

THE MINERAL INDUSTRY OF

PERU

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In 1997, Peru, with a population of more than 24 million, had a gross domestic product (GDP) of about \$54 billion.¹ Minerals and related industries were 8.7% of Peru's 1997 GDP. Mining export revenues represented about 40% of Peru's total export earnings. The Peruvian GDP attained a 7.4% growth, considerably higher than the 2.8% growth of 1996, and the inflation rate for the year was running at an average of 6.5%, much lower than the 11.2% of 1996, in spite of the effects of El Niño, the Asian financial crisis, and the lower prices for its major mineral exports, mainly copper, gold, lead, silver, and zinc. By yearend 1997, Peru's foreign debt amounted to \$27.4 billion, and its reported net international reserves were about \$10.2 billion (Sociedad Nacional de Minería y Petróleo, 1997, p. 15).

Peru saw several important changes, such as the privatization of the state-owned firms, the modernization of the Peruvian Government, the control of terrorism, and the stabilization of its economy. Foreign investors viewed such efforts as a distinct sign of strength, making Peru an attractive open-market economy in Latin America (Assereto, 1997, p. 2).

The Government also slashed subsidies and tariffs, freed foreign exchange and interest rates, liberalized international investment rules, and continued with its privatization process. In 1997, the National Commission for Foreign Investment and Technology (CONITE), reported that a total of 30 state-owned corporations were privatized, which created a revenue of \$450 million, with committed investments of \$680 million, and a cash flow of \$823.6 million (62% for energy, 6.5% for communications, 1.2% for mining, and 30.3% for others). At the end of 1997, CONITE reported a total of \$6.984 billion of committed new foreign investments. In the next decade, investments are expected to be \$14.1 billion, of which mining would receive 51%, petroleum 34%, and the other sectors of the economy 15% (Sociedad Nacional de Minería y Petróleo, 1997, p. 19-24). According to the Sociedad Nacional de Minería y Petróleo (SNMP) and the Private Investment Promotion Committee (COPRI), the Peruvian privatization program began on July 19, 1991, privatizing about 230 state-owned corporations and netting about \$9 billion, with committed new investments of about \$13 billion.

The privatization process continued to be managed by COPRI, and responsibility for specific privatization was vested in special committees, Comités de Privatización (CDP), whose members were selected from the ranks of leading professionals and officials, mainly from the private sector. The privatization of the remaining units of state-owned Minerero Peru (MINPE) will resume in mid-1998, in spite of low metal prices and probably

with base-price adjustments. COPRI will approve the privatization of MINPE's mine properties. Sale of the Michiquillay copper mine was postponed late this year; the base price had been originally set at \$40 million. A MINPE official said that low copper prices was not a factor on its sale. CDP was also proposing a scenario of royalties on Michiquillay's privatization (Metal Bulletin, 1998).

Since 1992, Peru's divestitures and openings to the private sector have been responsible for expanding utilities, communications, finance, retailing, mining, oil and gas, and transportation activities. As a component of Peru's economic reforms, privatization continued eliminating the Government's dominant role in local industries and services where private companies were previously excluded. Key to the program's success was attracting domestic and foreign investment. Mineral production in major privatized state-owned mines increased dramatically (U.S. Embassy, Lima, Peru, 1997).

The Supreme Decree No. 014-92-EM is the single revised text of the General Mining law of June 2, 1992, which provides guaranteed protections to mining ventures and contracts under the Peruvian Civil Code; therefore, they are immune from unilateral changes by any governmental authority in Peru without an appropriate legal or administrative remedy. Also, the Peruvian Constitution establishes equal protection for domestic and foreign investors, who may enter into agreements with the State. It also guarantees free access, possession, and disposal of foreign currency (Mendoza, 1998, p. 2).

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 had 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, there is no distinction in terms of application to domestic and foreign investors or corporations and consortia formed in Peru or abroad. There are no restrictions in the remittance of dividends, depreciation, and royalties abroad. Contracts can be signed between investors, and the Government guarantees stability of legal commitments and taxes. Peru is a signatory of the Multilateral Investment Guarantee Agency (MIGA), the international MIGA agreement, and many bilateral agreements, such as the Overseas Private Investment Corporation (Assereto, 1997, p. 8; Mendoza, 1998, p. 3-4).

The state-owned Petróleos del Perú S.A. (Petroperu) managed energy-related activities for the Government. All mineral resources, including geothermal resources, belonged to the State. The Government granted concessions for use by the State, private companies, and individuals. The administration and management

¹Where necessary, values have been converted from Peruvian new soles (S./) to U.S. dollars at the rate of S./2.73=US\$1.00.

of all mining activities rested in the executive branch.

The Dirección General de Asuntos Ambientales (DGAA) of the Ministry of Energy and Mines (MEM) has the responsibility to address environmental problems resulting from energy and mining activities and is mandated to implement the current environmental code and regulations. Since 1995, the Consejo Nacional del Ambiente (CONAM) gathered data-base information, which was reported by energy and mining firms under the Preliminary Environmental Assessment, the Environmental Impact Assessment, and the Environmental Adjustment and Management Program. Further follow-up activities, however, would still need to be undertaken to ensure that the strengthening and structuring of the DGAA and the CONAM would enhance their efficiency in carrying out environmental planning, intersectoral coordination, and environmental management. Mining and oil companies want to take better care of the environment, and oil companies, in particular, are under pressure because they are operating increasingly in the Amazonian rain forest, one of the world's most sensitive environments (Wall Street Journal, 1997, p. A1).

In 1997, according to published statistics (Sociedad Nacional de Minería y Petróleo, 1997; Ministerio de Energía y Minas, 1997), Peruvian mineral commodities production, valued at \$3.3 billion, increased by \$200 million compared with that of 1996. (See table 1.)

While the Latin American region was experiencing a dramatic economic upsurge as it neared the turn of the century, Peru, as a member of the Andean Common Market (ANCOM) (Bolivia, Colombia, Ecuador, Peru, and Venezuela), sold about 8% of its exports to the other ANCOM members and about 5% to other countries in Latin America. Peruvian mineral exports could increase as the negotiations between the Common Market of the Southern Cone (Mercosur) (Argentina, Brazil, Paraguay, Uruguay, and associate members Bolivia and Chile) and ANCOM may lead to a free-trade pact by 2000 and create the South American free trade agreement (SAFTA), but Peru is cautious about turning bilateral agreements into a single one, or SAFTA (Hall, 1998).

In 1997, mining exports were \$2.7 billion, or 40% of total exports. Peru's mineral export earnings, including petroleum, amounted to \$3.1 billion, or 60% of its total exports of \$5.2 billion. Imports increased by 3% to \$7.9 billion, creating a deficit of about \$2.7 billion. Peru imported crude oil valued at \$837.6 million, which created a trade deficit of \$450.5 million for the energy sector (Sociedad Nacional de Minería y Petróleo, 1997, p. 178).

According to the MEM, Peru's largest state-owned mining company was Empresa Minera del Centro del Perú S.A. (Centromín). Centromín auctioned the rights of its five polymetallic mines and La Oroya metallurgical complex as part of its piecemeal privatization program for the 1997-98 period. In 1997, Centromín transferred the following operating units:

- (1) the La Oroya smelter-refinery complex to a consortium formed by the Doe Run Resources Corp. of the United States and Renco Resources Inc. of Canada for \$121 million, with committed working capital of \$126 million;
- (2) the Casapalca unit and La Carcajada and Perro Ciego concessions to the Group Gubbins of Peru and Glencore

International (Glencor) of Switzerland for \$9.1 million, with committed new investments of \$110 million;

- (3) the operating units of San Cristóbal, Mahr Túnel, and Andaychagua to the Cía. Minera Volcán S.A. of Peru for \$12.8 million, with committed future investment of \$60 million; and
- (4) the Yauricocha unit to Cía. Minera San Ignacio de Morococha (SIMSA) of Peru for \$2 million, with committed investment of \$2 million (Ministerio de Energía y Minas, 1998, Plan de Gestión 1998, accessed on August 12, 1998, on the World Wide Web at URL <http://www.mem.gob.pe/nuevo/pub/plgesti98/pag8.html>).

According to the MEM's accessed data, the following enterprising activities took place in the private sector in 1997 Cominco Perú SRL. and Solitario Resources Corp. of Canada entered into a joint venture to develop the Bongará zinc project in the Amazonas Department and Phelps Dodge Corp. of the United States acquired 26.67% of equity in SIMSA and was negotiating a joint venture with the Cía. Minera Milpo S.A. on the Cerro Lindo base metals project in the Department of Lima.

Intense exploration, prefeasibility, and feasibility studies were also carried out in 1997.

- (1) Cambior S.A. (Cambior) has exercised the option of acquiring the La Granja copper project in the Department of Cajamarca. Cambior has spent \$42 million on the project and estimated ore reserves in the magnitude of 2.3 billion metric tons grading 0.59% copper. Plans for mine production rates were 100,000 metric tons per day (t/d) of concentrates and 40,000 t/d of leached material. The total planned copper metal output was 300,000 metric tons per year (t/yr), of which 255,000 t/yr will be produced from concentrates and 45,000 t/yr will be produced by solvent extraction-electrowinning (SX-EW). The total investment required for the La Granja project was estimated to be \$1.1 billion;(2) as of October 1997, the owners of the Antamina copper-zinc project in the Ancash Department (Noranda Inc., 37.5%; Rio Algom Limited, 37.5%; and Teck Corporation, 25%), spent \$45 million in exploration and in prefeasibility studies. The project contained 400 million metric tons (Mt) of ore reserves and will require a total investment of about \$2.52 billion;(2) Minera Barrick Misquichilca S.A. (Barrick Gold Corp. of Canada), owner of the Pierina gold mine in La Libertad Department, was planning to produce 23.3 t/yr (750,000 ounces) of gold starting in November 1998. The total required investment was estimated to be about \$316 million; and

- (4) after spending \$40 million, Minera Quellaveco S.A. (Minorco of Luxembourg and Anglo American Corp. of South Africa) completed a feasibility study for the Quellaveco copper deposit, which contained 700 Mt of ore reserves grading 0.8% copper, and its mineral resources could be more than 1.0 billion metric tons grading 0.6% copper. Quellaveco's production could be between 170,000 and 200,000 t/yr of metal copper, with an investment of about \$800 million.

There were also mine and plant expansions in 1997.

- (1) Cía. Minera Yanacocha S.A. (Newmont Gold Company of the United States, 51.35%; Cía. de Minas Buenaventura S.A. of Peru, 43.65%; and the International Finance Corporation of the World Bank, 5%) brought its fourth gold mine, Cerro Yanacocha, into operation, which increased gold output to 32.8 t from 25.2 t in 1996;(2) Cerro Verde's operator, Cyprus-Amax Minerals Co., decided to develop the Cerro Negro copper project, which has 70

Mt ore reserves grading 0.532% copper, at a cost of about \$100 million by 2000. Cerro Negro will provide an additional 20,000 t/yr, which will increase Cerro Verde's copper metal output to about 120,000 t/yr in 2000;

(3) the Cajamarquilla zinc refinery in Lima (Cominco Limited of Canada and Marubeni Ltd. of Japan) expanded to 120,000 t/yr from 100,000 t/yr in 1996 at a cost of \$30 million. A parallel zinc refinery of 120,000 t/yr, which will be built at a cost of \$326 million, will increase the zinc metal production to 240,000 t/yr in 2000;(4) Cía. Minera Sipán S.A. of Peru began operation and will produce about 3.7 t/yr of gold, with an investment of \$36 million (Ministerio de Energía y Minas, 1998, Plan de Gestión 1998, accessed on August 12, 1998, on the World Wide Web at URL <http://www.mem.gob.pe/nuevo/pub/plgesti98/pag8.html>); and (5) according to the Southern Peru Limited (SPL), its Cuajone Mine and Ilo refinery operations in Moquegua and Tacna Departments, respectively, will be expanded and modernized during the next decade in three phases. In phase I a sulfuric acid plant will be built and the Cuajone Mine and concentrator will be expanded to 87,100 t/d from 58,100 t/d in 1996 at a cost of \$245 million; in phase II the Ilo smelter-refinery will be modernized and expanded to 1.134 Mt/yr from 1.026 Mt/yr in 1996 all at a cost of \$787 million; and in phase III the Cuajone Mine will be further expanded to about 140,000 t/d at a cost of \$700 million, and the Ilo refinery will be expand to about 1.6 Mt/yr at a cost of \$84 million to process the concentrates produced by the Toquepala and the Cuajone copper mines, which reportedly contained 1.73 billion metric tons of minable (sulfate ores) and 665 Mt of leachable (oxide ores) reserves, respectively (Preble, 1997).

Other feasibility studies and project construction were taking place in the northern copper belt (La Granja and Michiquillay), the southeastern copper belt (Tintaya and Ferrobamba), the central polymetallic belt (Yauricocha, Toromocho, and Cerro de Pasco), and the gold belt (Quicay and Ocoña) (Mendoza, 1998, p. 5).

Private firms, mostly controlled by local interests, dominated the medium- and small-mining operations. More than 80 foreign mining companies have been established in Peru. During the next decade, they are planning to invest about \$11 billion in 18 feasibility-stage mining projects (\$7 billion), 26 expansion projects (\$2 billion), 197 exploration prospects (\$900 million), and several construction-stage projects (\$400 million) (Assereto, 1997, p. 15).

The new hydrocarbon law, No. 26844 of 1997, eliminated Petroperu's exclusive rights, such as control over secondary recovery of crude oil, refining, and imports and subsequent resale of petroleum and byproducts, in the industry. The law created more-favorable oil and gas exploration and production contract terms for investors, which resulted in an increased number of domestic and foreign companies expressing interest in participating in exploration contracts with Petroperu (Sociedad Nacional de Minería y Petróleo, 1997, p. 34). (See table 2.)

In 1997, according to published statistics (Sociedad Nacional de Minería y Petróleo, 1997; Ministerio de Energía y Minas, 1997), Peru's copper output increased to 502,970 t from 484,231 t, or up about 3.9% compared with that of 1996. About 489,000 t of copper, with a value of \$1.09 billion, was exported.

SPL remained the largest copper producer in the country with

an output of 266,434 t of copper from its mine operations at the Toquepala and the Quajone open pits and 42,289 t of copper recovered from the SX-EW plant at Toquepala. The output from SPL's Ilo refinery was a record high of 233,038 t of copper and 4,268 t of molybdenum with 107 t of silver.

BHP Tintaya S.A., Peru's second largest copper producer, reported an output of 68,800 t of copper from its Tintaya open pit in Cusco, which represented a 16.5% increase with respect to the 1996 output (59,072 t).

Sociedad Minera Cerro Verde S.A., owned by Cyprus-Amex Minerals Co., produced 54,489 t of copper, which was 18.8% more than that of 1996. This represented Cerro Verde's third consecutive increase in output following the completion of its mine expansion and mill recovery improvement programs.

Centromin, Peru's fourth largest producer, produced 35,179 t of copper from its base metal mines. Other copper producers were Cía. Minera Pativilca (7,892 t) and Cía. Minera Condestable S.A. (4,451 t). An additional 23,457 t came from medium- and small-sized mines in the country.

In 1997, Peru's gold production amounted to 76.8 t, an increase of 18.6% from that of 1996; the country exported 43 t of gold valued at about \$500 million. Newmont's Yanacocha Mine remained the largest gold producer in the country, having produced 32.8 t of gold, a 30% increase compared with the output of 1996, and representing 42.6% of Peru's gold production in 1997.

Gold recovered as a byproduct from the concentrates of the nation's polymetallic mines amounted to 4.3 t. Other private gold producers in 1997 were Minera Aurífera Retamas S.A., 4.7 t; Consorcio Minero Horizonte S.A., 2.8 t; and Cía. Minera Poderosa S.A., 2.5 t. Medium and small mines reported 7.3 t, and an unknown number of placers and "garimpos" (informal individual miners) accounted for about 29.3%, or 22.5 t, of 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, although gold was recovered from placers in rivers and streams throughout the jungle.

In 1997, Shougang Hierro Perú S.A., a subsidiary of China's Shougang Corp. and Peru's only iron ore producer, increased its output slightly to 2.965 Mt. The value of iron ore exports decreased by almost 9% to \$76.4 million. The country's economic growth was accompanied by the steady growth of the construction industry, which generated demands for steel and cement in the domestic market (Soldi, 1998, p. 2).

The Acerco S.A. (Acerco), new owners of the Siderúrgia del Perú S.A. steel plant, continued with the investment program to upgrade and modernize Peru's largest steelworks. Acerco is owned by G.S. Industries Inc. of the United States, Stanton Funding Co. of Canada, and Wiese Inversiones Financieras S.A. of Peru. Acerco paid \$20.2 million in cash and will pay \$142.7 million within a period of 8 years and an additional \$30 million to upgrade the steelworks.

The Peruvian zinc industry produced 865,000 t of zinc in concentrates, or 17% more than that of 1996; this was the world's fourth largest output after Australia, Canada, and China. This represented 11% of world concentrate output and 53% of Latin America's zinc concentrate and 27% of refined zinc. The

international prices of zinc were very favorable to induce that record production of zinc in Peru (Powers, 1998).

In 1997, Peru produced 258,189 t of lead (86,015 refined) and 865,267 t of zinc (166,105 t refined). Exports of lead and zinc, with silver content, were valued at about \$204 million and \$480 million, respectively. Centromín reported an output of 87,014 t of refined lead and 278,043 t of zinc metal and continued as the leading lead-zinc producer in the country.

In 1997, the Izcaycruz zinc mine owned by Glencor, produced 86,076 t of zinc in its second year of operation and was the largest private zinc producer in the country. Cía. Minera San Ignacio de Morococha S.A. was Peru's second largest private zinc producer with 72,030 t. Cía. Minera Milpo S.A. the largest private lead producer in Peru, produced 20,650 t of lead and 60,440 t of zinc. Milpo was 73.8% owned by local shareholders and 26.2% by foreign investors. Cía. Minera Santa Luisa S.A., a subsidiary of Mitsui Mining Co. of Japan, produced about 39,066 t of zinc and 18,693 t of lead from its Huanzalá Mine. Cía. Minera Raura S.A. produced about 43,355 t of zinc and 8,012 t of lead. Glencor's Perubar S.A. produced 34,531 t of zinc.

In 1997, Corporación Minera Nor Perú, a subsidiary of Panamerican Silver of Canada, produced 22,218 t of zinc, 5,257 t of lead, and 84.2 t of silver from its Quiruvilca Mine in northern Peru.

Silver production increased by about 5.4%, to 2,076.5 t, in 1997, making Peru the world's second largest producer after Mexico. The medium-sized companies produced 1,533.6 t; large mining companies contributed 527.6 t; and small companies produced the remaining 15.3 t.

In 1997, Centromín led silver producers in the nation's total output with 390 t. Buenaventura and its subsidiary, Orcopampa, dominated the medium-sized silver-mining sector with 205 t.

Minsur S.A. (Minsur) continued as Peru's only tin producer in 1997. Production from its San Rafael Mine in the Mariátegui Region was 27,952 t of tin, a 3.5% increase from that of 1996. 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. Minsur recently completed its tin smelting and refining installation in Pisco, south of Lima.

Two private companies in Peru were mining tungsten at the Pasto Bueno Mine in Ancash and at Palca XI Mine in Puno Region. The Palca XI Mine, operated by Minera Regina S.A., was the main producer. In 1997, production decreased to 280 t, or about 15.4% of that produced in 1996.

In 1997, five main cement companies operated in Peru. Cementos Lima S.A. produced about 1.54 Mt of cement, or about 41% of Peru's total cement output. The Atocongo plant has a design capacity of almost 1 million metric tons per year (Mt/yr), drawing from limestone quarries nearby. Cementos Norte Pacasmayo S.A., the second largest cement company in Peru, accounted for 22% of total production. It has an installed capacity of 800,000 t/yr, with a plant utilization of 60%. The plant is 670 kilometers (km) north of Lima in Pacasmayo, La Libertad Department. Cementos Andino S.A., the third largest cement company in Peru, accounted for 18% of total production; it is east of Lima. Cementos Yura S.A. has a market share of about 14%, and Cementos Sur S.A. has 5%, both in Arequipa Department (McCaffrey, 1996).

The phosphate deposits of Bayóvar in northern Peru, scheduled for privatization in mid-1998, comprise 150,000 hectares of phosphate and brine, with proven reserves of 550 Mt of phosphatic rock. As a consumer of sulfuric acid and producer of fertilizer, the Bayóvar project could be competitive because of its location in a valley of great agricultural potential and export opportunities to the Asia-Pacific region via the port of Paita (Mendoza, p. 8).

The 90,000 t/yr phosphate plant was operated by Empresa Minera Regional Grau Bayóvar, S.A., which produced only 48,000 t of phosphate in 1997. Phosphate shipments continued to New Zealand under a 100,000-t contract signed with Norphos International Ltd. of Auckland. Other shipments went to Chile and Costa Rica through the port of Paita.

Liquid fuels satisfied more than 60% of Peru's total energy requirements. Petroleum accounted for 23% of energy consumption, and electricity met 10% of the energy demand. Natural gas supplied 7% to the country's energy mix.

Peru's largest coal deposits are at Alto Chicama, 140 km north of Trujillo in La Libertad Department. 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.

Natural gas was primarily transported by pipeline from the Talara Basin in the Grau Region to the Talara refinery on the coast. Two gasfields were candidates for development in the Ucayali Basin. Peru's proven natural gas reserves were estimated to be 200 billion cubic meters at the end of 1997. The Aguaytia gasfield, approximately 41 km west-northwest of Pucallpa, had proven reserves of 8.5 billion cubic meters of gas and 9 million barrels (Mbbbl) of condensate (natural gas liquids). The country's largest potential gasfield is Camisea in Cusco, which consists of a pair of crescent-shaped gasfields that contain sufficient gas to supply Arequipa, Cusco, Lima, and other cities with energy for the next 100 years and potentially contain enough gas to supply fuel to neighboring Brazil (Wall Street Journal, 1997, p. A8). The San Martín and the Cachiriari prospects at Camisea had estimated inferred reserves of about 305.8 billion cubic meters of gas and 725 Mbbbl of condensate (Sociedad Nacional de Minería y Petróleo, 1997, p. 56). The fields are distant from potentially accessible markets; the MEM, however, indicated that new infrastructure was needed and must be developed.

In 1997, petroleum production in Peru averaged 119,900 barrels per day (bbl/d) compared with 1996's output of 120,300 bbl/d. Peru imported crude oil and petroleum products to satisfy its internal demand. The value of petroleum and derivative imports was \$837.6 million, which created a trade deficit of \$450.5 million for 1997 (Sociedad Nacional de Minería y Petróleo, 1997, p. 178).

Peru's total crude oil production of 43.8 Mbbbl in 1997 came from Occidental Petroleum Corp. of the United States, 42%, which remained as the largest oil producer of the country; Petroperu, 35%; and other producers, 23%. About 65% of the country's crude oil production came from the jungle blocks in the Ucayali Region; the remaining was produced at the coastal and offshore fields in northern Peru. The country's declining petroleum reserves were estimated to be about 380 Mbbbl in 1997 compared with the peak of 850 Mbbbl in 1981. La Pampilla in

Lima, the largest oil refinery in Peru, has a capacity of about 102,000 bbl/d. The second largest oil refinery in the country, Talara, has a capacity of about 60,000 bbl/d (Sociedad Nacional de Minería y Petróleo, 1997, p. 54-60).

Peru has 1,801 km of railroads and 69,942 km of roads, of which 7,459 km were paved and 13,538 km were unpaved. There were 8,600 km of navigable waterways and tributaries to the Amazon River system and 208 km of waterways into Lake Titicaca. Peru has an installed electrical generating capacity of 5,042 megawatts (MW), 60% of which came from hydroelectric plants. The Peruvian Government has raised \$694 million from the privatization of its electrical sector, with a commitment to invest \$1.6 billion to generate an additional 1,006 MW in the immediate future (Sociedad Nacional de Minería y Petróleo, 1997, p. 62-64).

Important mineral industry ports included Callao, Ilo, Matarani, Paita, San Nicolás, and Talara on the Pacific Ocean and Iquitos on the Amazon River. Also, a petroleum depot at Bayóvar that services the 800-km of crude oil pipeline in northern Peru. Natural gas and liquid gas are transported through a 64-km pipeline that runs between the Piura and the Tumbes Departments.

With strong capital flow from domestic and foreign investors, the country's economy was expected to bring long-term benefits to the energy, mining, and related mineral industries, which remained the most interesting sectors of the Peruvian economy. The privatization of Peru's mining, oil and gas, utilities, and communications sectors was expected to continue improving prospects for the metals, the petroleum and derivatives, and the electricity generation industries. The potential of utilizing natural gas, from the gasfields of Aguaytía and Camisea, for fertilizers production, petrochemicals, and thermoelectricity is very promising.

The privatization process should continue to generate investments in every sector of the Peruvian economy, particularly in the mining and energy industries. Current investments are making the modernization of Peru's industrial infrastructure possible. Medium-term foreign investments in the minerals sector were projected to be about \$20 billion, which was the largest committed capital, and will contribute significantly to the future of Peru's economic development. According to the Vice Minister of Mines, some important mineral developments were taking place in Peru, such as feasibility studies for the development of the Camisea gas project, which will require about \$3 billion; the Antamina copper-zinc project, which will need \$2.52 billion; and the La Granja copper project, which will require \$2.35 billion (Mendoza, p. 2).

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TABLE 1
PERU: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997 e/
METALS					
Antimony:					
Mine output, Sb content e/	240	460	460	460	460
Metal	219 r/	385 r/	230 r/	305	242 2/
Arsenic, white 3/	4,415	4,224	4,616	4,969	837 2/
Bismuth:					
Mine output, Bi content	1,300	1,210	900	1,000 e/	1,000
Metal	937	877	581	939	774 2/
Cadmium:					
Mine output, Cd content e/	500	600	600	500	500
Metal	471 r/	510 r/	560	405	474 2/
Chromium, mine output, Cr content e/	400	400	400	400	400
Copper:					
Mine output, Cu content	381,250	365,513	409,693	484,231	502,970 2/
Sulfate, Cu content	3,400	3,598	3,755	3,655	2,989 2/
Metal:					
Blister	98,695	107,885	83,368	73,907 r/	39,035 2/
Refined	258,934	265,413	261,751	249,890	284,347 2/
Electrowon	--	--	33,392	88,172 r/	99,738 2/
Total	258,934	265,413	295,143	338,062 r/	384,085 2/
Gold: 4/					
Mines kilograms	12,873	23,319	33,264	42,255	64,788 2/
Placers do.	17,445	24,480	24,480	22,535	22,535 2/
Total do.	30,318	47,799	57,744	64,790	76,822 2/
Indium do.	3,190	4,101 r/	5,069	4,290 r/	3,799 2/
Iron and steel:					
Iron ore and concentrate:					
Gross weight thousand tons	4,930	7,430	6,234	4,364 r/	4,439 2/
Fe content do.	3,400	4,830	3,948	2,916 r/	2,966 2/
Metal:					
Pig iron do.	147 e/	150	150	150 e/	150
Sponge iron e/	20,000	20,000	20,000	20,000	20,000
Ferroalloys e/	360	360	360	360	360
Steel ingots and castings thousand tons	417	506	515	510 r/	510
Semimanufactures	242 e/	250	250	250 e/	250
Lead:					
Mine output, Pb content	224,695	233,510	237,597	248,787	258,189 2/
Metal	87,197 r/	88,071	89,696	94,324 r/	86,015 2/
Manganese, mine output, Mn content e/	160	200	200	200	200
Molybdenum, mine output, Mo content	4,777	4,631	3,411	3,711	3,835 2/
Selenium, metal, refined kilograms	17,100	21,000	21,000	21,000 e/	21,000
Silver:					
Mine output, Ag content	1,631	1,742	1,929	1,970	2,077 2/
Metal, refined	589	710	680	717	665 2/
Tellurium, metal kilograms	1,764 r/	25,125 r/	30,087	25,089 r/	24,754 2/
Tin, mine output, Sn content	14,310	20,275	22,331	27,004	27,952 2/
Tungsten, mine output, W content	388 r/	259 r/	728	332 r/	280 2/
Zinc:					
Mine output, Zn content	664,045	690,017	692,290	760,563	865,267 2/
Metal	157,000	182,000	158,987	173,139 r/	166,105 2/
INDUSTRIAL MINERALS					
Barite	23,988	53,074	37,476	36,815	37,000
Boron materials, crude (borates)	36,500	30,000	40,581	38,973	40,000
Cement, hydraulic e/ thousand tons	2,500	3,000	3,000	3,848 r/ 2/	3,850
Chalk e/	101,200	101,200	101,200	101,200	101,200
Clays:					
Bentonite	10,250	27,682	26,961	18,592	18,600
Fire clay	9,500 e/	9,500	9,500	9,500 e/	9,500
Kaolin	5,100	5,100	8,445	14,295	14,300
Common clay	138,000 e/	138,000	312,520	378,399	378,400
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/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997 e/
INDUSTRIAL MINERALS--Continued					
Feldspar e/	11,400	11,400	11,400	11,400	11,400
Gypsum, crude	35,300	35,000	35,000	35,000	35,000
Lime e/	14,000	14,000	14,000	14,000	14,000
Mica e/	100	100	100	100	100
Nitrogen, N content of ammonia e/	90,000	90,000	90,000	90,000	90,000
Phosphate, crude	37,400	37,400	29,682	103,353	103,500
Salt, all types e/	238,000	238,000	140,200	235,536 2/	240,000
Stone, sand and gravel:					
Stone: e/					
Dolomite	40,000	50,000	1,622 2/	645 2/	645
Flagstone	300,000	300,000	300,000	300,000	300,000
Granite	2,000	2,000	2,000	2,000	2,000
Limestone	1,610	1,600	4,315 2/	4,363 2/	4,360
Marble	13,300	12,000	14,924 2/	12,410	12,400
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	18,000	18,000	22,954 2/	31,164 2/	31,200
Travertine	3,990	5,000	199,944 2/	259,465 2/	259,500
Sand and gravel:					
Construction	871	900	993	1226	1230
Silica sand	115	100	92	76	80
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	227,000	220,000	213,539	233,876	218,860 2/
Talc and related materials: e/					
Talc	1,200	1,200	13,818	12,985	13,000
Pyrophyllite e/	8,000	8,000	8,000	8,000	8,000
Total	9,200	9,200	21,818	20,985	21,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite, run-of-mine	31,100	35,000	14,324	16,778	16,778 2/
Bituminous, run-of-mine e/	41,000	45,000	45,000	45,000	45,000
Total	72,100	80,000	59,324	61,778	61,778 2/
Coke, all types e/	10,000	10,000	32,500	10,000	10,000
Gas, natural: e/					
Gross	1,200	1,200	1,200	1,200	1,200
Marketed	570	600	267 r/	248	242 2/
Natural gas liquids: e/					
Natural gasoline and others 5/	295	295	295	295	295
Butane	4	4	4	4	4
Total	299	299	299	299	299
Petroleum:					
Crude	46,000	46,465 r/	44,443 r/	43,909	43,764 2/
Refinery products:					
Liquefied petroleum gas	2,402 r/	2,720 r/	3,107 r/	3,191 r/	2,638 2/
Gasoline, motor	9,215 r/	9,522 r/	9,994 r/	10,561 r/	9,086 2/
Jet fuel	2,235 r/	2,427 r/	3,155 r/	4,348 r/	3,466 2/
Kerosene	5,219 r/	5,123 r/	5,092 r/	5,103 r/	4,665 2/
Distillate fuel oil	8,479 r/	8,940 r/	10,410 r/	11,887 r/	-- 2/
Lubricants	38 e/	38	65	243	243 2/
Residual fuel oil	14,148 r/	16,252 r/	19,199 r/	19,592 r/	17,198 2/
Asphalt	270 e/	270	1,557	761	760
Other e/ 6/	919 r/	1463 r/	1,570 r/	1,303 r/	1,304 2/
Total	42,925 r/	46,755 r/	54,149 r/	56,989 r/	41,357 2/

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

e/ Estimated. r/ Revised.

1/ Table includes data available through July 1998.

2/ Reported figure.

3/ Output reported by Doe Run Resources Corp.

4/ Peru's placer gold production was reported.

5/ Includes hexane.

6/ Includes refinery fuel and losses.

TABLE 2
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 1997

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Antimony	Doe Run Resources Corp., (private, 100%)	Smelter at La Oroya, Junín Department	700 1/
Barite	Barmine S.A., (private, 100%)	Santa Cruz de Cocachacra, Huarochirí, Lima Department	NA
Bentonite	Minerales Andinos S.A., (NL Industries, 90%)	Vichayal Mine, Piura Department	9
Bismuth	Doe Run Resources Corp., (private, 100%)	Refinery at La Oroya	1,000 1/
Copper	Southern Peru Copper Corp. (SPCC) (Asarco Corp., 63.0%; Phelps Dodge Overseas Capital Corp., 16.3%; The Marmon Group Inc., 20.7%)	Cuajone, Moquegua Department, and Toquepala, Tacna Department	300
Do.	Doe Run Resources Corp., (private, 100%)	Smelter at Ilo, Moquegua Department	250
Do.	Doe Run Resources Corp., (private, 100%)	Refinery at Ilo, Moquegua Department	175
Do.	Glencore International, (private, 100%)	Cobriza, Huancavelica Department;	60
Do.	Cía. Minera Volcán S.A., (private, 100%)	Smelter at La Oroya	65
Do.	Cía. Minera Volcán S.A., (private, 100%)	Refinery at La Oroya	60
Do.	Glencore International, (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, (private, 100%)	Yauricocha, Junín Department	60
Do.	BHP Tintaya S.A., (private, 100%)	Tintaya Mine, Cusco Department	50
Do.	Sociedad Minera Cerro Verde S.A., (Cyprus-Amax Minerals Co., 90.9%; Cía. de Minas Buenaventura, 9.1%)	Cerro Verde, Arequipa Department	30
Do.	Sociedad Minera Cerro Verde S.A., (Cyprus-Amax Minerals Co., 90.9%; Cía. de Minas Buenaventura, 9.1%)	Electrowon at Cerro Verde	20
Dolomite	Minera Baribent S.A., (private, 100%)	Esperanza, Ancash Department	25
Gold	Minera Yanacocha S.A., (Newmont Mining Corp., 51.4%; Cía. de Minas Buenaventura S.A., 43.6%; World Bank's IFC, 5%)	Yanacocha and Magui-Magui mines	16,000 2/
Do.	Cía. Minera Poderosa S.A., (private, 100%)	Cajamarca Department	
Do.	Cía. Minera Poderosa S.A., (private, 100%)	Poderosa, La Libertad Department	1,300 2/
Do.	Cía. de Minas Orcopampa S.A., (Buenaventura, 100%)	Orcopampa, Arequipa Department	1,050 2/
Do.	Asesoría Contable Minera S.A., (private, 100%)	Ocoña, Santa Clarita, Explatoro, and Molino de Oro, Arequipa Department	1,000 2/
Do.	Cía. Aurífera Río Inambari S.A., (Cía. Minera del Sur S.A., 84%, Aurífera Claudia, 16%)	Río Caichive, Madre de Dios Department	200 2/
Do.	Minera Aurífera Retamas S.A., (private, 100%)	Retamas, La Libertad Department.	3,900 2/
Do.	Consorcio Minero Horizonte S.A., (private, 100%)	Parcoy, La Libertad Department.	2,100 2/
Do.	Cía. Minera Sipán S.A., (private, 100%)	Sipán, Inca, La Libertad Department.	3,900 2/
Iron ore	Shougang Hierro Perú S.A., (private, 100%)	Marcona, Ica Department.	13,000
Lead	Empresa Minera del Centro del Perú S.A. (Centromín) (Government, 100%)	Cerro de Pasco, Cerro de Pasco Department	85
Do.	Doe Run Resources Corp., (private, 100%)	Smelter at La Oroya	93
Do.	Doe Run Resources Corp., (private, 100%)	Refinery at La Oroya	95
Do.	Glencore International, (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.	Cía. Minera Milpo S.A., (private, 100%)	El Porvenir Mine, Pasco Department	20
Do.	Cía. Minera Santa Luisa S.A., (private, 100%)	Huanzalá Mine, Junín Department	40
Molybdenum	SPCC	Cuajone, Moquegua Department and Toquepala, Tacna Department	NA
Petroleum, crude	Petróleos del Perú S.A., (Petroperu) (Government, 100%)	Onshore Piura Department; northeast and central jungle areas, Loreto Department	68,000 3/
Do.	Petróleos del Mar S.A., (Petroperu, 100%)	Pacific Coast, offshore Piura Department	28,000 3/
Do.	Occidental Petroleum Corp. del Perú (private, 100%)	Northeastern jungle, Loreto Department	90,000 3/
Petroleum products	Petroperu	Refineries at Talara, Lima, Iquitos, Marsella, and Pucallpa	185,500 3/
Silica sand	Minera Baribent S.A., (private, 100%)	María G. and Martín I., Junín Department	27
Silver	Centromín	Cerro de Pasco, Cerro de Pasco Department	116,500 2/
Do.	Glencore International, (private, 100%)	Casapalca, Lima Department	65,000
Do.	Cía. Minera Volcán S.A., (private, 100%)	San Cristóbal, Mahr Túnel, and Andaychagua, Junín Department	50,000
Do.	Cía. Minera San Ignacio de Morococha, (private, 100%)	Yauricocha, Junín Department	46,500
Do.	Doe Run Resources Corp., (private, 100%)	Refinery at La Oroya	809,000 2/

See footnotes at end of table.

TABLE 2--Continued
PERU: STRUCTURE OF THE MINERAL INDUSTRY IN 1997

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Silver--Continued:			
Do.	Cía. de Minas Buenaventura S.A., (Buenaventura) (private, 83%; Centromin 17%)	Julcani and Huachocolpa Mines Huancavelica Department, Uchucchacua Mine, Lima Department	187,000 2/
Do.	Cía. de Minas Orcopampa S.A., (Buenaventura, 100%)	Orcopampa Mine, Arequipa Department	161,000 2/
Steel	Empresa Siderúrgica del Perú (Acerco S.A., 100%)	Chimbonte, Ancash Department	550
Do.	Empresa Laminadora del Pacífico S.A., (private, 100%)	Pisco, Ica Department	180
Tellurium	Doe Run Resources Corp., (private, 100%)	Refinery at La Oroya	12 1/
Tin	Minsur S.A., (private 100%)	San Rafael Mine, Puno Department	2,500 1/
Tungsten	Minera Regina S.A., (private, 100%)	Palca XI, Puno Department	1,400 1/
Do.	Fermín Málaga Santolalla S.A., (private, 100%)	Pasto Bueno, Ancash Department	1,000 1/
Zinc	Centromín	Cerro de Pasco, Cerro de Pasco Department	195
Do.	Glencore International, (private, 100%)	Iscaycruz, Lima Department Casapalca, Lima Department	90 25
Do.	Cía. Minera Volcán S.A., (private, 100%)	San Cristóbal, Mahr Túnel, and Andaychagua, Junín Department	80
Do.	Cía. Minera San Ignacio de Morococha, (private, 100%)	Yauricocha, Junín Department	80
Do.	Doe Run Resources Corp., (private, 100%)	Refinery at La Oroya	70
Do.	Refinería Cajamarquilla S.A., (Cominco Ltd. of Canada, 87%; Marubeni Corp. of Japan, 13%)	Refinery at Cajamarquilla, Lima Department	120
Do.	Cía. Mra. San Ignacio de Morococha S.A., (private, 100%)	San Vicente Mine, Junín Department	70
Do.	Cía. Minera Raura S.A., (private, 100%)	Raura, Lima Department	45
Do.	Corp. Minera Nor Perú S.A., (Panamerican Silver, 100%)	Quiruvilca, La Libertad Department	25
Do.	Cía. Minera Santa Luisa S.A., (private, 100%)	Huanzalá Mine, Junín Department	20
Do.	Cía. Minera Milpo S.A., (private, 100%)	Yanacancha, Cerro de Pasco Department.	60

NA Not available.

1/ Metric tons per year.

2/ Kilograms per year.

3/ 42-gallon barrels per day.