

Peru

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With a population of more than 27 million, Peru had a gross domestic product (GDP) of \$53.4 billion, 2000a¹) or \$123 billion² in terms of purchasing power parity in 2001. Peru's GDP growth was 0.2% compared with 3.1% in 2000, and the average inflation rate for the year was negative 0.1% compared with 3.7% in the previous year (Ministerio de Energía y Minas, 2002a, p. 20; U.S. Central Intelligence Agency, 2002a§; World Bank Group, 2002§). Minerals and hydrocarbon industries accounted for 11.2% of Peru's 2001 GDP compared with 2.4% in 2000. Mining export revenues of \$3.2 billion represented 45.1% of total exports of \$7.1 billion. In 2001, the reduction in Peru's total trade deficit was significant—about \$100 million compared with \$300 million in 2000 and \$616 million in 1999. Peru's trade, however, grew by only 1.4% in 2001 (Ministerio de Energía y Minas, 2002a, p. 20-22, 39). In 2001, Peru's rate of economic growth was affected by the instability in the Argentinean market, the continued effects of El Niño, and the country's political instability. Metal exports in 2001 (\$3.19 billion) remained about the same level as those of 2000 (\$3.21 billion), although the prices for its major mineral exports (mainly copper, gold, lead, and zinc) remained at low levels. Peru's foreign debt amounted to \$27.6 billion, which was 2.8% lower than that of 2000 (\$28.4 billion), and its net international reserves increased to \$8.6 billion from \$8.2 billion in 2000 (Ministerio de Energía y Minas, 2002a, p. 20, 39-40; Muñoz, 2002).

The promotion of domestic and foreign private investment in Peru via the privatization of Government-owned firms and the formation of joint ventures started off at a vigorous pace in 1991 and has continued, although at a slower pace. Foreign investors viewed Peru as an attractive Latin American open-market economy because the State guarantees property ownership, investments, free remittance of profits, and capital repatriation and provides equal treatment with national investors; the Peruvian Government also slashed subsidies and tariffs, freed foreign exchange and interest rates, liberalized international investment rules, simplified the tax code, established concessions for construction and operation of public infrastructure (telecommunications, roads, ports, and airports), and embarked on fiscal austerity and investment in social development and agriculture. Furthermore, the role of the Peruvian Government has been limited to that of regulator, promoter, and overseer (Ministerio de Energía y Minas, 2002b, p. 5-7, 21-25).

In 2001, according to the Comisión Nacional de Inversiones y Tecnologías Extranjeras (CONITE) and the United Nations'

¹References that include a section twist (§) are found in the Internet References Cited section.

²Where necessary, values have been converted from Peruvian new soles (S/) to U.S. dollars at the rate of S/3.523=US\$1.00.

Economic Commission for Latin America and the Caribbean (ECLAC), Peru registered \$10.02 billion of foreign direct investment (FDI), which was about 2.8% higher than that of 2000 (\$9.75 billion); FDI was \$8.57 billion in 1999 and \$8.03 billion in 1998. After a decade of unprecedented growth, the flows of FDI into Peru and Latin America in general decreased during 2000-2001 partly owing to the region's instability in the economic and political fronts augmented by recent events in Argentina, Peru, and Venezuela and the adverse international economic conditions, which included a longer-than-expected recession in the United States and lower growth in Europe and Japan (Comisión Nacional de Inversiones y Tecnologías Extranjeras, 2002a§; Economic Commission for Latin America and the Caribbean, June 2002§). The Ministerio de Energía y Minas also reported that Peru received \$3.32 billion of FDI in the minerals sector [mining (\$1.67 billion), petroleum (\$98 million), and gas (\$1.55 billion)] compared with \$3.36 billion in 2000, \$1.76 billion in 1999, and \$1.51 billion in 1998 (Ministerio de Energía y Minas, 2002b, p. 7, 21-25).

CONITE reported that since July 19, 1991, when the privatization program began, the Peruvian Government has privatized more than 220 state-owned corporations and netted \$10.5 billion, or almost 17% of Peru's GDP; new investments of \$12.7 billion, or 24% of the GDP, have been committed by domestic and foreign investors between 2001 and 2009. A total investment of \$9.1 billion for the mining sector was expected for the 2001-to-2009 period (Ministerio de Energía y Minas, 2002b, p. 22-28; Comisión Nacional de Inversiones y Tecnologías Extranjeras, 2002a§). The privatization process continued to be managed by the Comisión de Promoción de la Inversión Privada, which had the legal authority to transfer state-owned assets. Responsibility for specific privatization was vested in the Comités de Privatización (CEPRIs) whose members were selected from the ranks of leading professionals and officials mainly from the private sector. Thus far, the Government has privatized most of its assets in the following sectors: mining, 90%; manufacturing, 85.5%; electricity and hydrocarbons, 68% each; and agriculture, 35% (Ministerio de Energía y Minas, 2002b, p. 21-22).

In the mining sector, some tenders were still pending for the following large projects in 2002-2003—Empresa Minera del Centro del Perú S.A.'s (Centromin) copper deposits at Michiquillay, Department of Cajamarca, and Toromocho, Department of Junín. Minero Perú S.A.'s copper and iron deposits as Las Bambas, Cusco; the coal deposits at Alto Chicama, Department of La Libertad; and the phosphates and brine at Bayóvar, Department of Piura. Additionally, several mining prospects, in order of importance, for gold, copper, coal, and industrial minerals were to be privatized (Ministerio de Energía y Minas, 2002b, p. 25, 29-32). Government officials

estimated that Centromin's privatization could generate around \$2.14 billion and that privatization earnings could be increased between \$3 and \$4 billion on additional sales of state assets, such as the Talara oil refinery, the Mantaro hydroelectric complex, possibly in 2003. One successful privatization in 2001 was that of the power-generating company Electroandes, which was acquired by PSEG Global Corp. of the United States on July 20, 2001, for \$227 million (Ministerio de Energía y Minas, 2002b, p. 38).

Government Policies and Programs

Supreme Decree No. 014-92-EM of June 1992 (the General Mining Law) and Legislative Decree No. 868 of May 1996 (amendments) provide guaranteed protections to mining ventures and contracts under the Peruvian Civil Code. Consequently, such ventures and contracts are immune from unilateral changes by any governmental authority in Peru without an appropriate legal or administrative remedy. The hydrocarbon law No. 26844 of 1997 eliminated the exclusive rights of the state-owned *Petróleos del Perú S.A.* to control over secondary recovery of crude oil, refining, and imports and subsequent resale of petroleum and byproducts. These laws have ensured more-favorable minerals and crude oil and gas exploration and production contract terms for investors, which has resulted in an increased number of domestic and foreign companies expressing interest in participating in exploration, production, and distribution of natural gas and petroleum contracts with *Perupetro S.A.* and mineral properties with *Centromin* (table 2).

Also, the Peruvian Constitution establishes equal protection for domestic and foreign investors who may enter into agreements with the Government and guarantees free access, possession, and disposal of foreign currency. Within the framework of Decree law No. 708 of November 1991 (promotion of investment in mining), Legislative Decree No. 662 of August, 1991 (promotion of foreign investment), Legislative Decree No. 757 of November 1991 (framework for the development of private investment), Legislative Decree No. 818 of April 1996 (incentives for investing in natural resources), and Supreme Decree No. 162-92-EF of October 1992 (rules guaranteeing foreign investment), more than 250 domestic "Stability and Guarantee Contracts" have been signed since 1993 (Ministerio de Energía y Minas, 2002b, p. 28).

Legal procedures to obtain mining rights were made easier by the enactment of complementary legislation Supreme Decree No. 018 of July 9, 1992. The Government no longer has exclusive control over exploration, mining, smelting, and refining of metals and fuel minerals. Individuals and private companies are allowed to hold mining permits in Peru. In the legal framework for investment and taxation, no distinction is made among domestic and foreign investors, corporations, and consortia formed in Peru or abroad. No restrictions were put on the remittance of dividends, depreciation, and royalties abroad. Contracts can be signed among investors, and the Government guarantees the stability of legal commitments and taxes. To increase protection of investors' interests, Peru signed agreements with the World Bank's Multilateral Investment Guarantee Agency (authorized by Legislative Decree 25312) and with the Overseas Private Investment Corporation

(authorized by Legislative Decree 25809) (Ministerio de Energía y Minas, 2002b, p. 74-78).

Perupetro instead of *Petroperú S.A.* manages energy-related activities for the Government. In principle, all mineral and geothermal resources belong to the Government, which grants concessions for use by the private companies and individuals. The administration and management of all mining legal processes and concessions rested with the executive branch.

The \$2.6 billion *Camisea* gas project located in the *Ucayali* basin, *Cusco*, has been split into two contracts. First, on February 16, 2000, Peru's *Comité Especial del Proyecto Camisea (Cecam)* gave the go-ahead to the consortia led by Argentina's largest oil producer *Pluspetrol S.A.* (*Pluspetrol Perú Corp.* as operator) (36%) and included *Hunt Oil Company* of the United States (36%), *SK Corp.* of the Republic of Korea (18%), and *Tecpetrol S.A.* of Argentina (10%) to produce natural gas during the 40-year upstream operations (exploration and production) on *Camisea*. The Supreme Decree No. 021-2000-EM of December 7, 2000 (License to exploit *Camisea*), with *Comisión de Promoción de la Inversión Privada's* blessing of December 4, 2000, approved the exploitation contract between *Perupetro* and the consortia led by *Pluspetrol*. Second, on October 20, 2000, Peru issued a tender for a 33-year contract for transportation and distribution of gas and natural gas liquid (NGL) through separate pipelines by yearend 2003. The sole bidder for the second phase was a six-company consortium that was led by Argentina's *Tecgas S.A.* (30%) and included *Pluspetrol S.A.* (19.2%), *Hunt Oil* (19.2%), *Graña y Montero S.A.* of Peru (12%), *Sonatrach Company* of Algeria (10%), and *SK Corp.* (9.6%) (Moons, 2001, p. 5; *Comisión de Promoción de la Inversión Privada*, 2001, p. 4-8; U.S. Energy Information Administration, 2002a§).

Environmental Issues

The *Dirección General de Asuntos Ambientales (DGAA)* of the *Ministerio de Energía y Minas (MEM)* has the responsibility to address environmental problems that result from energy and mining activities and is mandated to implement the laws and regulations of the environmental legal framework, such as Legislative Decree No. 613 of September 1990 (the environmental code), and Supreme Decree No. 016-93-EM of April 28, 1993 (the environmental regulation) (Ministerio de Energía y Minas, 2002b, p. 71-73). The sustainable development model for the mining and energy sectors began in 1993 with regulations and procedures for gradual reduction of pollution, which include economic development policies and environmental protection. The mining industry must comply by adjusting its ongoing operations to permissible effluent levels and its new operations by using cleaner technologies. The *DGAA* evaluates and proposes the environmental regulations for the mining and energy sectors, which include the maximum emission levels that are compatible with the internationally accepted limits set by the United Nations and the World Bank; approves environmental impact assessments for new operations and Environmental Adjustment and Management Programs for ongoing ones; and administers the national environmental information system. The *MEM* is authorized to handle environmental affairs in the minerals sector, such as establishing the environmental protection policy and maximum allowable

levels for effluents, signing environmental administrative stability agreements, overseeing the impact of operations determining responsibilities, and imposing administrative sanctions (Ministerio de Energía y Minas, 2002b, p. 73-74). The mining and oil companies are increasing their efforts to protect the environment, and oil companies, in particular, are under pressure because the number of operations in the Amazon Rain Forest, which is one of the world's most sensitive ecosystems, are increasing.

Production

In 2001, Peruvian metals and minerals production was valued at \$3.3 billion; the value of all mining products exported during the year amounted to \$3.19 billion, which was about the same level as that of 2000 (\$3.21 billion). Including petroleum, Peru's mineral export earnings amounted to \$3.6 billion, or 50.7% of its total exports of \$7.1 billion. Imports decreased by 1.4% to \$7.2 billion, which generated a deficit of \$100 million in the country's trade balance. Peru imported crude oil valued at \$1.1 billion, which created a trade deficit of \$700 million for the energy sector in 2001 (Ministerio de Energía y Minas, 2002a, p. 20, 39-40; Sociedad Nacional de Minería, Petróleo y Energía, 2002c, p. 55).

Despite Latin America's economic turmoil, Peru's 2001 metal production increased compared with that of 2000, particularly in copper (30.4%), zinc (16.1%), silver (9.7%), lead (7%), tin (2.1%), and gold (1.1%). In 2001, the increased gold output was because of production achieved by large-sized mines, which was 97.5 metric tons (t) compared with that of 2000 (92.3 t). Minera Yanacocha S.A. (MYSA) [Newmont Mining Corp. of the United States (51.35%), Cia. de Minas Buenaventura S.A. (Buenaventura) (43.65%), and the World Bank's International Finance Corporation (5%)] contributed 42.5% of gold (58.7 t) production. Other principal contributors of gold were, in order of importance, Minera Barrick Misquichilca S.A. (28.3 t), Cia. Minera Ares S.A. and Minera Aurífera Retamas S.A. (5.2 t) each, Cia. de Minas Orcopampa (4.5 t), Consorcio Minero Horizonte S.A. (4.3 t), Cia. Minera Aurífera Santa Rosa S.A. (3.2 t), and Minas Arirahua S.A. (1.1 t), or with 36.1% of the total (Instituto de Ingenieros de Minas del Perú, 2001b, p. 20-22; Ministerio de Energía y Minas, 2002a, p. 46). The copper increase was the result of expansions at Peru's first and third largest copper producers Southern Peru Copper Corp.'s (SPCC) Cuajone Mine and solvent extraction and electrowinning (SX-EW) of oxide ores in the Cuajone and the Toquepala copper mines, Sociedad Minera Cerro Verde S.A.'s Cerro Verde Mine, and Peru's second largest private copper producer BHP Billiton Tintaya S.A. The country's second largest private lead producer Cia. Minera Atacocha S.A., which included Cia. Minera Condestable S.A. and several small- and medium-sized mines, also contributed to the growth in copper output. The zinc increase was the result of expansions at Peru's largest private zinc producer Volcan Compañía Minera S.A.A. (Ministerio de Energía y Minas, 2002a, p. 8-14, 46, 51, 56; Sociedad Nacional de Minería, Petróleo y Energía, 2002b, p. 13, 39).

The Antamina Mine, which is a \$2.3 billion copper-zinc megaproject, entered into production in September and consisted of an open pit, a 70,000-metric-ton-per-day (t/d)

concentrator, a 302-kilometer (km) slurry pipeline, port facilities in Huarmey, and a new access road, power line, and town site. The mine was owned by Compañía Minera Antamina S.A. (CMA) (BHP Billiton plc., 33.75%; Noranda Inc., 33.75%; Teck Cominco Ltd., 22.5%; and Mitsubishi Corporation, 10%). Antamina's revised proven and probable ore reserves were calculated to be 559 million metric tons (Mt) at a grade of 1.24% copper, 1.03% zinc, 13.71 grams per metric ton (g/t) silver, and 0.029% molybdenum, or 1.8% equivalent copper (Baertl, 2001; Instituto de Ingenieros de Minas del Perú, 2001b, p. 29-31; Ministerio de Energía y Minas, 2002b, p. 35).

Trade

In 2001, mining was the main exporting sector of the country. Peru's main mineral exports were gold (\$1.2 billion), copper (\$987 million), zinc (\$419 million), lead (\$196 million), and silver (\$169 million) (Ministerio de Energía y Minas, 2002a, p. 8-13). As a member of the Mercado Común Andino (ANCOM) (Bolivia, Colombia, Ecuador, Peru, and Venezuela), Peru sold about 7% of its exports to the other ANCOM members; about 6% was sold to other countries in Latin America. Peruvian mineral exports could increase if the negotiations between the Mercado Común del Cone Sur (Mercosur) (Argentina, Brazil, Paraguay, and Uruguay and associate members Bolivia and Chile) and ANCOM lead to a free trade pact in the near future; if the negotiations are successful, a South American free trade agreement could be created (Sociedad Nacional de Minería, Petróleo y Energía, 2002c, p. 55; Comisión Nacional de Inversiones y Tecnologías Extranjeras, 2002b§).

Structure of the Mineral Industry

The structure of the Peruvian mineral industry continued to change to a privately owned/ Government-regulated regime from a Government-owned/Government-operated one. MYSA acquired the Yanacocha gold project in Cajamarca [Crown Resources Corp. (41.2%) and Solitario Resources Corp. (58.8%), both of the United States], which in addition to being in the vicinity of the Amaro, the Chailhuagon, and the Perol gold properties, contains 641.4 Mt of geological reserves that grade 0.30% copper and 0.79 g/t gold. MYSA was planning a feasibility study to develop those properties in 2002-03 and to mine them as one mining unit by 2004 (Instituto de Ingenieros de Minas del Perú, 2001a, p. 15). Cominco Ltd. committed to invest \$2.5 million per year during the next 7 years and to carry out no less than 3,000 meters (m) of diamond drilling each year for the Bongará zinc project in Florida Canyon, Cajamarca (Instituto de Ingenieros de Minas del Perú, 2001a, p. 10).

In 2001, mine and facility expansions with total investments of \$1.4 billion were completed. Among the most important completions of output increases were the following: SPCC's Cuajone Mine, to 87,000 metric tons per day (t/d) of copper ore from 60,000 t/d; the concentrator, leaching, and ion exchange plants at SPCC's Toquepala Mine, to 60,000 t/d of copper metal from 45,000 t/d; Atacocha's mill, to 3,500 t/d of lead-zinc concentrates from 2,100 t/d; Empresa Minera Iscaycruz S.A.'s mill, to 2,500 t/d of zinc ore from 1,700 t/d; and the gold smelter at MYSA's Yanacocha Mine, to 350 t/d from 150 t/d

(Instituto de Ingenieros de Minas del Perú, 2001b, p. 31-32, 67, 80-84). Refinería Cajamarquilla S.A. [Teck Cominco (87%) and Marubeni Corp. of Japan (13%)] was planning to build an equivalent 120,000-metric-ton-per-year (t/yr) zinc refinery next to the current facility, but it was postponed because of lower zinc prices in the open market (Instituto de Ingenieros de Minas del Perú, 2001b, p. 70; Ministerio de Energía y Minas, 2002b, p. 29; Turner, 2001, p. 2).

In 2001, mine projects with a total investment of \$2.6 billion were completed, such as BHP Tintaya's ion exchange plant to treat copper oxides in Yauri, Cusco; Buenaventura's Antapite gold mine in Huaytará, Huancavelica; CMA's Antamina polymetallic mine in the Department of Ancash; and MYSA's La Quinua gold mine, which is near the Yanacocha Mine, in Cajamarca. Mine projects with feasibility studies included Billiton plc.'s La Granja copper project in Cajamarca; Tintaya's Antapaccay copper-gold project, which is 10 km from the Tintaya open pit in Yauri, Cusco; Minera Quellaveco S.A.'s copper project in Moquegua; and SPCC's Cuajone ion exchange plant in Moquegua. Projected investments totaled \$3.3 billion (Ministerio de Energía y Minas, 2002b, p. 29, 32).

Additional investments (\$1.3 billion) were expected in projects with advanced exploration work, such as the Tambogrande gold and base-metal deposit of Manhattan Sechura Company in the Department of Piura; the San Gregorio zinc project of Sociedad Minera El Brocal S.A. in the Department of Cerro de Pasco; the Minas Conga gold-copper-lead-silver mineralization of Minera Yanacocha SRL in Cajamarca; and the Magistral copper-molybdenum-silver deposit of Minera Ancash Cobre S.A. in Ancash. Magistral is located in the same geological trend than that of CMA's Antamina base-metal mine (Instituto de Ingenieros de Minas del Perú, 2001a, p. 8-19). Finally, the State was expecting that Minerero Peru's projects pending privatization, such as Las Bambas, the Michiquillay, and the Toromocho base-metal deposits and the Bayóvar phosphates, would generate an estimated investment of \$2.1 billion (Ministerio de Energía y Minas, 2002b, p. 37-38).

Private firms, most of which were controlled by local interests, dominated the medium- and small-sized mining operations. More than 100 foreign mining companies have been established in Peru since 1990 (table 2).

Commodity Review

Metals

Copper.—Peru's copper (content in concentrates) output increased to 722,035 t compared with 553,924 t in 2000. This increase was as a result of expansions and modernizations of copper processing facilities, and the Antamina Mine's output, which started during the third quarter of 2001. Peru exported about 686,000 t of copper metal valued at \$987 million (Ministerio de Energía y Minas, 2002a, p. 8).

SPCC remained the largest copper producer in the country with a total output of 341,947 t of copper metal from its mine operations at, in order of importance, the Toquepala and the Cuajone open pits and its SX-EW cathode plant at Toquepala, which produced 48,100 t of metal in 2001. Copper metal output

at the SPCC's Ilo refinery in Moquegua increased to 280,000 t in 2001 from 227,000 t in 1998 and 195,000 t in 1994, which represented a total increase of 43.5% compared with that of 1994 refining capacity (González, 2001, p. 2). Tintaya reported an output of 85,184 t of copper from its open pit operations. Phelps Dodge Corp.'s Cerro Verde copper mine produced 76,665 t, which represented Cerro Verde's fourth consecutive increase in output since the completion of its mine expansion and mill recovery improvement programs in 1997. Doe Run Perú S.R. Ltd. produced 16,509 t of copper from its Cobriza base-metal mine in the Department of Huancavelica. Medium- and small-sized mines in the country supplied an additional 201,730 t (Ministerio de Energía y Minas, 2002a, p. 51).

In 2001, expansion of the Toquepala Mine was completed with the identification of a massive sulfide ore, which increased the mine's proven and probable reserves to 770 Mt at a grade of 0.74% copper and 0.08% molybdenum and 1.931 billion metric tons of leachable ("lixiviable") reserves at a grade of 0.20%. The concentrator's capacity will be increased to 60,000 t/d from 43,500 t/d by mid-2002 at a cost of \$80 million. The construction of an additional leaching section at the Cuajone SX-EW cathode plant continued; this will increase the plant's capacity to 56,000 t/yr from 22,000 t/yr by mid-2003. SPCC was planning to build a new smelter that will produce anodes instead of blister in Ilo during 2005-06; the new smelter will save \$0.02 per pound of copper in processing costs, which is currently (2001) \$0.54 per pound. The new smelter will process 1.83 Mt of copper concentrates, which will be an increase of 59.1% to the current (2001) capacity of 1.15 Mt, and Ilo's refinery will be expanded further to 330,000 t/yr as well (González, 2001, p. 1-9; Ministerio de Energía y Minas, 2002a, p. 43; Ministerio de Energía y Minas, 2002b, p. 34).

Gold.—Peru's total gold output increased to 138.0 t in 2001 from 132.6 t in 2000. MYSA remained as the largest gold producer in 2001 with 58.7 t of gold, which was a 6.5% increase compared with that of 2000. Gold recovered as a byproduct from the concentrates of Peru's polymetallic mines amounted to 4.2 t. Other gold producers in 2001 were Barrick (28.3 t), Retamas (5.2 t), Ares (5.2 t), Sipán (4.8 t), Orcopampa (4.5 t), Horizonte (4.3 t), Santa Rosa (3.2 t), and Cia. Minera Poderosa S.A. (2.3 t). From the total gold output, large producers reported 87.0 t; medium producers, 28.3 t; and small-sized mines 6.1 t; and an unknown number of placers and "garimpos" (informal individual miners), about 16.6 t. Placers accounted for 12% of the gold produced in the country. The southeastern Andes have well-known gold placers on the Inambari River and its tributaries. Placer gold production was concentrated in the Inca and the Mariategui Regions; gold also was recovered from placers in rivers and streams throughout the jungle (Ministerio de Energía y Minas, 2002a, p. 10, 46-47; Sociedad Nacional de Minería, Petróleo y Energía, 2002a, p. 50; Soldi, 2001, p. 3-4).

Iron Ore.—Shougang Hierro Perú S.A. (a subsidiary of China's Shougang Corp.) continued to be Peru's sole iron ore producer. Mine output increased to 3.1 Mt of iron content in 2001 from 2.8 Mt in 2000. The value of iron ore exports was \$81 million, which was an increase of 20.9% compared with

that of 2000 (\$67 million). In 2001, with an investment of \$100 million, Shougang Hierro built a new pellet plant to increase its production capacity to 3 million metric tons per year (Mt/yr) (Ministerio de Energía y Minas, 2002a, p. 14, 71).

Lead, Silver, and Zinc.—In 2001, the Peruvian zinc industry produced 1.1 Mt of zinc in concentrates and was the world's third largest after China and Australia (Plachy, 2002). This represented an increase of about 16.1% compared with the output of 2000 and 12% of the world's concentrate output, almost 62% of Latin America's zinc concentrate, and 29% of refined zinc (Ministerio de Energía y Minas, 2002a, p. 9, 56-59). The country's total silver output increased to 2,674 t in 2001 from 2,438 t in 2000 and was the second largest producer in the world after Mexico (Ministerio de Energía y Minas, 2002a, p. 13, 66; Hilliard, 2002). Also, Peru produced 289,546 t of lead in concentrates and was the fourth largest producer in the world after Australia, China, and the United States (Ministerio de Energía y Minas, 2002a, p. 12, 61; Smith, 2002). Exports of lead (258,000 t), silver (38 million ounces, or 1,182 t) and zinc (792,000 t) were valued at about \$196 million, \$169 million, and \$419 million, respectively (Ministerio de Energía y Minas, 2002a, p. 9, 12-13).

In 2001, Cía. Minera Volcán S.A. produced 319,317 t of zinc, 76,135 t of lead, and 334 t of silver from its operations in the Yauli mining district and the Paragsha property in Cerro de Pasco; Volcán was the largest private producer of lead, silver, and zinc in Peru. Glencore International AG with its subsidiaries Iscaycruz (121,507 t of zinc, 9,562 t of lead) and Empresa Minera Yauliyacu S.A. (36,238 t of zinc, 13,484 t of lead, and 154 t of silver) was Peru's second largest private zinc producer with a total of 157,745 t. Cía. Minera Milpo S.A. [owned by local shareholders (73.8%) and foreign investors (26.2%)] produced 76,755 t of zinc, 23,071 t of lead, and 110 t of silver. Atacocha produced 56,366 t of zinc, 29,573 t of lead, and 127 t of silver. Cía. Minera Santa Luisa S.A. (a subsidiary of Mitsui Mining & Smelting Co. Ltd. of Japan) produced 47,405 t of zinc and 21,816 t of lead from its Huanzalá Mine. Sociedad Minera El Brocal S.A. produced 46,952 t of zinc, 18,5416 t of lead, and 110 t of silver. Cía. Minera San Ignacio de Morococha S.A. produced 35,198 t of zinc and 2,880 t of lead. Cía. Minera Raura S.A. produced about 34,973 t of zinc, 9,947 t of lead, and 54 t of silver. Buenaventura was the second largest private producer of silver with 333 t; it also produced 9,341 t of zinc and 7,651 t of lead. Sociedad Minera Corona S.A. was the third largest private silver producer with 158 t. Cía. de Minas Arcata was the fifth largest private silver producer with 138 t. SPCC reported 90 t of silver from its smelting and refining operations in Ilo. Corp. Minera Nor Perú S.A. (a subsidiary of Pan American Silver Corp. of Canada) produced 22,009 t of zinc, 8,778 t of lead, and 123 t of silver from its underground Quiruvilca Mine in northern Peru. Peru's silver production increased to 2,674 t from 2,438 t in 2000; Peru was the world's second largest producer after Mexico (Hilliard, 2002; Ministerio de Energía y Minas, 2002a, p. 56, 61, 66, 69).

Steel.—In 1996, Sider Corp. S.A. acquired Empresa Siderúrgica del Perú's Chimbote steel plant. Sider paid \$20.2 million in cash and will pay \$142.7 million within 8 years and

an additional \$30 million investment commitment to upgrade the steelworks. Sider, which was reorganized in January 2001 [Acerco S.A. (49.4%), Grupo Wiese (49.4%), and others (1.2%)], continued producing flats, rebars, bars 80B, and tubing (Apoyo & Asociados Internacionales, 2002§).

Tin.—Minsur S.A. continued to be Peru's sole tin producer in 2001. Production from its San Rafael Mine in the Mariátegui Region was 69,696 t in concentrate, which was a 1.7% decrease compared with that of 2000. Minsur's tin smelting and refining operations in Pisco, south of Lima, produced 38,182 t of metal, which was a 2.1% increase compared with that of 2000. Peru was the largest tin producer in Latin America followed by Brazil and Bolivia and the third largest tin producer in the world after China and Indonesia (Carlin, 2002; Ministerio de Energía y Minas, 2002a, p. 11, 73).

Industrial Minerals

Cement.—According to the International Cement Review and the domestic Association of Cement Producers, Peru's total cement production in 2001 was 3.95 Mt, which remained about the same level as that of 2000. Five main cement companies operated and produced 3.5 Mt. The largest cement producer Cementos Lima S.A. (CLSA) produced about 1.7 Mt of cement, or about 43% of Peru's total cement output; CLSA's Atocongo plant had a design capacity of almost 2 Mt/yr and drew from nearby limestone quarries. The second largest cement producer Cementos Andino S.A. accounted for 19% of total production; it had an installed capacity of 800,000 t/yr with a plant utilization of 95%. The third largest cement producer Cementos Norte Pacasmayo S.A. accounted for 18% of total production. Cementos Yura S.A. had a market share of about 11%, and Cementos Sur S.A. had 5% (International Cement Review, 2001; Pflucker, 2002, p. 3).

Phosphate Rock.—State-owned Minero Perú's phosphate deposits (Bayóvar project), which comprised 150,000 hectares of phosphate and brine, have proven reserves of 550 Mt of phosphatic rock. It has been scheduled for privatization in 2004. As a consumer of sulfuric acid and producer of fertilizer, the Bayóvar project could be developed competitively because it is located in a valley of great agricultural potential and tremendous export opportunities to the Asia-Pacific region via the port of Paita (Ministerio de Energía y Minas, 2002b, p. 38).

The 90,000-t/yr phosphate plant that was operated by Empresa Minera Regional Grau Bayóvar, S.A., produced 4,825 t of phosphate in 2001, which was 13.5% lower compared with 5,581 t in 2000. Phosphate shipments continued to New Zealand under a contract for 100,000 t/yr signed with Norphos International Ltd. of Auckland. Other shipments went to Chile and Costa Rica through Paita (Ministerio de Energía y Minas, 2002a, p. 31).

Mineral Fuels

Coal.—Peru's largest coal deposits are at Alto Chicama, 140 km north of Trujillo in La Libertad Region. Other coal deposits occur in the Cuenca del Santa in the Marañón Region and the

coal basins of Goyllarisquizga and Hatun Huasi in the Caceres Region of central Peru. In 2001, according to the U.S. Energy Information Administration (2002b§), Peru's recoverable coal reserves were estimated to be 1.06 billion metric tons, and coal production was relatively small (about 23,000 t) compared to an estimated consumption of 680,000 t.

Natural Gas and Petroleum.—Natural gas was primarily transported by pipeline from the Talara Basin in the Grau Region to the Talara refinery on the coast. The Aguaytia gasfield, approximately 41 km west-northwest of Pucallpa, has proven reserves of 8.5 billion cubic meters (301 billion cubic feet) of gas and 9 million barrels (Mbbbl) of condensate, or NGL. The proven natural gas reserves of Camisea's Cashiriari and San Martin gasfields in the Ucayali Basin were estimated to be 246 billion cubic meters (8.7 trillion cubic feet), which included 587 Mbbbl of condensate at the end of 2001 (Moons, 2001, p. 5; Ortigas, 2001, p. 7; U.S. Energy Information Administration, 2002a§). Camisea consisted of a pair of crescent-shaped gasfields that have potentially enough gas to supply Arequipa, Cusco, Lima, and other cities with energy for the next 100 years and that could be integrated to supply fuel to the neighboring countries of Mercosur, Brazil in particular (Ortigas, 2001, p. 11-13). Because the fields are distant from accessible markets, the MEM indicated that new infrastructure must be developed.

Natural gas production remained about the same level as that of 2000, or 276.7 million cubic meters, which was produced by Petrotech del Perú S.A. (42.2%), Aguaytia S.A. (27.1%), Perez Compac S.A. (21.6%), and others (9.1%) (Soldi, 2001, p. 4; Ministerio de Energía y Minas, 2002c, p. 2-17).

In 2001, crude oil production decreased by 3.5%, or an average of 96,000 barrels per day (bbl/d) compared with that of 2000. Production of petroleum derivatives increased by almost 5.1% and averaged 160,863 bbl/d compared with the 2000 output of 153,008 bbl/d (Ministerio de Energía y Minas, 2000c, p. 2-17; Sociedad Nacional de Minería, Petróleo y Energía, 2002a, p. 51; U.S. Energy Information Administration, 2002c§). Peru imported crude oil and petroleum products to satisfy its internal demand of 179,000 bbl/d. The value of petroleum and derivative imports was \$1.7 billion, which created a trade deficit of about \$800 million in the energy sector for 2001 (Ministerio de Energía y Minas, 2002c, p. 16; Sociedad Nacional de Minería, Petróleo y Energía, 2002b, p. 54; Soldi, 2001, p. 4).

Peru's total crude oil production of 35.0 Mbbbl in 2001 came from Pluspetrol (62.5%); the balance was produced by Petrotech (13.4%), Perez Compac (12.3%), and others (11.8%) (Sociedad Nacional de Minería, Petróleo y Energía, 2002b, p. 54). About 68% of the country's crude oil production came from the jungle blocks in the Loreto and the Ucayali Regions; the remainder was produced at the coastal and offshore fields in northern Peru. The country's petroleum reserves were estimated to be about 324 Mbbbl in 2001 (U.S. Energy Information Administration, 2002c§).

The largest oil refinery Petroperu's La Pampilla had a designed capacity of about 100,000 bbl/d; in 2001, it ran at 76.1% capacity. The second largest oil refinery Petroperu's Talara had a design capacity of about 60,000 bbl/d; in 2001, it ran at 60.6% capacity. Other refineries had the following designed capacities—Conchán, 15,500 bbl/d; Iquitos, 10,500

bbl/d; Pucallpa, 3,250 bbl/d; and El Milagro, 1,700 bbl/d. The major refinery production came from La Pampilla (46.6%), followed by Talara (38.2%), Conchán (7.4%), Iquitos (4.8%), Pucallpa (1.8%), and El Milagro (1.2%) (Ministerio de Energía y Minas, 2000c, p. 17; Sociedad Nacional de Minería, Petróleo y Energía, 2002a, p. 51).

Reserves

Table 3 lists the Peruvian reserves of major minerals, such as copper, gold, iron ore, lead, molybdenum, silver, zinc, and other selected mineral commodities on or about January 1, 2002. Data are shown in terms of metal contained in ore for the base and precious metals or recoverable quantities of other mineral commodities, which included industrial minerals and mineral fuels. These mineral reserves represent "proven" and "probable" categories and exclude quantities reported as "possible." Reserves were defined as being well-delineated and economically minable ore from mines committed to production.

Annual changes in assessment of reserves, in simplest terms, are the arithmetic result of additions to reserves, deletions from reserves, and production. A complication in Peru has been the production of more than one metal by a large number of mines, thus necessitating close attention to market price and processing costs for two or possibly several mineral commodities simultaneously to enable production as coproducts.

During 2000 to 2001, reserves of the leading base and precious metals increased significantly because of new discoveries of gold in Alto Chicama and copper ore during the expansion of the Cerro Verde, the Cuajone, the Tintaya, and the Toquepala pits.

Reserves of major metals were distributed unevenly throughout Peru and were influenced mostly by mineralization of the Precambrian Cordillera and the Coast Ranges where several districts dominated the reserves position in terms of proven and probable minable reserves of major metals.

Infrastructure

Peru had 1,988 km of railroads and 72,900 km of roads, of which 8,700 km was paved and 64,200 km was unpaved. Peru had 8,800 km of navigable waterways and tributaries to the Amazon River system and 208 km of waterways into Lake Titicaca. Also, a petroleum depot at Bayóvar serviced the 800-km northern Peru crude oil pipeline. Natural gas and liquid gas were transported through a 64-km pipeline in the same area (U.S. Central Intelligence Agency, 2002b§). Peru had an installed electrical generating capacity of 5,050 megawatts (MW), more than 76% of which came from hydroelectric plants (U.S. Central Intelligence Agency, 2002c§). The Peruvian Government has raised \$1.6 billion from the privatization of its electrical sector, with a commitment to invest about \$18 million to install an additional 1,006 MW of capacity in the immediate future (Ministerio de Energía y Minas, 2002b, p. 21-22, 52).

Important mineral industry ports included Callao, Ilo, Matarani, Paita, San Nicolás, and Talara on the Pacific Ocean and Iquitos on the Amazon River. The country's energy mix by source was hydro (74.8%), fossil fuel (24.5%), and others (0.7%).

Outlook

The energy, mining, telecommunications, and related industries remained the most attractive sectors of the Peruvian economy, which with continued capital flow from domestic and foreign investors were expected to provide long-term benefits to the country. The privatization of Centromín, Electroperú S.A., Minería Perú, Petroperú, and the banking sector was expected to continue improving prospects for the minerals and financial sectors and the electricity generation industry. According to the CEPRI, the privatization process was expected to continue to generate additional investments in every sector of the Peruvian economy, particularly in the mining and energy industries (Ministerio de Energía y Minas, 2002b, p. 21-25).

In 2001, investments were being used to modernize Peru's industrial infrastructure. Future foreign investments in the minerals sector are projected to be about \$17 billion, which is the largest committed capital to date, and will contribute significantly to the future of Peru's economic development (Ministerio de Energía y Minas, 2002b, p. 10).

The mineral industries are an important part to the Peruvian economy. In 2001, several major mineral developments took place in the country, which will continue to contribute to its economic growth. For example, Teck Corp. and Cominco Ltd., which are Canadian mining companies, merged to constitute Teck Cominco Ltd. (effective September 10, 2001). Teck Cominco's plan is to increase Cajamarquilla's zinc refinery capacity to 240,000 t/yr from 120,000 t/yr zinc in 2004 (Turner, 2001). CMA's Antamina project was designed to produce up to 1.5 Mt/yr of copper and zinc concentrates over a 23-year mine life and will be the third largest producer of zinc (163,300 t/yr) and the seventh largest producer of copper (272,200 t/yr) in the world (Botts, 2002). Cambior Inc. of Canada transferred the rights for La Granja copper project to Billiton (effective March 30, 2001) in exchange for a \$35 million payment. Billiton will carry out a new feasibility study at a cost of \$15 million within 3 years. La Granja deposit consists of 3.2 Mt at a grade of 0.61% copper, potential resources of 6.4 Mt at a grade of 0.55% copper, and 800 Mt of leachable ore at a grade of 0.25% copper (Instituto de Ingenieros de Minas del Perú, 2001a, p. 12-13; Ministerio de Energía y Minas, 2002b, p. 36). Pluspetrol (operator for the Camisea consortium), announced that drilling has begun on the first of four development wells planned for the Camisea natural gas development. The timetable is to drill them to depths of more than 2,000 m in the San Martín I structure on block 88 by 2003. Hunt Oil, which was another partner of the Camisea project, was working on a prefeasibility study for the construction of a gas-to-liquid (GTL) export project facility in Peru. If GTL exports were to be authorized, then the total cost of production, transport, distribution, and exports, which would include transportation vessels, would increase to an estimated \$2.5 billion (Oil & Gas Journal, 2002). The GTL project seems to be, at best, very speculative with no adequate and transparent regulations on GTL exports yet.

Investors are implementing an approach to community development and environmental protection that is based on sustainable development principals. Despite new standards in Peru for sustainable development and environmental protection set by such mineral investors as CMA and MYSA, the country

is, however, facing political upheavals, and the mining industry is increasingly on the defensive. For instance, CMA's Huarney port facilities site was a target to protestors against Huarney's residents relocation to another city in Ancash. MYSA's Cerro Quilish gold deposit development was stalled by Cajamarca to protect the city's major watershed by issuing a municipal ordinance declaring Cerro Quilish a "protected area." The Coordinadora Nacional de Comunidades Afectadas por la Minería's (Conacami) expectations are to bring collective strength to counter Government policies and to negotiate "demands" with mining companies. Conacami indicated that they have the right to participate and to be consulted on mineral policies that involve communities which are affected by mining operations. For example, Conacami, residents of the town of Tambogrande, and others have indicated that they "want nothing to do" with Manhattan Minerals Corp.'s Tambogrande gold-copper deposit development. Local leaders have ignored the Government's plea to consider the environmental impact study before a decision is to be made by the MEM (Metal Bulletin, 2002).

References Cited

- Baertl, Augusto, 2001, Compañía Minera Antamina: Convención de Ingenieros de Minas del Perú, 25th, Arequipa, Peru, September 10-14, 2001, 8 p.
- Botts, D.S., Caballero, Frida, and Recharte, Jorge, 2001, Antamina and Huascarán National Park—A case study in mining, conservation, and sustainable development: Convención de Ingenieros de Minas del Perú, 25th, Arequipa, Peru, September 10-14, 2001, 14 p.
- Carlin, J.F., Jr., 2002, Tin: U.S. Geological Survey Mineral Commodity Summaries 2002, p. 174-175.
- Comisión de Promoción de la Inversión Privada, 2001, Perú—Contrato de Licencia para la explotación de hidrocarburos: Comité Especial del Proyecto Camisea, November 2000, p. 109.
- González, RO., 2001, Southern Perú y su plan de desarrollo: Convención de Ingenieros de Minas del Perú, 25th, Arequipa, Peru, September 10-14, 2001, 9 p.
- Hilliard, H.E., 2002, Silver: U.S. Geological Survey Mineral Commodity Summaries 2002, p. 150-151.
- Instituto de Ingenieros de Minas del Perú, 2001a, Perú—Vast mining potential: MINERÍA, año XLIX, no. 288, September, 112 p.
- Instituto de Ingenieros de Minas del Perú, 2001b, Mining—Backbone of the Peruvian economy: MINERÍA, año XLIX, no. 288, September, 112 p.
- International Cement Review, 2001, Perú—Cementos Lima's Atocongo: International Cement Review, November, 12 p.
- Metal Bulletin, 2002, Mining companies feel the heat in Peru: Metal Bulletin, no. 8675, May 23, p. 7.
- Ministerio de Energía y Minas, 2002a, Producción minera, *in* Anuario Minero del Perú 2001: Ministerio de Energía y Minas, December, 73 p.
- Ministerio de Energía y Minas, 2002b, Plan referencial de minería 2000-2009: Ministerio de Energía y Minas, November 25, 2000-July 26, 2001, 81 p.
- Ministerio de Energía y Minas, 2002c, Refinación, *in* Dirección General de Hidrocarburos: Ministerio de Energía y Minas, December 2001, 18 p.
- Moons, Alberto, 2001, Pluspetrol en Perú: Convención de Ingenieros de Minas del Perú, 25th, Arequipa, Peru, September 10-14, 2001, 10 p.
- Muñiz, Mirtha, 2002, Perú—Economic indicators, *in* Peru Macroeconomic Report 1999-2002: Banco de Crédito del Perú, year II, no. 2, April 8, 13 p.
- Oil & Gas Journal, 2002, Camisea gas development is on schedule: Oil & Gas Journal, v. 100, no. 29, July 22, p. 9.
- Ortigas, L.C., 2001, El Proyecto Camisea: Lima, Peru, Comité Especial Proyecto Camisea, October 24, 56 p.
- Pflucker, J.M., 2002, Peruvian cement sector—The trend continues: Lima, Peru, BBVA Continental, October 1, 18 p.
- Plach, Jozef, 2002, Zinc: U.S. Geological Survey Mineral Commodity Summaries 2002, p. 188-189.
- Smith, G.R., 2002, Lead: U.S. Geological Survey Mineral Commodity Summaries 2002, p. 94-95.
- Sociedad Nacional de Minería, Petróleo y Energía, 2002a, Informativo

mineroenergético: Sociedad Nacional de Minería, Petróleo y Energía, año XI, no. 1, January, p. 51.
Sociedad Nacional de Minería, Petróleo y Energía, 2002b, Informativo mineroenergético: Sociedad Nacional de Minería, Petróleo y Energía, año XI, no. 2, February, 56 p.
Sociedad Nacional de Minería, Petróleo y Energía, 2002c, Informativo mineroenergético: Sociedad Nacional de Minería, Petróleo y Energía, año XI, no. 3, March, 56 p.
Soldi, C.G., 2001, Peru, *in* Mining annual review: Mining Journal Ltd., folio 962, 5 p.
Turner, Bob, 2001, Teck Cominco: Convención de Ingenieros de Minas del Perú, 25th, Arequipa, Peru, September 10-14, 2001, 8 p.

Internet References Cited

Apoyo & Asociados Internacionales S.A.C, 2002 (August), Clasificadora de riesgo—Empresas—SIDERPERU, accessed August 7, 2002, via URL <http://www.aai.com.pe>.
Economic Commission for Latin America and the Caribbean, 2002 (June), Foreign investment in Latin America and the Caribbean—2001 report, accessed July 18, 2002, via URL <http://www.eclac.cl>.
Comisión Nacional de Inversiones y Tecnologías Extranjeras, 2002a, Registered foreign investment—June 2001, Statistical Bulletin, accessed July 18, 2002, at URL http://www.mef.gob.pe/peruinv/ingles/pub/b_june2001.pdf.
Comisión Nacional de Inversiones y Tecnologías Extranjeras, 2002b, Peru—Your best investment option, accessed July 25, 2002, at URL <http://www.mef.gob.pe/peruinv/ingles/legal/peru.htm>.
U.S. Central Intelligence Agency, 2002a, Peru—Economy, World Factbook 2001, accessed July 11, 2002, at URL <http://www.odci.gov/cia/publications/factbook/geos/pe.html>.
U.S. Central Intelligence Agency, 2002b, Peru—Transportation, World Factbook 2001, accessed July 11, 2002, at URL <http://www.odci.gov/cia/publications/factbook/geos/pe.html>.
U.S. Central Intelligence Agency, 2002c, Peru—Electricity, World Factbook 2001, accessed July 11, 2002, at URL <http://www.odci.gov/cia/publications/factbook/geos/pe.html>.
U.S. Energy Information Administration, March 2002a, Peru—Natural gas, Country Analysis Brief, accessed July 24, 2002, via URL <http://www.eia.gov/emeu/cabs/peru2.html>.
U.S. Energy Information Administration, March 2002b, Peru—Energy overview—Coal, Country Analysis Brief, accessed July 24, 2002, via URL <http://www.eia.gov/emeu/cabs/peru2.html>.
U.S. Energy Information Administration, March 2002c, Peru—Energy overview—Oil, Country Analysis Brief, accessed July 24, 2002, via URL <http://www.eia.gov/emeu/cabs/peru2.html>.
World Bank Group, 2002, Regions and countries—Peru, accessed July 16, 2002, at URL <http://www.worldbank.org/html/extdr/regions.htm#p>.

Major Sources of Information

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Major Publications

Andean Air Mail & Peruvian Times, S.A., Lima: Carta Minera y Panorama Petrolero, weekly.
Business Monitor International Ltd., London, United Kingdom: Andean Group—Latin America, Monthly Executive Brief.
L & L Editores SRL, Lima: Minas y Petróleo, El Semanario de la Minería y el Petróleo, weekly.
Instituto de Ingenieros de Minas del Perú, Lima: Monthly Organo Informativo.
Metal Bulletin—Metals & Minerals Latin America, London. A Metal Bulletin Newsletter, monthly.
Ministerio de Energía y Minas, Lima: Anuario Minero del Perú, annual.
Ministerio de Energía y Minas, Lima: En Cifras, Monthly Journal of Statistics.
Sociedad Nacional de Minería, Petróleo y Energía, Lima: Monthly Reports.
Sociedad Nacional de Minería, Petróleo y Energía, Lima: Memoria Anual, annual.

TABLE 1
PERU: PRODUCTION OF MINERAL COMMODITIES 1/2/

(Metric tons unless otherwise specified)

Commodity	1997	1998	1999	2000	2001 p/
METALS					
Antimony:					
Mine output, Sb content e/	460	460	460	460	460
Metal	242	364	255	461	274
Arsenic, white 3/	837	624	1,611	2,495	1,958
Bismuth:					
Mine output, Bi content e/	1,000	1,000	1,000	1,000	1,000
Metal	774	832	705	744	640
Cadmium:					
Mine output, Cd content	116	--	--	--	--
Metal	474	535	466 r/	483 r/	456
Chromium, mine output, Cr content	191	--	--	--	--
Copper:					
Mine output, Cu content	506,498	483,338	536,387	553,924	722,035
Sulfate, Cu content	3,502	2,450	2,554	2,484	1,953
Metal:					
Blister	50,454	46,595	31,463	16,030	44,176
Refined	294,988	309,594	318,914	324,417	340,736
Electrowon	98,080	101,837	114,425	127,311	131,139
Total	393,068	411,431	433,339	451,728	471,875
Gold: 4/					
Mines kilograms	55,020	71,654	110,530	116,085	121,402
Placers do.	22,920	22,560	17,956	16,500	16,620
Total do.	77,940	94,214	128,486	132,585	138,022
Indium do.	3,799	4,231	5,005	5,015	4,263
Iron and steel:					
Iron ore and concentrate:					
Gross weight thousand tons	4,439	4,880	3,949	3,892	3,892
Fe content do.	3,171	3,282	2,715 r/	2,813 r/	3,087
Metal:					
Pig iron do.	264	283	250	327	330 e/
Sponge iron do.	104	61	50	80	80 e/
Ferroalloys e/	360	360	360	360	360
Steel ingots and castings e/ thousand tons	510	510	510	510	510
Semimanufactures e/	250	250	250	250	250
Lead:					
Mine output, Pb content	262,466	257,713	271,782	270,576	289,546
Metal	97,882	109,492	121,090	116,412	121,181
Manganese, mine output, Mn content e/	200	200	200	200	200
Molybdenum, mine output, Mo content	3,835	4,344	5,470	7,193	9,499
Selenium, metal, refined kilograms	12,678	18,006	23,008	23,110	16,110
Silver:					
Mine output, Ag content	2,090	2,025	2,231	2,438	2,674
Metal, refined	773	989	1,115	1,180 r/	1,184
Tellurium, metal kilograms	24,754	21,682	17,110	22,020 r/	19,105
Tin:					
Mine output, Sn content	53,736	49,574	59,191	70,901	69,696
Metal 5/	27,953	25,907	30,618	37,410	38,182
Tungsten, mine output, W content	285	76	--	--	--
Zinc:					
Mine output, Zn content	867,691	868,757	899,524	910,303	1,056,629
Metal	171,191 r/	174,655	196,978	199,813	201,498
INDUSTRIAL MINERALS					
Barite	63,600	7,506	3,512	11,403	11,031
Boron materials, crude (borates)	46,988	22,002	14,716	9,309	9,374
Cement, hydraulic thousand tons	4,301	4,340	3,799	3,906	3,950
Chalk e/	101,000	101,000	101,000	101,000	101,000
Clays:					
Bentonite	22,285	19,563	19,659	21,059	18,217
Fire clay	3,990	3,255	10	5,973	5,900 e/
Kaolin	7,875	4,968	1,332	6,165	5,532
Common clay	326,261	360,958	240,889	398,523	676,944
Diatomite e/	35,100	35,100	35,100	35,100	35,100

See footnotes at end of table.

TABLE 1--Continued
PERU: PRODUCTION OF MINERAL COMMODITIES 1/2/

(Metric tons unless otherwise specified)

Commodity	1997	1998	1999	2000	2001 p/
INDUSTRIAL MINERALS--Continued					
Feldspar	2,502	3,983	1,594	5,642	4,253
Gypsum, crude	64,863	78,656	28,355	140,630	30,658
Lime	31,223	37,220	28,344	140,630	30,568
Nitrogen, N content of ammonia	1,019	949	950	950	950
Phosphate rock, crude	67,136	46,821	9,038	5,581	4,825
Salt, all types	79,492	808,625	778,048	247,619 r/	418,954
Stone, sand and gravel:					
Stone: e/					
Dolomite	645	645	645	645	645
Flagstone	300,000	300,000	300,000	300,000	300,000
Granite	2,000	2,000	2,000	2,000	2,000
Limestone	4,097 6/	5,508 6/	4,313 6/	4,334 6/	4,370 6/
Marble	10,080 6/	9,716 6/	7,651 6/	10,511 6/	11,636 6/
Onyx	150	150	150	150	150
Quartz and quartzite (crushed)	40,000	40,000	40,000	40,000	40,000
Shell, marl	4,000	4,000	4,000	4,000	4,000
Slate	33,488 6/	35,202 6/	15,792 6/	16,706 6/	16,800 6/
Travertine	261,392 6/	69,248 6/	15,463 6/	16,220 6/	2,971 6/
Sand and gravel:					
Construction	1,666	1,819	1,848	1,607	1,154
Silica sand	83	96	90	74	120
Sulfur, elemental:					
Native e.	100	100	100	100	100
Byproduct of metallurgy e/	60,000	60,000	60,000	60,000	60,000
Sulfuric acid, gross weight	408,010	516,514	517,000 e/	590,209 r/	623,084
Talc and related materials:					
Talc	5,750	11,165	12,085	9,668	11,165
Pyrophyllite e/	8,000	8,000	8,000	8,000	8,000
Total e/	13,800	19,200	20,100	17,700	19,200
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite, run-of-mine	21,694	7,385	1,488	16,625	23,000
Bituminous, run-of-mine e/	45,000	45,000	45,000	45,000	45,000
Total e/	66,700	52,400	46,500	61,600	68,000
Coke, all types e/	10,000	10,000	10,000	10,000	10,000
Gas, natural:					
Gross e/	1,055 6/	1,000 r/	1,000 r/	1,000	1,000
Marketed	242	409	333	277	277
Natural gas liquids: e/					
Natural gasoline and others 7/ thousand 42-gallon barrels	295	295	295	295	295
Butane	5	5	5	5	5
Total	300	300	300	300	300
Petroleum:					
Crude	42,191	59,625	38,663	36,314	35,040
Refinery products:					
Liquefied petroleum gas	2,329	2,292	2,357	2,484	2,612
Gasoline, motor	9,641	10,134	9,449	9,291	9,767
Jet fuel	2,862	3,416	3,112	2,822	2,966
Kerosene	5,200	5,103	4,910	5,235	5,503
Distillate fuel oil	15,092	15,040	13,622	12,355	12,988
Lubricants	567	525	530	513	539
Residual fuel oil	18,959	20,640	17,437	18,348	19,287
Asphalt	1,206	987	363	--	--
Other 8/	1,720	3,784	4,611	4,800	5,053
Total	57,576	61,921	56,391	55,848	58,715

See footnotes at end of table.

TABLE 1--Continued
PERU: PRODUCTION OF MINERAL COMMODITIES 1/2/

e/ Estimated. p/ Preliminary. r/ Revised. -- Zero.

1/ Table includes data available through July 2002.

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

3/ Output reported by Doe Run Resources Corp.

4/ Peru's placer gold production was reported.

5/ Output reported by Minsur S.A.'s smelter.

6/ Reported figure.

7/ Includes hexane.

8/ Includes refinery fuel and losses.

TABLE 2
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 2001

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Antimony	metric tons	Doe Run Resources Corp. (private, 100%)	Smelter at La Oroya, Junín Department	700
Barite		Barmine S.A. (private, 100%)	Santa Cruz de Cocachaca, Huarochirí, Lima Department	NA
Bentonite		Minerales Andinos S.A. (NL Industries Co., 90%)	Vichayal Mine, Piura Department	9
Bismuth	metric tons	Doe Run Resources Corp. (private, 100%)	Refinery at La Oroya, Junín Department	1,000
Cement		Cementos Lima S.A. (private, 100%)	Atocongo Plant, Lima Department	2,000
Do.		Cementos Norte Pacasmayo S.A. (private, 100%)	Pacasmayo Plant, La Libertad Department	800
Do.		Cementos Andino S.A. (private, 100%)	East Lima Plant, Lima Department	800
Do.		Cementos Yura S.A. (private, 100%)	Yura Plant, Arequipa Department	300
Do.		Cementos Sur S.A. (private, 100%)	Arequipa Plant, Arequipa Department	200
Copper		Southern Peru Copper Corp. (SPCC) (Grupo Mexico, S.A. de C.V., 54.2%; the Marmon Corp., 14.2%; Phelps Dodge Overseas Capital Corp., 14%; others, 17.6%)	Cuajone, Moquegua Department, and Toquepala, Tacna Department	350
Do.		do.	Smelter at Ilo, Moquegua Department	300
Do.		do.	Refinery at Ilo, Moquegua Department	280
Do.		Compañía Minera Antamina S.A. (CMA) (BHP Billiton plc., 33.75%; Noranda Inc., 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Huari, Ancash Department	275
Do.		do.	Antamina concentrator, Ancash Department	70
Do.		Doe Run Resources Corp. (private, 100%)	Cobriza, Huancavelica Department	60
Do.			Smelter at La Oroya, Junín Department	65
Do.			Refinery at La Oroya, Junín Department	60
Do.		Glencore International AG (private, 100%)	Casapalca, Lima Department	60
Do.		Cía. Minera Volcán S.A. (private, 100%)	San Cristóbal, Mahr Túnel, and Andaychagua, Junín Department	60
Do.		Cía. Minera San Ignacio de Morococha S.A. (private, 100%)	Yauricocha, Junín Department	60
Do.		BHP Tintaya S.A. (private, 100%)	Tintaya Mine, Cusco Department	90
Do.		Sociedad Minera Cerro Verde S.A. (Phelps Dodge Corp., 82.5%; Cía. de Minas Buenaventura S.A., 9.2%; others, 8.3%)	Cerro Verde, Arequipa Department	80
Do.		do.	Electrowon at Cerro Verde, Arequipa Department	20
Dolomite		Minera Baribent S.A. (private, 100%)	Esperanza, Ancash Department	25
Gold	kilograms	Minera Yanacocha S.A. (Newmont Mining Corp., 51.35%; Cía. de Minas Buenaventura S.A., 43.65%; World Bank's International Finance Corporation, 5%)	Yanacocha, La Quinua, and Maqui-Maqui mines, Cajamarca Department	70,000
Do.	do.	Minera Barrick Misquichilca S.A. (Barrick Gold Corp., private, 100%)	Pierina, Cajamarca Department	26,000
Do.	do.	Cía. Minera Poderosa S.A. (private, 100%)	Poderosa, La Libertad Department	2,000
Do.	do.	Cía. de Minas Orcopampa S.A. (Buenaventura, 100%)	Orcopampa, Arequipa Department	5,000
Do.	do.	Minas Arirahua S.A. (private, 100%)	Arirahua, La Libertad Department	2,000
Do.	do.	Asesoría Contable Minera S.A. (private, 100%)	Ocoña, Santa Clarita, Exploratoro, and Molino de Oro, Arequipa Department	1,000
Do.	do.	Cía. Aurífera Río Inambari S.A. (Cía. Minera del Sur S.A., 84%; Aurífera Claudia, 16%)	Río Caichive, Madre de Dios Department	200
Do.	do.	Minera Aurífera Retamas S.A. (private, 100%)	Retamas, La Libertad Department	5,200
Do.	do.	Consorcio Minero Horizonte S.A. (private, 100%)	Parcoy, La Libertad Department	4,000
Do.	do.	Cía. Minera Sipán S.A. (private, 100%)	Sipán, Inca, La Libertad Department	4,800
Do.	do.	Cía. Minera Ares S.A. (private, 100%)	Ares, La Libertad Department	5,200

See footnotes at end of table.

TABLE 2--Continued
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 2001

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold--Continued:	kilograms	Cía. Minera Aurífera Santa Rosa S.A. (private, 100%)	Santa Rosa, Puno Department	3,000
Iron ore		Shougang Hierro Perú S.A. (Shougang Corp., 100%)	Marcona, Ica Department	13,000
Lead		Doe Run Resources Corp. (private, 100%)	Smelter at La Oroya, Junín Department	93
Do.	do.	do.	Refinery at La Oroya, Junín Department	95
Do.		Empresa Minera Iscaycruz S.A. (Glencore International AG, 100%)	Pachangara, Lima Department	10
Do.		Empresa Minera Yauliyacu S.A. (Glencore International AG, 100%)	Casapalca, Lima Department	15
Do.		Cía. Minera Volcán S.A. (private, 100%)	San Cristóbal, Mahr Túnel, and Andaychagua, Junín Department	70
Do.		do.	Paragsha, Cerro de Pasco Department	85
Do.		Cía. Minera San Ignacio de Morococha S.A. (private, 100%)	Yauricocha, Junín Department	5
Do.		Cía. Minera Atacocha S.A. (private, 100%)	Yanacancha Mine, Junín Department	40
Do.		Cía. Minera Milpo S.A. (private, 100%)	El Porvenir Mine, Cerro de Pasco Department	25
Do.		Cía. Minera Santa Luisa S.A. (private, 100%)	Huanzalá Mine, Junín Department	40
Do.		Sociedad Minera El Brocal S.A. (private, 100%)	San Gregorio Mine, Cerro de Pasco Department	60
Do.		Corp. Minera Nor Perú S.A. (Pan American Silver Corp., 100%)	Quiruvilca, La Libertad Department	10
Molybdenum		SPCC	Cuajone, Moquegua Department, and Toquepala, Tacna Department	NA
Natural gas	million cubic meters per day	Pluspetrol Perú Corp. (Pluspetrol S.A., 36%; Hunt Oil Company, 36%; SK Corp., 18%; Tecpetrol S.A., 10%)	Camisea gas deposit, Cusco Department	NA
	do.	Petrotech del Perú S.A. (Petroperú S.A., 100%)	Pucallpa, Loreto Department	120
	do.	Aguaytia S.A. (Petroperú S.A., 100%)	Aguaytia gas deposit, Ucayali Department	80
	do.	Perrez Companc S.A. (Petroperú S.A., 100%)	Pucallpa, Loreto Department	60
Petroleum, crude	42-gallon barrels per day	Petrotech del Perú S.A. (Perupetro, 100%)	Onshore Piura Department; northeast and central jungle areas, Loreto Department	68,000
Do.	do.	Perez Companc S.A. (Perupetro, 100%)	Pacific Coast, offshore Piura Department	30,000
Do.	do.	Pluspetrol S.A. (private, 100%)	Northeastern jungle, Loreto Department	90,000
Do.	do.	Occidental Petroleum Corp. (private, 100%)	Block 1-AB, northern jungle, Loreto Department	28,000
Petroleum products	42-gallon barrels per day	Perupetro S.A.	Refineries at Talara, Lima, Iquitos, Marsella, Milagro, and Pucallpa	195,000
Silica sand		Minera Baribent S.A. (private, 100%)	María G. and Martín I., Junín Department	27
Silver	kilograms	Empresa Minera Yauliyacu S.A. (Glencore International AG, 100%)	Casapalca, Lima Department	160,000
Do.	do.	Doe Run Resources Corp. (private, 100%)	Refinery at La Oroya	809,000
Do.	do.	Cía. Minera San Ignacio de Morococha S.A. (private, 100%)	Yauricocha, Junín Department	46,500
Do.	do.	Cía. de Minas Buenaventura S.A. (Buenaventura) (private, 83%; Centromin, 17%)	Julcani and Huachocolpa Mines, Huancavelica Department, Uchucchacua Mine, Lima Department	350,000
Do.	do.	Cía. de Minas Orcopampa S.A. (Buenaventura, 100%)	Orcopampa Mine, Arequipa Department	161,000
Do.	do.	Cía. Minera Volcán S.A. (private, 100%)	San Cristóbal, Mahr Túnel, and Andaychagua,	325,000
Do.	do.	Sociedad Minera Corona S.A. (private, 100%)	Hualgayoc, Cajamarca Department	175,000
Do.	do.	Cía. Minas Arcata S.A. (private, 100%)	Arcata, Arequipa Department	170,000
Do.	do.	SPCC	Ilo smelting and refining, Moquegua Department	150,000
Do.	do.	Cía. Minera Santa Luisa S.A. (private, 100%)	Huanzalá Mine, Junín Department	53,000
Do.	do.	Cía. Minera Raura S.A. (private, 100%)	Raura, Lima Department	54,000
Do.	do.	Cía. Minera Nor Perú S.A. (private, 100%)	Quiruvilca, La Libertad Department	128,000
Do.	do.	Cía. Minera Milpo S.A. (private, 100%)	Yanacancha, Cerro de Pasco Department.	110,000
Do.	do.	Cía. Minera Atacocha S.A. (private, 100%)	Yanacancha Mine, Junín Department	130,000
Do.	do.	Sociedad Minera El Brocal S.A. (private, 100%)	San Gregorio Mine, Cerro de Pasco Department	110,000
Do.	do.	Corp. Minera Nor Perú S.A. (Pan American Silver Corp., 100%)	Quiruvilca, La Libertad Department	125,000
Steel		Sider Corp. S.A. (Acercor S.A., 49.4%; Grupo Wiese, 49.4%; others, 1.2%)	Chimbote, Ancash Department	550
Do.		Empresa Laminadora del Pacífico S.A. (private, 100%)	Pisco, Ica Department	180
Tellurium	metric tons	Doe Run Resources Corp. (private, 100%)	Refinery at La Oroya	12
Tin	metric tons per day	Minsur S.A. (private 100%)	San Rafael Mine, Puno Department	2,500
Do.	do.	do.	Pisco smelting and refining, Ica Department	40,000
Tungsten	do.	Minera Regina S.A. (private, 100%)	Palca XI, Puno Department	1,400
Do.	do.	Fermin Málaga Santolalla S.A. (private, 100%)	Pasto Bueno, Ancash Department	1,000

See footnotes at end of table.

TABLE 2--Continued
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 2001

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Zinc	Cía. Minera Volcán S.A.A. (private, 100%)	Cerro de Pasco, Cerro de Pasco Department, and San Cristóbal, Mahr Túnel, and Andaychagua, Junín Department	320
Do.	Compañía Minera Antamina S.A. (CMA) (BHP Billiton plc., 33.75%; Noranda Inc., 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Huari, Ancash Department	165
Do.	do.	Antamina concentrator, Ancash Department	70
Do.	Empresa Minera Iscaycruz S.A. (Glencore International AG, 100%)	Pachangara, Lima Department	125
Do.	Empresa Minera Yauliyacu S.A. (Glencore International AG, 100%)	Casapalca, Lima Department	40
Do.	Cía. Minera San Ignacio de Morococha S.A. (private, 100%)	Yauricocha, Junín Department	80
Do.	Doe Run Resources Corp. (private, 100%)	Refinery at La Oroya	70
Do.	Refinería Cajamarquilla S.A. (Teck Cominco Ltd., 87%; Marubeni Corp. of Japan, 13%)	Refinery at Cajamarquilla, Lima Department	120
Do.	Cía. Minera San Ignacio de Morococha S.A. (private, 100%)	San Vicente Mine, Junín Department	70
Do.	Cía. Minera Atacocha S.A. (private, 100%)	Yanacancha Mine, Junín Department	60
Do.	Cía. Minera Raura S.A. (private, 100%)	Raura, Lima Department	45
Do.	Corp. Minera Nor Perú S.A. (Pan American Silver Corp., 100%)	Quiruvilca, La Libertad Department	25
Do.	Cía. Minera Santa Luisa S.A. (private, 100%)	Huanzalá Mine, Junín Department	50
Do.	Cía. Minera Milpo S.A. (private, 100%)	Yanacancha, Cerro de Pasco Department	80
Do.	Sociedad Minera El Brocal S.A. (private, 100%)	San Gregorio Mine, Cerro de Pasco Department	220

NA Not available.

TABLE 3
PERU: RESERVES OF MAJOR MINERALS IN 2001

(Thousand metric tons unless otherwise specified) 1/

Commodity	Reserves
Coal, all types	1,100,000
Copper	57,400
Gold	metric tons 3,500 2/
Iron ore	830,000
Lead	3,500
Molybdenum	450 e/
Natural gas	billion cubic meters 260
Petroleum crude	million barrels 600
Phosphate rock	million metric tons 550
Salt	thousand metric tons 100,000 e/
Silver	metric tons 36,000
Sulfur	150,000 e/
Tin	720
Uranium	100 3/
Zinc	16,000

e/ Estimated.

1/ Source: 2000 and 2001 "Anuario de la Minería del Perú" Ministerio de Energía y Minas except for natural gas and petroleum crude; U.S. Geological Survey Mineral Commodity Summaries 2002.

2/ Excludes metal in placer deposits.

3/ Recoverable at prices of \$100 per kilogram of uranium or less.