in 2008 compared with 5.8% (\$770 million) and 6.5% (\$860 million), respectively, in 2007. In 2008, most of the value of mineral fuel output was accounted for by the production of natural gas. Zinc led all the nonfuel minerals in Bolivia in terms of both the value and the volume of production. The value of mined zinc totaled about \$710 million followed by that of silver (\$520 million), tin (\$315 million), and gold (\$230 million). In 1990 prices, the real GDP of Bolivia increased by about 6.1% in 2008 compared with that of 2007, which was the greatest annual increase in a decade. In 2008, an increase of about 56% in the real value of production by the mining sector compared with that of 2007 led all sectors of the Bolivian economy in terms of its contribution to the growth in the real GDP of the country. The real value of production of mineral fuels also increased by about 2% during

¹Where necessary, nominal values have been converted from Bolivian bolivianos (Bs) to U.S. dollars (US\$) at an annual average exchange rate of Bs7.75=US\$1.00 for 2007 and Bs7.27=US\$1.00 for 2008. All values are nominal, at current prices, unless otherwise stated.

this same timeframe (Instituto Nacional de Estadística, Bolivia, 2009a; 2009b, p. 448-450; International Monetary Fund, 2009; López and Ferrufino, 2009, p. 9-10, 28-30; Ministerio de Minería y Metalurgia, Bolivia, undated a, p. 6).

In 2007 (the latest year for which data were available), the total labor force employed in mining was about 57,400 workers. Of these workers, an estimated 46,700 small-scale, cooperative, and artisanal (SMACA) miners were officially registered with a cooperative through the Government and at least 2,450 SMACA miners were not. In 2006 and 2007, about 3,350 people were employed by medium-scale mining operations that used modern mining methods. The remainder were employed by the state-owned mining company Corporación Minera de Bolivia (COMIBOL), which restarted active mining operations in 2006 for the first time since at least 2000 (when the company's last active mining operations were either privatized or closed). COMIBOL employed about 4,900 miners in 2007, and most of these Government employees were transferred from private mining cooperatives that had been working the Huanuni tin mine before the mine's renationalization during the final quarter of 2006. According to the Instituto Nacional de Estadística (INE), Bolivia, the total number of employees in the mineral industry was about 72,400 in 2007 (Instituto Nacional de Estadística, Bolivia, 2009b, p. 294; Ministerio de Minería y Metalurgia, Bolivia, undated b).

Preliminary estimates indicated that foreign direct investment (FDI) in Bolivia's oil and gas sector was about \$380 million in 2008 compared with about \$131 million in 2007. The 2007 level of FDI in the sector represented an increase of about 126% compared with that of 2006 (\$58 million). The 2006 level of FDI was the lowest since 1996 (when the production of natural gas in the country was still in a nascent stage), and corresponded with the Government's measures to nationalize the sector. In 2008, FDI in the mining sector was estimated to be at its highest level (\$478 million) since at least 1996 (about \$20 million), and had increased substantially even compared with that of 2007 (\$308 million). In early 2007 and somewhat into 2008, there appeared to be some Government announcements in favor of the nationalization of the mining sector. Government investment in the oil and gas sector increased to about \$51.3 million in 2008 compared with \$7.6 million in 2007; public investment realized in the mining sector was \$34 million in 2008 compared with about \$11 million in 2007 (Ecclestone, 2008; Orvana Minerals Corp., 2008, p. 22-23; Instituto Nacional de Estadística, Bolivia, 2009b, p. 630, 686; undated a, b; Mapstone and Schipani, 2009).

In 2008, the mineral trade balance (not including some trade in chemical substances and products that may have been mineral based) was about \$4.4 billion. The value of trade in minerals may include the value of some transportation and (or) pipeline services. Natural gas was Bolivia's leading export (reportedly valued at about \$3.16 billion), and zinc in concentrates was the leading nonfuel mineral export (about \$740 million). Production of silver was growing in economic importance, and

the value of the country's exports of silver (mostly contained in concentrates) was reported to be about \$500 million compared with \$225 million in 2007. The leading mineral import category consisted of manufactured mineral fuels and related materials (about \$545 million), which included petroleum refinery products, and the second ranked mineral import category was common manufactured (refined) metals (\$480 million) (López and Ferrufino, 2009, p. 28-30, 70; Instituto Nacional de Estadística, Bolivia, 2010a, b).

Government Policies and Programs

On May 2, 2007, operations contracts came into effect for private oil and gas companies in accordance with the terms of the Government's program to nationalize the sector, and it appeared as if no further major changes to the Hydrocarbons Law were made during 2008. These operations contracts were approved as part of the Hydrocarbons Law of 2005 (law No. 3058 of May 17, 2005), which also allowed for two other new types of contracts between private companies and the state—production-sharing contracts and association contracts. Under all three types of contracts, oil and gas reserves and any production belongs to the state and the contractor (private company) must deliver the full amount of production to the state-owned oil and gas company, Yacimientos Petrolíferos Fiscales Bolivianos (YPFB). These contracts were designed to replace risk-sharing contracts, which existed under the previous Hydrocarbons Law of 1996 (law No. 2689 of April 30, 1996). In effect, the contractors bore all of the risks and costs for the exploration and production of hydrocarbons under the risk-sharing contracts but were allowed to claim ownership of production and sell it on the open market, subject only to paying royalties and taxes. On May 1, 2006, the President issued Supreme Decree No. 28701 to nationalize the hydrocarbon resources of Bolivia. Following this decree, the Government negotiated 44 operations contracts with existing private producers of oil and natural gas in the country, and the contracts were approved by the Government on April 23, 2007. These contracts still require the private contractors to bear the risks and costs of production. In addition, however, the private companies cannot claim ownership of oil and gas reserves in the country and must rely on reimbursement by the Government to cover any recoverable costs and (or) be compensated for any profits they might earn (Vargas, 2007; López and Ferrufino, 2009, p. 2, 7-9).

The main mining law is the Mining Code of 1997 (law No. 1777 of March 17, 1997). In 2007, the mining code was modified to allow for restructured royalties (mining-specific taxes) and other taxes to be charged to mining companies. The 2007 law (law No. 3787 of November 24, 2007) included measures that (1) require companies to pay an additional income tax of 12.5% if the prices of the minerals produced exceed certain thresholds (specific to each mineral), and (2) restructure both the royalty rates and the percentages of redistributions (to local, State, or Federal entities) of Government royalty and tax revenue from private mining companies in the country. The mining code did not appear to undergo any revisions during 2008, but Government revenues from mining royalties and the additional income tax on mining companies increased to

about \$95 million compared with \$70 million in 2007. During 2008, the President of Bolivia was able to schedule a public referendum on a proposed new constitution for January 2009. Approval of the new constitution could lead to the Government further revising both the mining code and the hydrocarbons law (Ministerio de Minería y Metalurgia, Bolivia, 2007; Coeur d'Alene Mines Corp., 2009, p. 22; López and Ferrufino, 2009, p. 2, 7-9, 73, 80-87; Romero, 2009).

Production

Data on mineral production are in table 1. In decreasing value of production in 2008, the leading nonfuel mineral commodities in Bolivia were zinc, silver, tin, gold, and lead. In terms of tonnage, production of lead, silver, and zinc all increased substantially compared with levels of mine production in 2007 mostly owing to a full year of production at the San Cristobal Mine. The startup of production at the San Bartolome Mine in June 2008 also had a significantly positive effect on the country's production of silver in concentrates during the year. Production of tin contained in concentrates increased significantly in the country, mostly owing to an increase in production to about 6,700 metric tons (t) of tin compared with about 5,400 t in 2007 by SMACA mining operations and partly owing to a slight increase to 7,875 t of tin compared with about 7,670 t in 2007 at the state-owned Huanuni Mine. Owing to a substantial increase in the annual average price of gold in 2008 compared with that of 2007, the value of mine production of gold in Bolivia increased, although the volume of production decreased mostly owing to a decrease in production of gold at the Don Mario Mine. In percentage terms, the volume of production of mined copper in the country increased significantly in 2008, but information concerning the cause of the increase was not available. In 2007 (the latest year for which reliable information concerning the structure of copper production in the country was available), production by SMACA mining operations accounted for all of the copper mine production in the country (table 1; Orvana Minerals Corp., 2008, p. 1; Coeur d'Alene Mines Corp., 2009, p. 22; ITRI Ltd., 2009; López and Ferrufino, 2009, p. 58-65; Ministerio de Minería y Metalurgia, Bolivia, 2009; undated a, p. 1).

In 2008, production of cement increased substantially compared with that of 2007 almost entirely owing to a combined increase in production of cement by Fábrica Nacional de Cemento S.A. at the company's Cal Orcko and Chucquisaca plants and by Sociedad Boliviana de Cemento S.A. at the company's VIACHA cement plant. Bolivia's production of ulexite (a boron mineral material) increased significantly, but information concerning the cause of this increase was not available. Marketable production of natural gas increased slightly and production of crude petroleum decreased slightly compared with levels in 2007, although both public investment and FDI in the oil and gas sector increased substantially during this timeframe (Instituto Nacional de Estadística, Bolivia, 2009b, p. 686; undated c; López and Ferrufino, 2009, p. 63, 77-78; Instituto Boliviano del Cemento y el Hormigón, undated).

Structure of the Mineral Industry

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 a low level of technology and artisanal mining methods used by the SMACA miners. In 2008, SMACA miners accounted for about 38% of total mine production of tin compared with 34% in 2007, and accounted for 81% of antimony production in 2007. In 2007 (the latest year for which reliable information of this type was available), SMACA miners accounted for all the mine production of industrial minerals in the country (with the possible exception of some of those industrial minerals used in the manufacture of cement), as well as for all the mine production of bismuth, copper, tantalum, and tungsten (ITRI Ltd., 2009; Ministerio de Minería y Metalurgia, Bolivia, undated a, p. 1).

With respect to medium-scale mining in the country in 2008, Sinchi Wayra S.A. (a 100% owned subsidiary of Glencore International AG of Switzerland) was the leading mining company (in terms of revenues from mining, mineral processing operations, and exports), and its leading product was zinc in concentrate. During 2008, the Bolivian Government announced that it was proceeding with negotiations with Glencore to allow COMIBOL to control about 50% of the Colquiri tin and zinc mine; the Porco lead, silver and zinc mine; and perhaps other mines operated by Sinchi Wayra in Bolivia, as well as finalize the terms of compensation to be paid by the Government to Glencore for nationalization of the Vinto smelting complex in February 2007. The negotiations between the Government and Glencore appeared to be ongoing through the end of 2008. Empresa Minera Manquiri S.A. (a subsidiary of Coeur d'Alene Mines Corp. of the United States) produced about 90 kilograms of silver at the San Bartolome Mine during the second half of 2008, and the company expected to ramp up to full production of about 280,000 kilograms per year of silver by sometime in 2009. In 2008, Sumitomo Corp. of Japan agreed to acquire the remaining shares of Apex Silver Mines Ltd. in the San Cristobal Mine, although the acquisition was not expected to be concluded until sometime in 2009. Apex planned to continue to operate the mine (for Sumitomo) under the new company name of Golden Minerals Co. after expected emergence from Chapter 11 bankruptcy proceedings in the United States on March 24, 2009 (table 2; Walsh, 2007, 2009; ITRI Ltd., 2008; Coeur d'Alene Mines Corp., 2009, p. 22; Golden Minerals Co., 2009, p. 6; Glencore International AG, undated; Ministerio de Minería y Metalurgia, Bolivia, undated c).

Outlook

During 2008, the ramping up of production at the San Cristobal Mine was hindered by shortages of water for processing, among other factors. Still, the San Cristobal Mine was expected to ramp up to an annual average production capacity of about 225,000 metric tons per year (t/yr) of zinc,

82,000 t/yr of lead, and 525 t/yr of recoverable silver contained in separate lead-silver and zinc-silver concentrates by the end of 2009. Also, by the end of 2009, the San Bartolome Mine and plant was expected to produce at or near a capacity of about 280 t/yr of silver contained in doré. Jindal Steel & Power Ltd. planned to invest \$2.1 billion in El Mutun iron and steel project through 2014, but it was not clear how much iron or steel the company would be able to produce during this construction phase. The company planned for the eventual design capacity at El Mutun to be 10 million metric tons (Mt/yr) of iron ore pellets, 6 Mt/yr of sponge iron, and 1.7 Mt/yr of crude steel (Jindal Steel & Power Ltd., 2008, p. 5, 12; Coeur d'Alene Mines Corp., 2009, p. 2, 22; Golden Minerals Co., 2009, p. 6, 24-31; Sumitomo Corp., 2009).

According to the Fraser Institute, surveyed companies considered Bolivia to have the most substantial barriers to investment in the crude petroleum and natural gas sector among 54 worldwide jurisdictions, and the Fraser Institute's ranking of the country as a desirable destination for investment by private companies in the mining sector was 66th out of 71 worldwide jurisdictions in 2008. To maintain or increase production by the mineral industry, substantial public investment (through COMIBOL and YPFB) could be required to supplement private investment, even with FDI in both the mining and oil and gas sectors increasing in 2008. In 2008, public investment in the mining, metallurgy, and oil and gas sectors did increase compared with that of 2007. In the mining and metallurgy sectors, the Government planned to increase investment in 2009, including in projects to expand production at the Huanuni tin mine, construct a pilot plant to produce lithium carbonate in the Salar de Uyuni, help develop the mine site and construct a plant to produce copper cathodes at the Coro Coro copper mining project, and install a new tin-smelting furnace at the Vinto smelting complex (together with Ausmelt Ltd. of Australia) (Vargas, 2007; Angevine and Thomson, 2008, p. 5, 12; Ausmelt Ltd., 2008, Business News Americas Ltda., 2008; Cauclanis, 2008a; Beltran, 2009; Garcia, 2009; Instituto Nacional de Estadística, Bolivia, 2009b, p. 630, 686; Kosich, 2009; McMahon and Cervantes, 2009, p. 7, 10, 14).

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TABLE 1
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2004	2005	2006	2007	2008 ^e
METALS³					
Antimony:					
Mine output, Sb content	2,633	5,204	5,460	3,881	3,905 ⁴
Metal, including Sb content of trioxide	386	2,941	2,320 ^e	2,862	3,000
Arsenic, mine output, arsenic trioxide, arsenic sulfide	168	120	90	--	--
Bismuth:					
Mine output, Bi content	62	44	155	147	150
Metal, smelter	33	--	40 ^e	(5)	50
Copper:					
Mine output, Cu content	576	35	218	606	731 ⁴
Metal, smelter, primary	441	--	--	--	--
Gold, mine output, Au content ⁶	6,951	8,871	9,628	8,818	8,405 ⁴
	kilograms				
Lead:					
Mine output, Pb content	10,267	11,231	11,955	22,798	81,602 ⁴
Metal, smelter, primary	84	33	85 ^e	301	300
Silver:					
Mine output, Ag content ⁷	406,925	420,300	472,208	524,989	1,114,000 ⁴
Refined	10,768	18,221	22,600 ^e	23,657	25,000
Tantalum, tantalite	--	4,080	8,000 ^e	3,914	4,000
	do.				
Tin:					
Mine output, Sn content	17,569	18,640	17,669	15,972	17,319 ⁴
Metal, smelter	13,627	13,841	14,100 ^e	12,251	12,666 ⁴
Alloys, Sn-Pb alloyed metal	480	498	1,030 ^e	473	500
Tungsten, mine output, W content	403	531	868	1,107	1,148 ⁴
Zinc, mine output, Zn content	147,430	159,502	172,747	214,053	383,618 ⁴
INDUSTRIAL MINERALS					
Barite	5,774	11,379	8,943	8,245	9,000
Bentonite ^c	548 ⁴	590 ⁴	--	--	--
Borax ^c	-- ⁴	-- ⁴	56	--	--
Boric acid	--	13,584	12,136	15,032	15,000
Cement, hydraulic	1,276	1,440	1,636	1,739	1,985 ⁴
	thousand metric tons				
Gemstones, rough					
Amethyst	199,615	89,092	175,715,176 ⁸	671,587,996 ⁸	650,000,000
Ametrine	5	20,011	33,675	8,933	9,000
Quartz, pink	49,323	49,210	3,756	38	40
Emerald	--	7,742	2,219	--	--
	do.				
Gypsum, crude	28	26	617	4,458	4,500
Salt, natural, all types ^c	45,000	45,000	45,000	45,000	45,000
Of which, rock salt	869	552	688	1,545	1,500
Stone, natural:					
Flint	2,000	4,174	4,427	25	25
	kilograms				
Granite	--	368	119	205	200
Limestone as dimension stone	21	--	--	(5)	(5)
Marble	327	102	102	81	80
Slate (pizarra)	314	297	192	233	230
Sulfur, native	--	--	3	--	--
Ulexite	68,031	62,604	50,727	64,499 ^r	55,710 ⁴
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural:					
Gross	12,671 ^r	14,672	14,689	15,230	15,374 ^{p,4}
	million cubic meters				
Marketable	10,257	12,536	13,434	14,301	14,895 ^{p,4}
	do.				
Natural gas liquids ^c	4,500	4,600	4,600	4,800	4,800 ^p
	thousand 42-gallon barrels				

See footnotes at end of table.

TABLE 1—Continued
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2004	2005	2006	2007	2008 ^c
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum:					
Crude	14,192	15,417	14,882	15,027	14,233 ^{p, 4}
thousand 42-gallon barrels					
Refinery products:					
Liquefied petroleum gas	791	864	855	895	850 ^p
Gasoline:					
Aviation	23	25	28	32	25 ^p
Motor	3,867	3,726	3,877	4,558	4,300 ^p
Jet fuel	946	1,104	1,076	992	950 ^p
Kerosene	150	151	153	131	130 ^p
Distillate fuel oil	4,419	4,450	4,615	4,880	4,600 ^p
Lubricants:					
Oil, automotive	78	83	102	105	100 ^p
Oil, industrial	5	7	10	8	5 ^p
Greases ⁹	3	3	4	3	3 ^p
Asphalt ⁹	14	15	15	13	10 ^p
Paraffin oil ⁹	5	3	1	--	-- ^p
Total	10,301	10,431	10,736	11,617	11,000 ^p

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

¹Table includes data available through February 28, 2010.

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-sized mines.

⁴Reported figure.

⁵Less than 1/2 unit.

⁶Includes production of metallic gold.

⁷Includes production of metallic silver.

⁸Includes production by previously unregistered miners, whose production was not officially accounted for prior to 2006.

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

TABLE 2
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
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		Empresa Metalúrgica Vinto (Government, 100%)	Vinto antimony smelter, ¹ Carretera Vinto, Oruro Department	60.
Do.		Fundestaño 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		Cooperativa Minera L. Tasna Ltda.	Tasna Mine, near City of Oruro, Oruro Department	100.
Bismuth, refined		Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Telamayu bismuth refinery, Telemayu, Potosi Department	350.
Do.		Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, ¹ Carretera Vinto, Oruro Department	90.
Cement	thousand metric tons	Sociedad Boliviana de Cemento S.A. (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	1,510 cement; 760 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	630 cement; 620 clinker.
Do.	do.	Cooperativa Boliviana de Cemento Ltda. (COBOCE)	Irpa Irpa Plant, near city of Cochabamba	363 cement; 330 clinker.
Do.		ITACAMBA Cemento S.A.	Plant, Santa Cruz Department	200 cement.
Copper		Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp., 95%, and Empresa Minera Unificada S.A., 5%)	San Vicente Mine, Potosi Department	130.
Gold	kilograms	Empresa Minera Paititi S.A. {Orvana Minerals Corp. [Fabulosa Mines Ltd. (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.	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.		Minera San Cristóbal S.A. (Apex Silver Mines Ltd., 65%, and Sumitomo Corp., 35%)	San Cristobal Mine, southwestern Bolivia	82,000.
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, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	4,700.
Lead, metal		Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, ¹ Carretera Vinto, Oruro Department	120.
Do.		Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%)	Karachipampa lead-silver smelter, and zinc refinery, ² Potosi Department	30,000.

See footnotes at end of table.

TABLE 2—Continued
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
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 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 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.
Do.	do.	Operated by Empresa Petrolera Chaco S.A. (Pan American Energy LLC [BP p.l.c., 60%, and BRIDAS Corp., 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; Bulu Bulu, Carrasco and Kanata fields, on the border of Cochabamba and Santa Cruz Departments	2,200.
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.
Do.	do.	Operated by Vintage Petroleum Boliviana Ltda. (owned by Occidental Petroleum Corp., 100%)	Chaco Sur and Ñupuco fields, Tarija Department; Naranjillos field, Santa Cruz Department	350.
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 Corp., 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; Bulu Bulu, 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.
Do.	do.	Operated by Vintage Petroleum Boliviana Ltda. (owned by Occidental Petroleum Corp., 100%)	Chaco Sur and Ñupuco fields, Tarija Department; Naranjillos field, Santa Cruz Department	140.
Silver	kilograms	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	220,000.
Do.	do.	Minera San Cristóbal S.A. (Apex Silver Mines Ltd., 65%, and Sumitomo Corp., 35%)	San Cristobal Mine, southwestern Bolivia	525,000.

See footnotes at end of table.

TABLE 2—Continued
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Silver— Continued	kilograms Empresa Minera Manquiri S.A. (Coeur d'Alene Mines Corp., 100%)	San Bartolomé Mine, by Cerro Rico, near Potosi, Potosi Department	280,000.
Do.	do. Sinchi Wayra S.A. (Glencore International AG, 100%)	Bolivar, Colquechaquita, Don Diego, Porco, and San Lorenzo Mines, Oruro and Potosi Departments	200,000.
Do.	do. Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp., 95%, and Empresa Minera Unificada S.A., 5%)	San Vicente Mine, Potosi Department	22,500.
Do.	do. Empresa Minera La Solución S.A. (Apogee Minerals Ltd., 100%)	Asientos and Monserrate lead-silver-zinc mines, Cochabamba Department	2,000.
Silver, metal	Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%)	Karachipampa lead-silver smelter, and zinc refinery, ² Potosi Department	310.
Do.	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, ¹ Carretera Vinto, Oruro Department	2.
Tin	Empresa Minera Huanuni [Corporación Minera de Bolivia (Government, 100%), 100%]	Huanuni Mine, Dalence Province, Oruro Department	8,000.
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 Corporación Minera de Bolivia mines, in Oruro, Potosi, and La Paz Departments	7,000.
Tin, refined	Operaciones Metalúrgicas S.A. (OMSA)	Huajara Industrial Park, east of the City of Oruro, Oruro Department	3,360.
Do.	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	10,000.
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 Co.'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	240,000.
Do.	Minera San Cristóbal S.A. (Apex Silver Mines Ltd., 65%, and Sumitomo Corp., 35%)	San Cristobal Mine, southwestern Bolivia	225,000.
Do.	Small-scale mining operations and cooperatives (private, 100%)	Cerro Rico Mine, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	45,000.
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	14,000.
Do.	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp., 95%, and Empresa Minera Unificada S.A., 5%)	San Vicente Mine, Potosi Department	2,000.
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, ² Potosi Department	150,000.

^cEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto.

¹There was no reported production of refined antimony or bismuth, nor of lead or silver metal (unless in alloys) in 2007 (Ministerio de Minería y Metalurgia, Bolivia [undated], Cuadro No. 6, Boletín estadístico minero metalúrgico—Enero–Diciembre, 2007: La Paz, Bolivia, Ministerio de Minería y Metalurgia, no. 222); and no further information was available concerning production of these refined metals in 2008.

²Inactive since completion of construction in 1985; through 2008.

