

2005 Minerals Yearbook

BOLIVIA

THE MINERAL INDUSTRY OF BOLIVIA

By Steven T. Anderson

The mineral industry has a long history in the Republic of Bolivia, where 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, and promoting natural gas exports has been the focus of the Bolivian Government's economic development strategy since the late 1990s. This strategy proved to be very lucrative, and the natural gas sector attracted substantial foreign direct investment (FDI) until 2003. From 2003 through 2005, however, uncertainty surrounding the implementation of the 1996 hydrocarbons law and risk of increased control of the country's major gasfields and oilfields by the Government served to deter reinvestment in the mineral fuels sector by foreign owners. Net FDI in the Bolivian economy was estimated to be about -\$280 million compared with +\$63 million in 2004, which indicates that there was a net loss in foreign capital formation in 2005.1 FDI in the mineral fuels sector was estimated to have decreased by 12.5% compared with that of 2004 and was expected to decrease even more in 2006 (Banco Central de Bolivia, 2006; Federal Research Division, U.S. Library of Congress, 2006, p. 9-10, 12-13; Petroleum Economist, 2006).

Governmental proposals for increased taxation on production and export of mineral fuels, including popular proposals for reestablishing at least majority control of mineral fuel production facilities by the state-owned mineral fuels company Yacimientos Petrolíferos Fiscales Bolivianos (YPFB), had been ongoing in Bolivia since at least 2000, but until 2005 were always rejected in favor of plans to support FDI and expand exports of natural gas. In 2003, popular demonstrations were held to protest private (foreign) ownership of the rights to exploit fields (which had been controlled by YPFB before approval of a new hydrocarbons law in 1996 led to their privatization) and the lack of a satisfactory Government plan to increase transfers of the benefits of increased natural gas exports to the wider Bolivian populace. These protests resulted in the resignation of the President of Bolivia in 2003 and led to a precipitous drop in FDI in the exploration and development of new fields and to reduced reinvestment in maintaining production in existing fields. Total FDI in the mineral fuels sector of Bolivia was about \$463 million in 2002 but decreased to \$250 million in 2003, \$120 million in 2004, and an estimated \$105 million in 2005. 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 not much apparent spillover through 2005. 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 and was estimated to have increased to about \$183 million in 2005. The mining projects that were primarily responsible for this upward trend in FDI were, in order of importance, the San Cristobal and San Bartolome silver projects. On May 19, 2005, the Government approved a new hydrocarbons law that effectively imposed a 50% royalty on mineral fuel production by foreign companies operating in Bolivia. During the latter half of 2005 and through the first half of 2006, the Government made repeated announcements to reassure investors in the mining sector that proposed increases in taxes on mine production would not be approved at a similar level (Banco Central de Bolivia, 2006; Olson, 2006; Kosich, 2006§²).

The most important metals mined in Bolivia were, in decreasing order of value, zinc, tin, gold, silver, lead, antimony, and tungsten. The most significant (in terms of value) industrial minerals were ulexite (boron compounds), amethyst, and barite. In 2005, total mine output of metallic ores and concentrates and crude industrial minerals was valued at about \$616 million, of which about 89% was exported in the form of crude ores and concentrates. Mineral imports mainly consisted of mineral fuels, especially petroleum refinery products, and imports of mineral fertilizers and cement clinker. In 2005, the country's mineral trade surplus was about \$1.44 billion compared with \$1.01 billion in 2004 (Instituto Nacional de Estadística, 2006e, p. 32; Ministerio de Minería y Metalurgia, Bolivia, 2006, p. 1-2, 17).

In 2005, the annual average price for most metals and industrial minerals produced in Bolivia remained high or increased relative to previous record levels in 2004. The higher prices served to maintain the annual value of production of the mining and mineral processing sector despite a decrease of about 2.6% in the total annual tonnage produced during this timeframe. This sector contributed about 4.1% of the real gross domestic product (GDP) in 2005 compared with 3.8% in 2004. The value of production of mineral fuels (predominantly natural gas) contributed about 6.8% of the value of the real GDP compared with 6.1% in 2004. Bolivia's GDP based on purchasing power parity was \$25.68 billion, which amounted to an increase of 6.5% compared with that of 2004. The rate of inflation was about 5.4% (table 1; Instituto Nacional de Estadística, 2006b, p. 411; International Monetary Fund, 2006§).

At the beginning of 2005, Bolivia's proven reserves of natural gas were estimated to rank a distant second to those of Venezuela in Latin America and were estimated to be about 40% greater than those of either Argentina or Trinidad and Tobago. Bolivia's resources were estimated to be sufficient to enable the country to become a hub for trade of mineral fuels in South America, given its own natural gas production capacity, its network of pipelines, and its strategic location in the center of the continent next to Chile, which is becoming

¹All values are nominal, at current prices, unless otherwise stated.

²References that include a section mark (§) are found in the Internet References Cited section.

increasingly dependent on imports of natural gas. Bolivia's estimated reserves of petroleum were much less significant than the country's natural gas reserves. Bolivian copper, gold, iron ore, silver, tin, and zinc resources have been estimated by private exploration companies to be globally significant. Accurate figures concerning the country's leading mineral resources, however, are mostly not publicly available. Bolivia was still considered underexplored for nonfuel minerals, especially in the Pre-Cambrian shield area where some explorers have indicated that significant deposits of nickel, palladium, platinum, and other valuable metals might exist. In addition, foreign investment in exploration has been frequently deterred by uncertainty concerning the mining law, taxation, and rights to exploit existing reserves, as well as civil unrest directed against foreign investment in the mining sector. In 2005, the primary minerals of interest for exploration and development of production in Bolivia were antimony, boron materials, gold, lead, lithium, magnesium compounds, potassium, semiprecious stones, silver, tin, and zinc (Economist, The, 2005; BP p.l.c., 2006, p. 22; Crenwelge, 2006; U.S. Energy Information Administration, 2006).

Government Policies and Programs

During the second half of 2005 and continuing into 2006, many Bolivians demonstrated to express dissatisfaction with the new hydrocarbons law and publicly demanded full nationalization of the mineral fuels sector. The Bolivian Congress continued to support a bill for full nationalization and argued that accurate assessment and complete collection of the taxes and royalties mandated in any new hydrocarbons law would not really be feasible without at least majority operational control by state-run YPFB. Foreign owners of facilities for the production and export of mineral fuels also expressed dismay with the new law, and most of the major companies placed a hold on investment in exploration, new production capacity, and planned capacity expansions during the second half of the year. During the first half of 2005, investment flows were estimated already to be at or below levels that the Bolivian Hydrocarbons Chamber thought would be necessary just to maintain production at contractual levels. In the first quarter of 2006, Repsol YPF S.A. announced a reevaluation of the company's proven oil and natural gas reserves in Bolivia as of 2005 that included careful consideration of the economic effects of implementation of the May 2005 hydrocarbons law. This revised accounting reduced the company's proven reserves by 52.5% compared with estimates at the end of 2004. Total investment in exploration for new deposits of natural gas and petroleum in the country decreased by about 47% compared with that of 2004, although total investment in immediate extraction of mineral fuels from existing wells was estimated to have increased slightly during this same timeframe (Olson, 2005; Instituto Nacional de Estadística, 2006a, p. 6; International Monetary Fund, 2006, p. 29; Repsol YPF S.A., 2006b, p. 28).

The tax and royalty provisions of the new hydrocarbons law were actually not implemented throughout the year because no private foreign-owned company with mineral fuel interests in Bolivia finished renegotiating its foreign investment contract(s) to comply with the new law. Almost all the leading producers met with the Bolivian Government to request the 6-month period of negotiation allowed under the new law before adjusting their contracts with the State; this negotiation period was set to expire in June 2006. By the end of October 2005, three U.S. companies with oil and gas interests in Bolivia threatened to sue the Bolivian Government, citing provisions of the United States-Bolivia Bilateral Investment Treaty, and at least four other companies from other countries were considering similar action according to their respective countries' bilateral investment treaties with Bolivia. Many of these same companies were also considering filing complaints with the International Center for Settlement of Investment Disputes (World Bank) if scheduled negotiations with the Bolivian Government did not achieve a satisfactory resolution. The President (who allowed the bill to become law) resigned in July 2005, but the interim President that succeeded him still signed the law and even issued a decree for its immediate implementation. The interim Government issued another decree, however, that a system needed to be established to enable officials to audit the foreign-owned operations and verify production levels for royalty and tax purposes. Full nationalization of the mineral fuels sector became the top political issue leading up to the national elections on December 18, 2005, and public demonstrations against the new hydrocarbons law continued throughout the year (Oil & Gas Journal, 2005; Wertheim, 2005; Asociación Nacional de Mineros Medianos, 2006, p. 10; Repsol YPF S.A., 2006a, p. 28; U.S. Commercial Service, 2006, p. 11).

Throughout 2005, the country's mining reactivation plan that was approved on January 31, 2004, was still not fully implemented. The reactivation plan was aimed at redirecting as much of expected revenues from new mining projects (primarily owing to expectations of continuing higher prices for most metals and industrial minerals) toward broader economic development efforts, especially in the areas surrounding the proposed mining operations. In looking forward to 2006, foreign mining companies that planned to operate in Bolivia still faced a high level of uncertainty concerning potential renegotiation of investment contracts, higher taxes and royalties, and potential nationalization following the national elections on December 18, 2005. As with the mineral fuels sector, congressional leaders argued that enforcement of any new (or old) provisions of the mining law would require at least majority control of current and future mining operations by the Government through reestablishment of direct control of mining activities by Corporación Minera de Bolivia (COMIBOL) (Mesa Gisbert, 2004; Asociación Nacional de Mineros Medianos, 2006, p. 11-14; Los Tiempos, 2006a§).

Structure of the Mineral Industry

In 2005, the modern metal mining sector in Bolivia consisted of 11 medium-scale mining companies affiliated through the Asociación Nacional de Mineros Medianos (ANMM), some of which did not produce during the year. Together, these companies employed about 7,500 people, including administrative staff, executives, mine workers, and technicians. The company membership in ANMM remained basically the

same in 2005 as it was in 2004, except that a new company, REXMA S.A., became a member. REXMA was primarily exploring for gold and nonferrous mineral deposits in the Department of Santa Cruz. Also, Apex Silver Mines Limited of Toronto, Ontario, Canada, transferred operation of its San Cristobal lead-silver-zinc project to its new subsidiary Empresa Minera San Cristobal S.A. from the company's development-stage subsidiary Andean Silver Corporation to oversee the construction phase of the San Cristobal Mine. Glencore International AG of Baar, Switzerland, acquired Compañía Minera del Sur S.A. (COMSUR) at yearend 2004 and changed the new subsidiary's name to Sinchi Wayra S.A. at yearend 2005 (Asociación Nacional de Mineros Medianos, 2006, p. 75, 77, 81).

In 2005, the leading mining company in Bolivia was COMSUR. The company's principal mineral commodity was zinc in concentrate, although COMSUR was also the country's leading individual producer of lead and silver. COMSUR owned and operated about five mines in the Oruro and the Potosi Departments. COMSUR also controlled a majority interest in the medium-scale tin and antimony smelting complex Complejo Metalúrgica de Vinto S.A. through COMSUR's majority interest in another medium-scale mining company, Compañía Minera Colquiri S.A. (CMC). The country's leading medium-scale producer of gold was Empresa Minera Paititi S.A. (Paititi), which was a subsidiary of Orvana Minerals Corporation of Toronto, Ontario, Canada. Empresa Minera Unificada S.A. (EMUSA) was a privately owned Bolivian mining company and accounted for all Bolivia's medium-scale mine production of antimony. Empresa Minera Inti Raymi S.A. (Inti Raymi) was a medium-scale mining company that still produced some gold and silver at its plant associated with the closed Kori Kollo Mine. The material processed at the Kori Kollo facilities was mined at the Kori Chaca Mine, which was located adjacent to Kori Kollo, and included some tailings recovered from material left over from the Kori Kollo Mine. Inti Raymi was mostly owned by Newmont Mining Corporation of Denver, Colorado. Empresa Minera La Solución S.A. was the only other medium-scale mining company with notable production in 2005; La Solución Mine produced small amounts of lead, silver, and zinc. In July 2005, Apogee Minerals Ltd. of Toronto, Ontario, Canada, acquired a 51% interest in La Solución from a private holding company and entered an option contract to fully acquire the company and mine if the conditions of the contract are satisfied (table 2; Apogee Minerals Ltd., 2005, p. 29; Asociación Nacional de Mineros Medianos, 2006, p. 24; Glencore International AG, 2005§; Newmont Mining Corporation, 2005§).

In 2005, small-scale, artisanal, and cooperative (SMACA) mining operations accounted for all the country's mine production of bismuth, copper, and tungsten. They also accounted for about 84% of the mine production of antimony; 63%, tin; 52%, silver; 43%, lead; 32%, gold; and 26%, zinc. Most cooperatives were small and consisted of individual miners organized by mine or by specific mineral. Most mining cooperatives in Bolivia relied chiefly on artisanal mining methods. Cooperatives were more involved in the production of base metals, and less-organized small-scale and individual

miners in the country were mostly involved in alluvial gold mining. Mining cooperatives were loosely organized under the Federación Nacional de Cooperativas Mineras (FENCOMIN), which also helped represent them legally and provided assistance in managing their extensive claims. Many small-scale miners were previously employed by COMIBOL, but most of them had not been formally employed in mining since being laid off in the late 1980s. Small-scale miners who did not belong to a cooperative were associated under the Bolivian Government's Cámara Nacional de Minería (CANALMIN), but a great many more unassociated miners were estimated to be actively mining in the country (Asociación Nacional de Mineros Medianos, 2006, p. 102-106; Crenwelge, 2006; Federal Research Division, U.S. Library of Congress, 1989§).

The leading producer of natural gas and petroleum in Bolivia was Petróleo Brasileiro S.A. (Petrobrás) of Rio de Janeiro, Brazil. The other leading producers were, in decreasing order of level of natural gas production in 2005, Repsol of Madrid, Spain (including combined production of direct operations and ownership interest in Empresa Petrolera Andina S.A.); BG Group plc of Reading, United Kingdom; BP p.l.c. of London, United Kingdom (through its ownership interest in Empresa Petrolera Chaco S.A. and some of Repsol's operations via majority ownership of Pan American Energy LLC); BRIDAS Corporation of Buenos Aires, Argentina (also through its minority ownership interest in Pan American); and Pluspetrol Bolivia Corporation S.A. of Buenos Aires, Argentina, which became a significant producer following the startup of commercial production at its Tacobo field in 2005 (table 2; BG Group plc., 2006§; BP p.l.c., 2006§, Ministerio de Hidrocarburos y Energía, Bolivia, 2006b§).

In terms of reserves, Repsol controlled about 34% of Bolivia's proven and probable natural gas reserves and did not expand reserves or production capacity in the country during the year. Although Repsol nominally owns just 50% of Andina, four of the seven members of Andina's Board of Directors are nominated by Repsol; the Bolivian pension funds have only three members on the Board. Therefore, Repsol could fully consolidate all physical aggregates and income from operations, including control of all rights to reserves owned by Andina, and Repsol had the greatest vested interest in rights to natural gas reserves in the country. Petrobrás's ownership interests were vested more in pipelines and transportation of natural gas and not as much in rights to actual reserves as Repsol, although Petrobrás had purchasing contracts with every other major natural gas producer in Bolivia to supply the Brazilian market. Through the end of 2005, the proven and probable reserves of natural gas and petroleum controlled by Petrobrás in Bolivia accounted for 2.7% of the company's total reserves and about 18% of Bolivia's total reserves of natural gas. BG Group controlled about 14% of Bolivian proven and probable reserves of natural gas (including partial ownership of the Repsoloperated Caipipendi exploration and exploitation concession block); Total S.A. of Courbevoie, France, controlled about 13%, BP, 6.6%; Exxon Mobil Corp., 5.1% (through its nonoperational equity interest in the Itau exploration concession that was being explored by Total); and Bridas, 4.4%. Similar to the ownership situation with Andina, the pension funds that nominally owned

50% of Chaco did not actively control any of the rights to the reserves owned by Chaco; instead the BP-Bridas joint venture controlled all Chaco's reserves and part of the Caipipendi concession, which included the large (about 2.6 trillion cubic meters of proven and probable natural gas reserves) Margarita field (Ministerio de Hidrocarburos y Energía, Bolivia, 2005; Petróleo Brasileiro S.A., 2006, p. 15; Repsol YPF S.A., 2006a, p. 28).

Although natural gas has supplanted silver and tin as the country's most valuable mineral resource, Bolivia has had trouble establishing itself as the energy hub in South America. The country has also not been able to find a way to realize the potentially large gains that could result from liquefying its natural gas and exporting it to such lucrative markets as the United States. Bolivia does not consume a significant amount of natural gas domestically, and the country has not succeeded in effectively reinvesting tax revenues from its natural gas exports to aid the country's wider economic development. By the end of 2005, Bolivia had not made much progress toward these objectives because its pipeline infrastructure exports natural gas in crude form only to Argentina and Brazil, and because of disagreement about the Bolivian Government's role in controlling mineral resources, including fuels (Economist, The, 2005; Federal Research Division, U.S. Library of Congress, 2006, p. 6-7, 11-13, 16, 20, 22).

Exploration

The location of the major mining investment projects already approved or budgeted for Bolivia, the potential project development budget as of the end of 2005, and ownership information of these projects are provided in table 3. The most valuable of these projects, by far, was expected to be San Cristobal. This project had been put on hold since early 2001 in anticipation of a recovery in the price of silver despite a favorable bankable feasibility study that was completed in 1997. In 2005, estimated reserves at San Cristobal remained at about the same levels as those of 2004, which were about 3.6 million metric tons (Mt) of zinc, 1.3 Mt of lead, and 14,500 metric tons (t) of silver. The proposed mine was expected to begin producing at an average of 165,000 metric tons per year (t/yr) of zinc, 64,000 t/yr of lead, and 53 t/yr of recoverable silver by the end of 2007. The next most valuable project was expected to be the San Bartolome silver project, which was owned (operated) by Coeur d'Alene Mines Corporation of Coeur d'Alene, Idaho. The estimated reserves of recoverable silver at San Bartolome were revised upward to about 4,730 t in 2004 compared with about 3,820 t in 2003; the estimate remained unchanged in 2005. The proposed mine, which was expected to produce between 190 t/yr and 250 t/yr of payable silver, was previously scheduled to start in 2007, but Coeur d'Alene decided to extend the construction phase of the mine until political uncertainty in Bolivia becomes more resolved (Centro de Documentación e Información, Bolivia, 2004; Apex Silver Mines Limited, 2006, p. 4-6, 8; Coeur d'Alene Mines Corporation, 2006, p. 27-28).

In 2005, almost all the oil and gas companies that were established in Bolivia postponed or cancelled plans to invest in exploration and development of new mineral fuel production

capacity, which resulted in a net loss of proven, probable, and especially potential reserves during the year. Since 2003, primarily owing to ongoing uncertainty concerning changes to the country's hydrocarbons law, political turnover, and public demonstrations, the most heavily invested companies mostly have made limited investments just to maintain production levels at existing wells. During the first 10 months of 2005, these companies (except Pluspetrol, which was still trying to establish itself as a significant producer in Bolivia during 2005) cut their total combined investment in exploration for new mineral fuel deposits in the country to \$14.5 million compared with \$71.9 million during the same period in 2004. Repsol drilled only one exploratory well in 2005 in the Marmore Block, which did not indicate sufficient potential for further development, and planned to drill one other well in 2006 in the Caipipendi Block. Since commercial production began at its Sabalo Field in the San Antonio Block in 2003, Petrobrás has not been as heavily invested in exploration in Bolivia as some of the other major investors in the country. Petrobrás did not drill any exploration wells in 2004; drilled only one exploration well in 2005, which was found to be not commercially feasible for further development; and did not plan to drill any additional wells in 2006. Although Petrobrás decreased its proven reserves in Bolivia by only about 4.4% at the beginning of 2006 compared with the beginning of 2005, the company was expected to announce a significant reduction in its reserves of oil and natural gas in Bolivia by the end of 2006 (International Monetary Fund, 2006, p. 39; Petróleo Brasileiro S.A., 2006, p. 15; Repsol YPF S.A., 2006a, p. 28).

From January through October 2005, Andina (Repsol) cancelled enough planned exploration projects to actually record a net disinvestment of -\$116,220 in natural gas exploration activities in Bolivia compared with a positive investment of about \$15.4 million during the same period in 2004. Similarly, BG Group invested only \$52,730 compared with \$823,500, and Chaco (BP and Bridas), \$705,020 compared with \$17.55 million, during the same comparative timeframes. BG Group's ongoing reduction of investment in Bolivia involved postponing development of the already explored Itau and Tarija fields and further exploration of the Caipipendi and the Charagua Blocks until economic and political uncertainty in Bolivia decreases sufficiently, which the company did not expect to take place before 2010 at the earliest. In total, Repsol was credited with investing about \$9.09 million in exploration in Bolivia from January through October 2005, compared with \$12.5 million during the same time period in 2004; Total S.A. invested \$4.37 million compared with about \$25 million during the same timeframes. Petrobrás remained roughly consistent in its relatively low exploration investment in mineral fuels in Bolivia in 2004 and 2005, investing about \$400,000 during the first 10 months of each year (BG Group plc., 2006§; Ministerio de Hidrocarburos y Energía, Bolivia, 2006a§).

Pluspetrol actually increased investment in exploration in Bolivia during the first 10 months of 2005 to about \$19 million compared with only about \$1 million during the same period in 2004. This unique (for this sector of the Bolivian mineral industry in 2005) exploration investment strategy could be justified by the country's increased direct exports of natural gas

to Argentina during the year, by both countries' agreement in August to extend the purchasing contract under which Bolivia would supply natural gas to the Argentine market through at least 2007, and by another agreement between the countries for Argentina to pay 47% more for Bolivian gas in 2006 than it paid in 2005. Also, discussions to further increase exports of natural gas to Argentina by constructing a new direct pipeline continued to progress, and the Bolivian Government was expected to negotiate another price increase for natural gas exports to Argentina in 2007 (U.S. Energy Information Administration, 2006; Ministerio de Hidrocarburos y Energía, Bolivia, 2006a§).

Bolivian reserves of natural gas had been decreasing since about the end of 2003, and it was estimated that there were about 1.4 trillion cubic meters of proven and probable reserves of natural gas in 2005 compared with about 1.5 trillion cubic meters in 2004. The decreased investment in exploration and development of new natural gas production capacity was most noticeable in the level of potential reserves of natural gas in Bolivia. In 2005, potential reserves of natural gas were approximately 430 billion cubic meters compared with about 682 billion cubic meters in 2004. Almost none of this loss of natural gas production potential was the result of potential reserves being upgraded to probable or proven status (Ministerio de Hidrocarburos y Energía, Bolivia, 2005).

Production

According to the preliminary figures of the Government's Ministerio de Minería y Metalurgia in current prices, the total value of mine production of metals and industrial minerals in Bolivia increased to about \$616 million in 2005 compared with a revised value of about \$517 million in 2004. Although mine production of metals and industrial minerals combined continued to decrease in 2005, production of metallic minerals recovered somewhat after decreasing in 2004 compared with production levels in 2003. The most important metals were, in order of decreasing nominal value of production in 2005, zinc, tin, gold, and silver; production of each of these metals (except silver) increased significantly in 2005 compared with that of 2004. In addition, production of antimony increased substantially during this timeframe. In 2005, SMACA miners controlled a greater share of the quantity of mine production of copper, silver, and zinc than in 2004, although medium-scale production (mostly foreign-owned) was beginning to reestablish its share in the mining of metals in Bolivia, especially in gold mining. The SMACA share of gold mine production decreased to 32% in 2005 compared with 62% in 2004; this decrease was mostly owing to increased production by Inti Raymi at the Kori Chaca Mine and increased production by Paititi from the lower mineralized zone at the Don Mario Mine (Orvana Minerals Corporation, 2005, p. 8-9; Asociación Nacional de Mineros Medianos, 2006, p. 102-106; Ministerio de Minería y Metalurgia, Bolivia, 2006, p. 4; Newmont Mining Corporation, 2006, p. 21-22).

In terms of production levels and the annual nominal value in 2005, zinc continued to lead mine production of metals and industrial minerals. Glencore increased production to 95,195 t of zinc in concentrate from 90,779 t in 2004 at mines operated

by COMSUR (Sinchi Wayra), and to 13,116 t from 12,034 t at mines operated by CMC. SMACA miners, however, accounted for a majority of the increase in zinc production in 2005. Although medium-scale firms have not controlled a majority of Bolivia's mine production of tin at least since COMIBOL stopped operating the state-run company's last tin mine in 2000, CMC did increase the company's mine production of tin to 2,940 t in 2005 from 2,545 t in 2004. The majority of the increase was owing to increased production by SMACA miners, particularly by mining cooperatives operating in the Caracoles and the Huanuni tin mines (Asociación Nacional de Mineros Medianos, 2006, p. 24, 85, 103, 106; Ministerio de Minería y Metalurgia, Bolivia, 2006, p. 4).

In 2005, EMUSA increased the company's mine production of antimony to 1,100 t from 485 t in 2004 at small operations in the Bolivian Altiplano and Eastern Cordillera. Some of these operations were joint ventures with local mining cooperatives, to which 287 t of EMUSA's production in 2005 was attributed. The remainder of the increase in mine production of antimony was accounted for by other autonomous SMACA mining operations (Asociación Nacional de Mineros Medianos, 2006, p. 23-25, 102)

In 2005, extraction of barite (mostly as a byproduct of zinc mining) increased by almost 100% compared with that of 2004, mostly owing to increased mine production of zinc. The barite was recovered by SMACA miners mostly from piles of material extracted as a result of lead and zinc mining activities in Cochabamba and Oruro Departments (Asociación Nacional de Mineros Medianos, 2006, p. 86-87, 96).

Production of ulexite decreased slightly in 2005 after decreasing precipitously in 2004 compared with that of 2003 following the Government withdrawal of the ulexite mining concessions of Quimica e Industrial del Borax Limitada (Quiborax) of Santiago, Chile, in June 2004. These mining concessions were operated by Quiborax through its wholly owned Bolivian subsidiary Non-Metallic Minerals S.A., which was located in the Salar de Uyuni, Potosi Department; the concessions were primarily responsible for the increases in the production of ulexite through 2003. In 2005, Quiborax was still attempting to obtain compensation from the Bolivian Government through a petition with the International Centre for Settlement of Investment Disputes (ICSID) of the World Bank for damages to the company's business as a result of the withdrawal of these concessions. Production of boric acid from material mined in Salar de Uyuni was officially reported for 2005 after no production was reported for 2003 or 2004, but it was not clear what companies were responsible for this production. 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 (table 1; Industrial Minerals, 2005, 2006).

In 2005, production of cement in the country also increased substantially (by slightly less than 13%) compared with that of 2004. Nonetheless, Bolivia imported about 163,000 t of cement clinker in 2005 compared with approximately 72,000 t in 2004 to help meet domestic demand. The combination of the cement production capacities listed in table 2 accounted

for approximately 70% of the total estimated for the entire country. In September 2005, Grupo Cementos de Chihuahua S.A. de C.V. (GCC) acquired a 47% ownership interest in Sociedad Boliviana de Cemento S.A. (SOBOCE), including a proportional ownership share in La Fábrica Nacional de Cemento (FANCESA). GCC reported that Bolivian demand for cement grew at a compounded annual rate of 4.7% from 2001 through 2005, and the company expected FANCESA to expand capacity to produce clinker in 2006. In 2005, however, FANCESA reported declining mine production out of the three quarries that it operated to provide mineral raw materials for clinker production, and imports of clinker may have to increase still more in 2006 in order to meet demand in Bolivia. In 2005, SOBOCE produced slightly more than 641,200 t of cement at its El Puente, EMISA, VIACHA, and WARNES plants, combined, and had a controlling ownership interest in the 399,700 t of cement produced by FANCESA during the year. In 2005, FANCESA was able to produce above the listed design capacity of its cement plant by converting a grinding facility to produce cement from clinker that was transported to the the plant from elsewhere, but reliable data concerning the proportion of production from imported clinker was not readily available (tables 1, 2; Fábrica Nacional de Cemento S.A., 2006, p. 20, 23-24; Grupo Cementos de Chihuahua S.A. de C.V., 2006, p. 4, 14, 22-23, 32; Instituto Nacional de Estadística, 2006d, p. 252; Sociedad Boliviana de Cemento S.A., 2006, p. 8, 13, 15; Los Tiempos, 2006a§).

In 2005, a 22% increase in the annual production of natural gas was partly owing to increased reinvestment in exploitation of existing wells compared with that of 2004 (table 1). Total investment in immediate extraction of natural gas and petroleum during the first 10 months of 2005 was \$113 million compared with \$98 million during the same period in 2004. From January through October 2005, BP and Bridas combined to invest about \$34 million to boost the immediate production of natural gas by Chaco compared with \$7.5 million during the same period in 2004. Similarly, Petrobrás invested \$21 million compared with \$10 million, and BG Group invested \$10 million compared with \$1 million during the same relative time periods. Petrobrás had operational control of approximately 58% of Bolivia's production of natural gas during the year, but income from international sales of this production was shared with other investment partners who did not necessarily participate directly in productive operations. Thus, Petrobrás counted sales of only about 26% of Bolivia's total production of natural gas toward company revenues. Repsol had ownership rights to about 20% of the total revenue from the sale of Bolivia's natural gas production during the year followed by Bolivian pension and other investment funds, about 12% (through their ownership interests in Andina and Chaco); Total, about 10%; BG Group, 7.6%; BP, 5.7%; Bridas, 3.8%; and other companies, such as Pluspetrol, 1.6% (table 2; Petróleo Brasileiro S.A., 2006, p. 15, 57; Ministerio de Hidrocarburos y Energía, Bolivia, 2006a§, b§).

Trade

In current prices, exports of natural gas accounted for 35% of the total value of exports and 10.5% of the nominal GDP in

2005 compared with 27.4% and 7.1%, respectively, in 2004. During the year, exports of crude petroleum began to become more significant economically and accounted for 11.2% of the nominal value of total exports and 3.35% of the value of the nominal GDP compared with 7.62% and 1.97%, respectively, in 2004. Also in current prices, exports of nonfuel minerals, mostly in the form of ores and concentrates, accounted for 12.7% of total exports and 3.7% of the nominal GDP compared with about 20% and 5.2%, respectively, in 2004 (Instituto Nacional de Estadística, 2006c, p. 26, 89-90; International Monetary Fund, 2006§).

In 2005, Bolivia exported 83.25%, by volume, of the marketable natural gas that it produced during the year to Brazil and 16.75% to Argentina. Imports of Bolivian gas by Petrobrás accounted for about 53% of the company's total sales of natural gas to the Brazilian market. Although Petrobrás did not hold direct ownership rights to some of this natural gas, the company was able to secure this vital supply for Brazil through joint contracts with the other major producers together with the approval of YPFB. Petrobrás continued to comply with its 20year (beginning in 1996) agreement to purchase natural gas from YPFB, and YPFB was required by the Bolivian Government to be an intermediary in any export contracts, including between a foreign producer, such as Petrobrás, and another foreign producer. In 2005, Petrobrás paid about \$799 million to the Bolivian Government through state-run YPFB for Bolivian exports of natural gas to Brazil compared with approximately \$544 million in 2004. All the natural gas produced by BG Group in Bolivia was designated for export to Brazil through two contracts, one with Petrobrás and YPFB and one with Companhia de Gás de São Paulo (Comgás), of which BG Group was also the majority shareholder (72.74%). In 2005, about 75% of Comgás's total distribution of natural gas to the Brazilian market was produced in Bolivia, and the company had a contract with Petrobrás and YPFB to purchase about 2.8 trillion cubic meters of natural gas imported from Bolivia for distribution within the State of Sao Paulo, Brazil. This contract was set to last through 2019 and to be expanded to require purchases of about 3.2 trillion cubic meters of natural gas imports from Bolivia (Companhia de Gás de São Paulo, 2006, p. 4, 16, 31; Instituto Nacional de Estadistica, 2006c, p. 26, 89-90; Petróleo Brasileiro S.A., 2006, p. 15, 57; BG Group plc., 2006§).

On July 2, 2004, Repsol and other companies operating in Bolivia restarted exporting natural gas directly to Argentina in response to shortages of natural gas in that country. Repsol's contractual supply portion (through YPFB) of the export agreement, which was renegotiated between the Government of Argentina and the Government of Bolivia in November 2004 and applicable throughout 2005, was 4.4 million cubic meters per day (about 1.6 billion cubic meters per year). The remainder of the 7.7 million cubic meters per day that was agreed upon to be exported to Argentina from Bolivia was supplied by other producers. Prior to this new export contract, Repsol had exported almost all its natural gas production in Bolivia to Brazil but was still able to supply the Cuiaba powerplant and other areas in Brazil through 2005 at full contractual levels. The reopening of the direct export market in Argentina was the primary reason for Repsol to increase its production of

natural gas in Bolivia by 22.5% in 2005 compared with that of 2004. Total's minority shares of Andina, the fields operated by Petrobrás, and the Gasryg pipeline meant that while most of the company's share of Bolivian production was exported to Brazil, some was transported to Argentina. Production of natural gas by Chaco in Bolivia was also exported to Argentina and Brazil, so BP's and Bridas's shares were exported to both countries as well (Repsol YPF S.A., 2006b, p. 20-21, 26-27, 43).

In 2005, the total nominal value of Bolivia's exports of mineral ores and concentrates was about \$547 million, and that of the country's exports of refined metals was about \$193 million. The leading export destination for ores and concentrates was, by value, Japan followed by Switzerland, the United States, and the Republic of Korea; the United States was the leading destination for refined metals followed closely by Switzerland and distantly by the United Kingdom and Brazil. In terms of both tonnage and nominal value, Bolivia's leading nonfuel mineral export commodity in 2005 was zinc ore and concentrate, of which the country exported about 150,000 t during the year (about 52% of which was shipped to Japan). Total tin exports ranked second in terms of value at current prices, but only 3,180 t was in the form of ore and concentrate, and about 13,200 t was in the form of refined tin metal. The United States was the leading destination for tin metal (accounting for 79% of the total tonnage exported by Bolivia) and was also the leading destination for refined antimony (combined metal and trioxide). Exports of silver in ore and concentrate were ranked third in nominal value, and Bolivia shipped out 382 t in this form (plus about 17 t in refined silver). Bolivia's exports of silver in ore and concentrate were distributed more evenly across recipient countries, and the principal destinations were the Republic of Korea (24% of the total), Japan (19%), Peru (18%), Switzerland (11%), and Canada and Mexico (about 9% million each). Gold bullion was ranked fourth in nominal value of exports, and 5,354 kilograms of this commodity was exported (98% to Switzerland). The other notable nonfuel mineral exports for Bolivia, in decreasing order of total export value, were lead in concentrates (10,840 t), antimony trioxide (2,500 t), antimony in concentrates (2,260 t), tungsten in ore (670 t), ulexite (63,500 t), boric acid (13,600 t), amethyst (89 t), and refined antimony metal (460 t) (Ministerio de Minería y Metalurgia, Bolivia, 2006, p. 8, 12-13, 17, 22).

Outlook

In 2005 and looking forward, foreign investors appear to have a high level of interest in the mineral industry of Bolivia, owing to continuing high prices for many mineral commodities and Bolivia's estimated untapped mineral resources for these same commodities. Estimates of extensive unexplored and undeveloped mineral wealth in Bolivia will probably continue to attract some foreign investment to truly new mineral exploration projects and restarts, although ongoing political uncertainty concerning both the mining law and the hydrocarbons law is likely to deter future investment. Government proposals for nationalization of the mining and mineral fuels sectors and the problems that the Government repeatedly has had with enforcing the policies that do exist (especially in more-remote

areas) are likely to continue to deter many investments that would otherwise have proceeded at the price levels experienced throughout 2005. If increasing the effective tax and royalties burden on production of natural gas to 50% is not enough and a new hydrocarbons bill that imposes majority ownership of the mineral fuels sector by state-run YPFB is effectively imposed, foreign firms interested in other sectors of the Bolivian economy, including mining, will be confronted with a fresh example of the full potential of risk inherent in FDI in the country. In 2005, foreign natural gas and petroleum companies did not wait to see if nationalization was to become a reality before reducing investment in exploration and development of new production capacity while attempting to extract as much mineral fuel from existing wells as possible. This was expected to lead to continuing decreases in reserves of mineral fuels in the country until the investment climate improves significantly or until the Government otherwise secures the funds and expertise to effectively invest in further development of the sector.

Bolivia had widespread poverty, and the Government had hoped that the new mining reactivation plan would stimulate the development of the mining sector of the Bolivian economy. In 2005, the mining reactivation plan was approved but not fully implemented. This was similar to the case with the new hydrocarbons law that was approved in May 2005, and may be explained by another change of Government during the year. Historically, however, taxation and redistribution schemes that have attempted to extract economic surplus from foreign investors and to reinvest the revenue to the economic benefit of the broader Bolivian populace have not been very effective. In 2005, many Bolivians continued to demonstrate for actual public ownership of mineral fuel and nonfuel mineral resources in the country and argued that the mining reactivation plan and new hydrocarbons law could not get past the critical step of effective tax collection to even begin real implementation. This argument was politically popular and the new President was elected at the end of 2005 on a platform that advocated nationalization as the only way to assure that Bolivians acquire the share of revenues from mineral exploitation that they desire. Depending on the success of this type of policy within the mineral fuels sector, nationalization of the mining sector was expected also to be proposed by the Government and to garner popular support. If this proves to be the case, many mining investment projects could be further delayed. Already in 2005, at least one company with a major mining investment project in the construction phase decided to extend this phase (delaying eventual production) in response to political unrest and a perceived increase in risk for the project (Coeur d'Alene Mines Corporation, 2006, p. 31).

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$\label{eq:table 1} \textbf{TABLE 1} \\ \textbf{BOLIVIA: PRODUCTION OF MINERAL COMMODITIES}^1$

(Metric tons unless otherwise specified)

Commodity ²	2001	2002	2003	2004	2005 ^p
METALS ³					
Antimony:					
Mine output, Sb content	2,264	2,346 ^r	2,585 ^r	2,633 ^r	5,098
Metal, including Sb content of trioxide	1,992	195	310 ^r	386 ^r	2,941
Arsenic, mine output, arsenic trioxide, arsenic sulfide	847 ^r	237	276	168	120
Bismuth:					
Mine output, Bi content	8	20	72	62	44
Metal, smelter	66	88	51 ^r	33	
Copper:					
Mine output, Cu content	18	120 ^r	182	576 ^r	714
Metal, smelter, primary	20 ^r			441	
Gold, mine output, Au content ⁴ kilograms	12,395	11,256	9,362	6,951	7,803
Lead:					
Mine output, Pb content	8,857	9,893	9,740	10,267	11,231
Metal, smelter, primary	106	100 r, e	50 ^r	84 ^r	33
Silver:					
Mine output, Ag content kilograms	407,998 ^r	450,311	465,309	406,925 ^r	418,506
Refined ⁵ do.	32,603	31,871	28,045 ^r	10,768 ^r	18,221
Tantalum, tantalite do.	11,992	10,823	10,070	r	4,080
Tin:	,	ŕ	,		,
Mine output, Sn content	12,298 ^r	15,242	16,755	17,569	18,433
Metal, smelter	11,292	10,976	12,836 ^r	13,627	13,841
Alloys, Sn-Pb alloyed metal	139	257	471 ^r	480 ^r	498
Tungsten, mine output, W content	532	399	441	403	531
Zinc, mine output, Zn content	141,226 ^r	141,558	144,985	145,906	158,582
INDUSTRIAL MINERALS	111,220	1.1,550	1,,,,,	1.0,500	100,002
Barite	6,253	1,556 ^r	1,851	5,774	11,379
Bentonite	159	216	227	548	590
Borax	1,750	940			
Boric acid	140	6,486			13,584
Cement, hydraulic thousand metric tons	983	1,010	1,138	1,276	1,440
Gemstones, rough	703	1,010	1,130	1,270	1,110
Amethyst kilograms	65,197 ^r	3.789 ^r	144,354 ^r	199,615 ^r	89,092
Ametrine do.	360	5,765	6	5	20,011
Quartz, pink do.	7,027 ^r	2,764 ^r	11,422	49,323	49,210
Emerald do.	47	2,704			7,742
Salt, natural, all types ^e	45,000	45,000	45,000	45,000	45,000
Of which, rock salt	308	3,834	2,271	43,000 869	552
Stone. natural:	308	3,034	2,271	809	332
	61	(6)		2	4
Flint Granite	64 79	(6) 126	58	2	4 368
Limestone as dimension stone					
		274		21	102
Marble	374	374	281	327	102
Slate, pizarra	202 ^r	306	228	314	297
Sulfur, native	250	2	100.545		
Ulexite MINIED AL ELIEL C AND DEL ATED MATERIAL C	32,477	40,479	109,545	68,031	62,604
MINERAL FUELS AND RELATED MATERIALS			1,017,921	988,384	962,651
Gas, natural:					
Gross million cubic meters	7,155	8,901	10,202	12,673 ^p	14,672
Marketable do.	5,275	6,421	7,398	10,257 ^p	12,536
Natural gas liquids ^e thousand 42-gallon barrels	3,800	3,900	4,100	4,500	4,600
Petroleum:					
Crude do.	11,424	11,338	12,223	14,192 ^p	15,417

See footnotes at end of table.

TABLE 1--Continued BOLIVIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commo	2001	2002	2003	2004	2005 ^p	
MINERAL FUELS AND RELAT	ΓΕD MATERIALSContinued					
PetroleumContinued:						
Refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	528	612	695	791 ^p	864
Gasoline:	_					
Aviation	do.	25	16	21	23	25
Motor	do.	3,439	3,449	3,450	3,867 ^p	3,726
Jet fuel	do.	854	909	944	946 ^p	1,104
Kerosene	do.	156	162	166	150 ^p	151
Distillate fuel oil	do.	2,955	3,198	3,488	4,419 ^p	4,450
Lubricants:						
Oil, automotive	do.	53	61	62	78 ^p	80 e
Oil, industrial	do.	2	2	2	5 ^p	5 e
Greases ⁷	do.	2	2	2	3 ^p	3 e
Asphalt ⁷	do.	12	13	13	14 ^p	14 ^e
Paraffin oil ⁷	do.	6	6	6	5 ^p	5 e
Other ^e	thousand 42-gallon barrels	5	28		p	e
Total	do.	8,037	8,458	8,849	10,301 ^p	10,400 e

^eEstimated; 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 November 2006.

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.

⁴Includes production of metallic gold.

⁵Includes production of metallic silver.

⁶Less than 1/2 unit.

⁷Reported figures were converted from metric tons to equivalent barrels.

${\it TABLE~2} \\ {\it BOLIVIA: STRUCTURE~OF~THE~MINERAL~INDUSTRY~IN~2005} \\$

(Metric tons unless otherwise specified)

	Major operating companies		Annual
Commodity	and major equity owners	Location of main facilities	capacity
Antimony	Empresa Minera Unificada S.A. (EMUSA)	Caracota, Chilcobija, and Espiritu Santo Mines,	1,100.
	(private, 100%)	Potosi Department	1.200
Do.	Small-scale mining operations and cooperatives	San Jose Mine, Oruro Department; Mines in	4,300.
	(private, 100%)	Caracota District, Nor Chichas, Quijarro, and	
		Sud Chichas Provinces, Potosi Department	
Antimony, refined	Complejo Metalúrgica Vinto S.A. (Compañía Minera	Vinto antimony smelter, Carretera Vinto, Oruro	60.
_	Colquiri S.A., 100%)	Department (no official production in 2005)	
Do.	Fundestaño de Oruro S.A. (Empresa Minera	City of Oruro, Oruro Department	1,100.
	Unificada S.A., 100%)		
Antimony trioxide	Empresa Minera Bernal Hermanos S.A.	Palala smelter, Tupiza, Potosi Department	1,900.
	(private, 100%)		
Bismuth, refined	Complejo Metalúrgica Vinto S.A. (Compañía Minera	Vinto smelting complex on the Carretera Vinto,	35.
	Colquiri S.A., 100%)	Oruro Department	
Cement thousand metric tons	Sociedad Boliviana de Cemento S.A. (SOBOCE)	El Puente (near city of Tarija), EMISA (near city	865 cement;
	(Grupo Cementos de Chihuahua S.A. de C.V.,	of Oruro), VIACHA (near city of La Paz),	640 clinker
	47.02%, and other private, 52.98%)	and WARNES (near city of Santa Cruz) plants.	
Do. do	Fábrica Nacional de Cemento S.A. (Sociedad	Cal Orcko industrial complex near city of Sucre,	375 cement;
	Boliviana de Cemento S.A., 33.34%; Municipal	including grinding plant, and FANCESA	360 clinker
	Government of Sucre, 33.33%; Universidad San	cement plant near city of Chucquisaca	
	Francisco Xavier de Chuquisaca, 33.33%)		
Do. do	Cooperativa Boliviana de Cemento Ltda. (COBOCE)	Irpa Irpa Plant, near city of Cochabamba	330 clinker.
Gold kilograms		Don Mario Mine, Chiquitos Province,	2,500
	[Fabulosa Mines Limited (Minera S.A., 100%),	Santa Cruz Department	
	52.5%, and other private, 47.5%], 100%)	•	
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		Tipuani, Guanay, Mapiri, Huayta, Kaka and	4,350.
		Teoponte Rivers, La Paz Department	
Gold-silver doré, bullion do	Empresa Minera Inti Raymi S.A. (Newmont Mining	Kori Chaca open pit mine and Kori Kollo	3,200 gold;
do	-	leaching plant, near city of Oruro	4,500 silve
	S.A., 12%)		
Lead	Compañía Minera del Sur S.A. (COMSUR)	Bolívar, Colquechaquita, Don Diego, Porco, and	15,000.
	(Glencore International AG, 100%)	San Lorenzo Mines, Oruro and Potosi	
		Departments	
Do.	Empresa Minera La Solución S.A. (Apogee Minerals	Asientos and Monserrate lead-silver-zinc mines,	610.
	Ltd., 51%, and other private, 49%)	Cochabamba Department	
	Etal, 51%, and onler private, 15%)	Coonacamen Department	
Do.	Small-scale mining operations and cooperatives	Cerro Rico Mine and in the areas immediately	4,700.
_ 2.	(private, 100%)	surrounding the San Cristobal Mine (under	.,
	(pirvate, 100%)	construction), Potosi Department	
Lead, metal	Complejo Metalúrgica Vinto S.A. (Compañía Minera	Vinto smelting complex on the Carretera Vinto,	35.
Lead, metar	Colquiri S.A., 100%)	Oruro Department	33.
Do.	Empresa Metalúrgica de Karachipampa (Atlas	Karachipampa lead-silver smelter, and zinc	30,000.
Б0.	Minerals Inc., 65%, and Corporación Minera de	refinery, Potosi Department	30,000.
	*	(inactive since completion in 1984)	
Notural gas million subjective	Bolivia, 35%)	1	2.700
Natural gas million cubic meters		Los Sauces, Rio Grande, Sirari, Vibora, and	2,700.
	YPF S.A., 50%; Previsión and Futuro Pension	Yapacani Fields, Santa Cruz Department	
	Funds, 24.46% each; other Bolivian Pension		
	Funds, 1.08%), and owned by Empresa Petrolera		
	Andina, S.A., 50%; Petróleo Brasileiro S.A., 35%;		
Petroleum thousand 42-gallon barrels	Total S.A., 15%	do.	2,100.

See footnotes at end of table.

TABLE 2--Continued BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Metric tons unless otherwise specified)

	Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Vatural gas	million cubic meters	Operated by Petróleo Brasileiro S.A. (Petrobras)	Sabalo Field, San Antonio Block; San Alberto	7,200.
		(Brazilian Government, 32.2%, and private, 67.8%),	Field and Block, Tarija Department	.,
		and owned by Empresa Petrolera Andina S.A.,	J. J. L.	
		50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%		
troleum	thousand 42-gallon barrels	Operated by Petróleo Brasileiro S.A. (Petrobras)	Sabalo Field, San Antonio Block; San Alberto	7,500.
		(Brazilian Government, 32.2%, and private, 67.8%),	Field and Block, Tarija Department	
		and owned by Empresa Petrolera Andina S.A.,		
		50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%		
atural gas	million cubic meters	Operated by Empresa Petrolera Chaco S.A. (Pan	Vuelta Grande Field, Chuquisaca Department;	2,200.
		American Energy LLC [BP p.l.c., 60%, and BRIDAS		
		Corporation, 40%] 100%), and owned by Empresa	the border of Cochabamba and Santa Cruz	
		Petrolera Chaco S.A., 50%, and BBVA and Futuro de	Departments	
		Bolivia pension funds, 50%	1	
troleum	thousand 42-gallon barrels	do.	do.	2,900.
atural gas	million cubic meters	Operated by Repsol YPF S.A., and owned by BG	Margarita Field, Caipipendi Block, Tarija	1,300.
		Group plc., 37.5%; Repsol YPF S.A., 37.5%;	Department; Paloma Field, Mamore Block,	
		Pan American Energy LLC, 25%	Cochabamba and Santa Cruz Departments	
troleum	thousand 42-gallon barrels	do.	do.	5,000.
atural gas	million cubic meters	Operated and owned by BG Group plc., 100%	La Vertiente, Escondido and Taiguati fields, La	630.
<i>6</i>		Transfer of the control of the contr	Vertiente Block; Los Suris field and block,	
			all in Tarija Department	
troleum	thousand 42-gallon barrels	do.	do.	610.
itural gas	million cubic meters	Operated by Pluspetrol Bolivia Corporation S.A.	Bermejo and Madrejones fields, Tarija Department;	
<i>6</i>		(owned by Pluspetrol S.A., 100%)	Tacobo field, Santa Cruz Department	
troleum	thousand 42-gallon barrels	do.	do.	160.
lver		Small-scale mining operations and cooperatives	Candelaria and other mines, Cerro Rico deposit,	220.
		(private, 100%)	as well as in areas immediately surrounding	
		(100/0)	the San Bartolome Mine (under construction),	
			Oruro and Potosi Departments.	
Do.		Compañía Minera del Sur S.A. (COMSUR)	Bolivar, Colquechaquita, Don Diego, Porco, and	200.
20.		(Glencore International AG, 100%)	San Lorenzo Mines, Oruro and Potosi	200.
		(Gieneore international 710, 100%)	Departments	
Do.		Empresa Minera La Solución S.A. (Apogee Minerals	Asientos and Monserrate lead-silver-zinc mines,	2.
20.		Ltd., 51%, and other private, 49%)	Cochabamba Department	
lver, meta	1	Empresa Metalúrgica de Karachipampa (Atlas	Karachipampa lead-silver smelter, and zinc	2,500.
rver, meta	1	Minerals Inc., 65%, and Corporación Minera de	refinery, Potosi Department	2,500.
		Bolivia, 35%).	(inactive since completion in 1984)	
Do.	kilograms	Complejo Metalúrgica Vinto S.A. (Compañía Minera	Vinto smelting complex on the Carretera Vinto,	150.
Бо.	Kiiogiuiis	Colquiri S.A., 100%)	Oruro Department	150.
in		Corporación Minera de Bolivia (COMIBOL)	Huanuni Mine, Dalence Province, Oruro	3,000.
		(Government, 100%)	Department	5,000.
Do.		Compañía Minera Colquiri S.A. (Compañía Minera	Colquiri tin and zinc mine, Inquisivi Province,	3,000.
20.		del Sur S.A., 51%, and Actis Capital LLP, 49%)	La Paz Department	5,000.
Do.		Empresa Minera Barrosquira Ltda.	Caracoles Mine, Inquisivi Province, La Paz	500.
		(private, 100%)	Department	200.
Do.		Small-scale mining operations and cooperatives	Caracoles, Huanuni, Viloco, and other current	11,100.
Б0.		(private, 100%)	or former COMIBOL mines, in Oruro,	11,100.
		(7	Potosi, and La Paz Departments	
in, refined		Fundestaño de Oruro S.A. (Empresa Minera	City of Oruro, Oruro Department	3,000.
, 10111100		Unificada S.A., 100%)	on, or orato, orato Department	2,000.
Do		Complejo Metalúrgica Vinto S.A. (Compañía Minera	Vinto smelting complex on the Carretera Vinto,	12,000.
		Company meaning ou , mo o.m. (Company Miller	. Into smerting complex on the Curretora vilito,	12,000.
Do.		Colquiri S.A., 100%)	Oruro Department	

See footnotes at end of table.

TABLE 2--Continued BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Metric tons unless otherwise specified)

	Major operating companies		Annual
Commodity	and major equity owners	Location of main facilities	capacity
Tungsten, W content	Small-scale mining operations and cooperatives	Bolsa Negra, Enramada, Reconquistada Mines,	580.
	(private, 100%)	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	
Zinc	Compañía Minera del Sur S.A. (COMSUR)	Bolivar, Colquechaquita, Don Diego, Porco, and	230,000.
	(Glencore International AG, 100%)	San Lorenzo Mines, Oruro and Potosi	
		Departments	
Do.	Small-scale mining operations and cooperatives	Cerro Rico Mine and in the areas immediately	36,100.
	(private, 100%)	surrounding the San Cristobal Mine (under	
		construction), Potosi Department	
Do.	Compañía Minera Colquiri S.A. (Compañía Minera	Colquiri tin and zinc mine, Inquisivi Province,	14,000.
	del Sur S.A., 51%, and Actis Capital LLP, 49%)	La Paz Department	
Do.	Empresa Minera La Solución S.A. (Apogee Minerals	Asientos and Monserrate lead-silver-zinc mines,	1,300.
	Ltd., 51%, and other private, 49%)	Cochabamba Department	
Zinc, refined	Empresa Metalúrgica de Karachipampa (Atlas	Karachipampa lead-silver smelter, and zinc	40,000.
	Minerals Inc., 65%, and Corporación Minera de	refinery, Potosi Department	
	Bolivia, 35%).	(inactive since completion in 1984)	

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

${\bf TABLE~3}$ BOLIVIA: ESTIMATED MAJOR MINERAL INVESTMENTS ONGOING OR BUDGETED IN $2005^{\rm l}$

(Million dollars)

				Total	Planned
Department	Project Name	Commodities	Ownership	investment	startup date
La Paz	La Solucion Mine (expansion)	Silver, lead, and zinc	Empresa Minera La Solución S.A. (Apogee	2 2	NA
		in concentrates	Minerals Ltd., 51%, and other private, 49%)		
La Paz	Colas de Colquiri concentration	Tin and zinc in	Compañía Minera Colquiri S.A. (CMC)	30 ²	NA
	plant (modernization)	concentrates	(Glencore International AG, 51%, and		
			Actis Capital LLP, 49%)		
La Paz	Laurani	Copper, gold, and silver in concentrates	General Minerals Corporation, 100%	NA	NA
Oruro	Kori Chaca (extension of	Gold in concentrate and	Empresa Minera Inti Raymi S.A. (Newmont	27	end-2005
	Kori Kollo Mine)	gold-silver doré	Mining Corporation, 88%, and Empresa		
	,	G	Minera Unificada S.A., 12%)		
Oruro	Kori Kollo (reclamation)	do.	Empresa Minera Inti Raymi S.A. (Newmont	12	2006
Oruro	Tion from (reclamation)	40.	Mining Corporation, 88%, and Empresa		2000
			Minera Unificada S.A., 12%)		
Oruro	Poopo	do.	Compañía Minera del Sur S.A. (COMSUR),	18	NA
Oruno	Toopo	40.	(Glencore International AG, 100%)	10	1,11
Potosi	San Bartolome	Silver and tin in	Compañía Minera Manquiri S.A. (Coeur	135	2008
1 01051	Sun Burtorome	concentrate	d'Alene Mines Corporation, 100%)	155	2000
Potosi	San Cristobal	Silver, lead, and zinc	Compañía Minera San Cristóbal S.A. (Apex	600	end-2007
1 01031	Sun Cristobur	in concentrate	Silver Mines Limited, 100%)	000	CHG 2007
Potosi	San Vicente (expansion)	Silver and zinc in	Pan American Silver Corp., 55%; Empresa	35 ²	2008
	(concentrate	Minera Unificada S.A., 40%; local mining		
		Concentrate	cooperative and Trafigura S.A., 5%)		
Potosi	Pailoviri II (Cerro Rico de Potosi)	do.	Franklin Mining Inc., 50%, and Corporación	NA	NA
			Minera de Bolivia (Government, 100%), 50%		
Potosi	Salar de Uyuni	Potash, salts, NaCl,	Corporación Minera de Bolivia (COMIBOL),	100	NA
		and boron materials	100% (Government, 100%)		
Potosi	Malku Khota	Gold and silver in	General Minerals Corporation, 100%	11 ²	NA
		concentrate	r , ,		
Potosi	Amayapampa	Gold	Luzon Minerals Ltd., 100%	26 ²	NA
Potosi	Karachipampa smelter	Silver, lead, zinc metal	Atlas Precious Metals Inc., 65%, and	130 ²	NA
	(modernization and installation		Corporación Minera de Bolivia		
	of zinc roaster and refinery)		(Government, 100%), 35%		
Santa Cruz	El Mutun	Iron ore, pellets, sponge	Jindal Steel & Power Ltd., 100%	2,300 ²	2011 3
		iron, steel			
Santa Cruz	Don Mario Mine (expansion)	Copper cathodes; copper,	Empresa Minera Paititi S.A. (Orvana Minerals	65 ²	end-2010
	-	gold, silver concentrates	Corp., 100%)		
Santa Cruz	San Simon	Gold concentrates	Eaglecrest Exploration Bolivia S.A.	26	2010 ³
and Beni			(Eaglecrest Explorations Ltd., 100%)		
NA Not availa	blo		1 ,,		

NA Not available.

¹Estimated data are rounded to no more than three significant digits; may not add to totals shown.

²If approved.

³Not before this date.