THE MINERAL INDUSTRY OF

MEXICO

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In 2002, Mexico's gross domestic product (GDP) was $637.1 billion[1] ($918.8 billion in terms of purchasing power parity). In real terms, the GDP increased by 0.7% compared with the decrease of 0.2% in 2001 (International Monetary Fund, 2003§[2]). The value of construction output, which is an economic sector that consumes a large portion of industrial minerals, increased by 1.7%. The value of mining output, however, decreased by 0.3%. The value of total exports increased by 1.5% to $160.8 billion compared with that of 2001. Exports of petroleum were 9% of total exports. Imports, which exceeded exports and totaled $168.7 billion, remained at about the same level as those of 2001. Imports of petroleum accounted for 11% of Mexico's imports (Instituto Nacional de Estadística, Geográfica e Informática, 2003§). Inflation decreased to 5% (International Monetary Fund, 2003§).

Mexico's mineral sector was affected by a number of factors in 2002. Low nonferrous metal prices, labor stoppages, and energy prices had a great impact on the health of the sector. Large and small producers alike were forced to close mines, and several projects that were scheduled for development were halted.

Investment in the mining sector by companies associated with the Cámara Minera de México (Mexican Chamber of Mines) continued the negative trend and decreased by 32% to $258 million, after a decrease of 46% in 2001 (Cámara Minera de México, 2002, p. 9; 2003, p. 12). In 1997, investment in the mining sector by companies associated with the Cámara Minera had reached $1.2 billion (Metals & Minerals Latin America, 2001).

Government Policies and Programs

Under the Mexican Constitution, minerals are part of the national patrimony. Under Article 27 of the Constitution, the Mining Law is the Government legislation that governs Mexico's mining industry. The Mining Law of 1992 became effective in September 1992 and was amended in 1996. The amendment was published in the Diario Oficial de la Federación (Official Diary of the Federation) on December 24, 1996.

The Mining Law covers exploration for and production and beneficiation of minerals. It removes many of the restrictions of the previous law regarding the participation of private and foreign companies in the Mexican mining industry at a time when the Government was privatizing State mining companies and decontrolling its mining reserves. The Law permits direct investment with up to 100% ownership of equity in exploration and development and allows up to 100% foreign participation in production.

The Mining Law allows the participation of the private sector in the production of some minerals previously reserved for the Government, such as coal, iron, phosphorus, potassium, and sulfur. Minerals or substances exempted from the Law are hydrocarbons, radioactive minerals, substances contained in suspension or dissolution in subterranean waters as long as they did not originate from mineral deposits different from the components of the land, rocks, or their fragmentation that could only be used for the fabrication of materials for construction or ore destined for such purposes, products derived from the fragmentation of the rocks mined principally by open pit, and salt formed by evaporation of brines from playas.

The exploration concessions are awarded for 6 years and are not renewable. Exploitation concessions are awarded for 50 years and are renewable for a similar period. The Mining Law eliminates the concession for ore beneficiation plants.

On February 15, 1999, revisions to the mining regulations were published in the Diario Oficial de la Federación. The new regulations were geared to increase the participation of the private sector in mining and the competitiveness of the mining companies in Mexico. The regulations decrease the administrative procedures by 20% and establish time limits for most of the procedures. The regulations also establish automatic approval when no Government response has been received by the expiration of the time limit. The Public Service Manual on Mining-Related Issues was published in July 1999. The manual establishes administrative procedures for all mining matters of the mining law and its regulations.

In 1994, the responsibility for the mining sector was transferred to the Secretaría de Comercio y Fomento Industrial (SECOFI). In 2001, SECOFI was renamed Secretaría de Economía. Dirección General de Minas is responsible for revisions to the Mining Law and its regulations, and granting mining concession titles.

Environmental Issues

Although various environmental laws and regulations have been promulgated since 1946, protection of the environment became a priority for the Government of Mexico as the population has increased and the mining industry has grown in size and importance. Accordingly, the General Law of Ecological Balance and Environmental Protection (LGEEPA), which is a key element of environmental legislation, was passed in 1992 (Ordal and Moya, 1996, p. 5). Environmental responsibilities that resided in various Government agencies were transferred to the Secretaría del Medioambiente,

[1] Where necessary, 2002 values have been converted from Mexican pesos (Mex$) to U.S. dollars at the rate of Mex$9.68249=US$1.00.

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

Recursos Naturales, y Pesca (Ministry of Environment, Natural Resources, and Fisheries) (SEMARNAP) in 1994. Enforcement of environmental regulations is buttressed by the Office of the Environmental Attorney.

Under SEMARNAP, mineral exploration and mining required a number of environmental permits and authorizations to conform to the statutes of LGEEPA. These start with a preliminary environmental impact statement for all major activities or projects. Besides an operating license, the necessary permits for any mine or plant include explosives, hazardous materials handling, land use, water discharge, and well usage. Other regulations are concerned with noise, gas and dust emissions, dumps and tailings, storage of oil and fuel, and electrical transformers.

Water-discharge regulations are specified in the Federal Law Concerning Water Rights (LFDMA) of January 1992 and the National Water Law of December 1992. According to the LFDMA, water pumped from mining works is not subject to discharge fees as long as it is not used in the "exploitation and/or metallurgical treatment of ore" or for other industrial or domestic use. Discharge fees, however, are required for water that contains more than 2,500 milligrams per liter of total dissolved solids, unless the discharged water can meet the minimum quality standards set by the Consejo Nacional de Agua (CONAGUA). Although water discharged to runoffs or water basins is also exempted from payments of a discharge fee if it meets CONAGUA water-quality standards, all other types of water discharge require payment of a fee according to schedules set by the LFDMA.

In 1998, SEMARNAP published the Norma Oficial Mexicana NOM-120-ECOL.1997 in the Diario Oficial de la Federación. The law established environmental protection for direct mining activities in a dry and temperate climate with coniferous forests, deciduous tropical forests, holm oaks, and xerophilous underbrush. In January 1999, a clarification of the law was published by SEMARNAP.

Production

An important mineral producer, Mexico ranked among the top world producers in a variety of nonfuel minerals. On the basis of U.S. Geological Survey production figures, it was the world's leading producer of bismuth (with more than 20% of the world's refinery output), celestite (with more than 30% of the world's total), and silver (with 14% of the world's total) and a significant supplier of mining and mineral products to the United States. In 2002, Mexico maintained its position as an important producer of many mineral commodities despite losing ranking status on several of them—fluorspar, 2nd (with about 14% of the world's total); cadmium, 4th; barite and lead (mine), 5th; gypsum and zinc (mine), 6th; molybdenum and salt, 7th; graphite, 8th; sulfur 9th; manganese ore (metal content), 10th; copper (mine), 12th; cement, 13th; crude steel, 16th; and gold, 19th.

In 2002, the total value of Mexico's mineral production (excluding petroleum and natural gas) decreased slightly from $4.8 billion in 2001 to $4.6 billion in 2002; metals contributed $2 billion, or 43% of the total. Production of sand and gravel (combined) was the highest in terms of value of all mineral commodities (excluding petroleum and natural gas) at $967 million; this was an 8% increase compared with that of 2001. Copper ranked second after sand and gravel and contributed $524 million; this was a 20% decrease compared with that of 2001 and represented about 27% of the metal value and 11% of the total. Silver followed with about 22% of the metal value and 19% of the total. The value of coal production was $210 million, or 4.5% of mineral production (excluding petroleum and natural gas) and about 8% of industrial mineral value (Consejo de Recursos Minerales, 2003, p. 23, 25). The value of production of cement and steel was unavailable.

Geographically, northern Mexico dominated the production of minerals. A few States produced a large portion of Mexico's minerals. The State of Sonora was the leading producer of copper with more than 80% of the total output. The State of Sonora was the largest producer of gold followed by the State of Durango. The State of Zacatecas was the principal producer of silver and zinc. The State of Chihuahua was the leading producer of lead (Consejo de Recursos Minerales, 2003, p. 409, 411, 413, 415, 417).

Petroleum continued to dominate Mexico's mineral sector. Petróleos Mexicanos, S.A. de C.V. (PEMEX), which was Mexico's national petroleum company, had revenues of $51.3 billion and provided almost 63%, or $32 billion, in direct and indirect taxes (Petróleos Mexicanos, S.A. de C.V., 2003a, p. 19). Mexico was the world's fourth leading producer (BP p.l.c., 2003§). In the Western Hemisphere, only the United States produced more crude petroleum during 2002.

Trade

In 2002, Mexico's total exports were valued at $160.8 billion. The value of mineral exports (excluding petroleum and natural gas) accounted for $2.7 billion, or less than 2% of the total. The value of metal exports totaled $2.2 billion, or 82% of total mineral exports (excluding petroleum and natural gas). Total imports were valued at $168.7 billion. Mineral imports (excluding petroleum and natural gas) accounted for $2.5 billion, or 1.5% of total imports (Consejo de Recursos Minerales, 2003, p. 26, 27).

During the year, about 85% of Mexico's mineral exports went to the United States, and 46% of its mineral imports originated in the United States (Consejo de Recursos Minerales, 2003, p. 128, 136). The value of exports to the United States increased, and the value of imports from the United States decreased.

Silver was the largest source of foreign exchange with $600 million, or 22% of total mineral exports, followed by iron, $568 million; gold, $348 million; and copper, $305 million. Metal imports were led by iron with 18% of the value of the total followed by gold and silver with 13% and 11%, respectively. Industrial mineral imports were led by coal and coke with a combined 39% of the value of total mineral imports (Consejo de Recursos Minerales, 2003, p. 123, 125, 131-132).

Mexico exported 607 million barrels of crude petroleum with a value of $14.4 billion, which was a 14% increase in value but a 3% increase in volume compared with that of 2001. Mexico was a net importer of natural gas and refinery products. Net exports totaled $11 billion. Of the total crude exports, 78% of the petroleum exported went to the United States followed by

Spain (9%) and the Netherlands Antilles (5%). About 2% of Mexico's exports went to countries ascribed to the San José Accord (Barbados, Belize, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, and Panama). The average export price for Mexican crude for 2002 was $21.58 compared with $18.57 (revised) in 2001 (Petróleos Mexicanos, S.A. de C.V., 2003a, p. 127, 131, 132; 2003b, p. 62).

Structure of the Mineral Industry

Government responsibilities for mining are held by the Secretaría de Economía. The Secretaría de Energía is responsible for petroleum and electricity. The Coordinación General de Minería is the Secretaría de Economía's highest office charged with mining policies with the purpose of fostering new investment and maintaining a healthy mining sector. It is supported by the Consejo de Recursos Minerales (CRM), the Dirección General de Minas, the Dirección General de Promoción Minera, and the Fideicomiso de Fomento Minero. The CRM is responsible for integrating the inventory of Mexico's national resources. The main functions of the Dirección General de Minas are to award mining concessions and to maintain the national mining and mapping registers. The Dirección General de Promoción Minera is responsible for promotion of the mining sector, which included incentives for the domestic and foreign investment in the sector. The Fideicomiso de Fomento Minero is responsible for financial, administrative, and technical assistance to the mining sector by the Government.

The Cámara Minera de México is another important organization in Mexico's mining sector. It promotes the interest of the private sector and maintains the dialogue between the private mining sector and the Government. Other prominent mineral-related organizations include the Asociación Nacional de Fabricantes de Cal (National Association of Lime Manufacturers), the Cámara Nacional de la Industria del Hierro y el Acero (National Chamber of Iron and Steel), Federación Nacional de Mineros Pequeños (National Federation of Small Miners), and the Instituto Mexicano del Aluminio A.C. (Mexican Aluminum Institute).

In 2002, employment in the mineral sector totaled 256,205; this was a 2.4% decrease compared with 262,574 in 2001 and a 12% decrease compared with that of 1998. Of the total, 33,656 were employed in the production of coal, graphite and nonmetals; 21,911, in the extraction and beneficiation of metals; 132,886, in the manufacturing of nonmetallic mineral products; and 65,161, in base-metal industries (Cámara Minera de México, 2003, p. 6). Nearly all miners were represented by the Sindicato Nacional de Trabajadores Mineros, Metalúrgicos y Similares de la República Mexicana. The Confederación de Trabajadores de México, which was the largest Mexican union, represented the cement employees. Until 2002, five large diversified companies—Corporación Industrial San Luis, S.A. de C.V., Empresas Frisco, S.A. de C.V., Grupo Acerero del Norte, S.A. de C.V. (GAN), Grupo México, S.A. de C.V., and Industrias Peñoles,,S.A. de C.V. (Peñoles)—dominated the production of nonfuel minerals (table 2). In 2002, Corporación Industrial San Luis sold its mining interest to Wheaton River Minerals Ltd. The large mining companies in Mexico operated about 40 mining units throughout the country. The medium-sized mining companies operated 20 mining units and produced 100% of the celestite, feldspar, fluorspar, gypsum, and silica sand and almost 90% of the graphite. The small-sized mining companies operated 170 mining units and produced almost 75% of the kaolin.

Mexico's cement industry was dominated by Cementos Mexicanos, S.A. de C.V. (CEMEX), which was the world's third largest producer of cement after the LaFarge Group of France and Holcin Ltd. of Switzerland. Cementos Apasco, S.A. de C.V. and Cooperativa La Cruz Azul, S.C.L. were also important producers of cement in Mexico.

The production of crude petroleum, natural gas, and basic petrochemicals, which were reserved for the Government under Article 27 of the Constitution, was entrusted to PEMEX. It operated through Pemex Exploración y Producción (Pemex Exploration and Production), Pemex Gas y Petroquímica Básica (Pemex Gas and Basic Petrochemicals), Pemex Internacional (Pemex International), Pemex Petroquímica (Pemex Petrochemicals), and Pemex Refinación (Pemex Refining). At yearend 2002, PEMEX's total employment was 141,628, which was about 2% higher than that of 2001 (Petróleos Mexicanos, S.A. de C.V. 2003a, p. 29).

Commodity Review

Metals

Copper.—In 2002, mine production of copper in Mexico decreased by 10% to 329,874 metric tons (t). Mexico's copper industry was affected by the metal's low price and strikes in its largest copper mines. Through its subsidiaries Industrial Minera México, S.A. de C.V. (IMMSA), Mexicana de Cananea, S.A. de C.V., and Mexicana de Cobre, S.A. de C.V., Grupo México was Mexico's largest copper producer with 83% of the production. The Cananea Mine in the State of Sonora became Mexico's largest producer. The mine was owned by Grupo México though its subsidiary Mexicana de Cananea. Production from Cananea was 86,700 t of copper in concentrate and 50,000 t of copper by solvent extraction/electrowinning (SX-EW). The second largest producer was Mexicana de Cobre's La Caridad mine (owned also by Grupo México) with about 91,900 t of copper in concentrate and 19,300 t of copper by SX-EW. IMMSA's underground mines produced 24,900 t. Cananea had Mexico's largest reserves of copper with 16.61 million metric tons (Mt) in copper recoverable by concentration and 5.10 Mt in copper recoverable by SX-EW (Grupo México, S.A. de C.V., 2003, p. 13).

Peñoles, which was one of Mexico's largest mining companies, was a small producer of copper in 2002 with less than 4% of the country's output. During the year, the company began construction of the Milpillas copper project in the State of Sonora. Peñoles completed the access ramp and pumping station. The company obtained the environmental impact permit and began the construction of a 600-meter shaft, and completed detailed engineering of the beneficiating plant. Plans called for a heap-leaching SX-EW operation that was scheduled to begin production of copper cathode by 2005 with a capacity of 55,600

metric tons per year (t/yr) of copper cathode and a life of 11.5 years. Total investment for Milpillas was estimated to be $192 million (Industrias Peñoles, S.A. de C.V., 2003, p. 16).

Gold and Silver.—Mexico's mine production of gold was 21,324 kilograms (kg), which was a 9% decrease compared with that of 2001. Peñoles was the largest producer of gold with an output of about 11,400 kg (reported as 365,900 troy ounces) (Industrias Peñoles, S.A. de C.V., 2003, p. 41). La Herradura, which was a mine operated by Minera Pendmont S. de RL. de C.V., was Mexico's largest gold mine; it produced 8,400 kg; Minera Pendmont was a joint-venture company between Peñoles (56%) and Newmont Mining Corporation (44%) in the State of Sonora. Production from the open pit La Herradura began in 1998, and in 2002, Peñoles' share of production contributed to 40% of the company's total output, or 4,600 kg (reported as 146,144 troy ounces). At La Herradura, a third leaching pad was completed in April, which increased gold production capacity by 16.5%. The investment for this expansion totaled $4.5 million. La Ciénega in the State of Durango was Peñoles' second largest gold-producing mine with 36.5% of the company's production. During the year, Peñoles began construction of a new shaft at the mine, which was scheduled to be completed in mid-2003 at an estimated cost of $4.6 million (Industrias Peñoles, S.A. de C.V., 2003, p. 15).

The precious-metal producer Minas Luismín, S.A. de C.V. (the mining subsidiary of San Luis) was purchased by Wheaton River Ltd. for $85 million (Wheaton River Minerals Ltd, 2002a). The company had three mining units—La Guitarra in the State of Queretaro, San Dimas in the State of Durango, and San Martín in the State of Mexico. The San Dimas unit comprised the San Antonio, the Santa Rita, and the Tayoltita Mines. As of December 2001, these mining units had proven and probable reserves of 12,600 kg (reported as 404,000 troy ounces) of gold and 945,000 kg (reported as 30,380,000 troy ounces) of silver (Wheatron River Minerals Ltd., 2002b).

In 2002, Minera Hecla, S.A. de C.V. (a subsidiary of Hecla Mining Company of the United States) began production from its San Sebastian silver and gold mine in the State of Durango in 2001 and produced more than 1,300 kg of gold, which was more than twice the production level achieved in 2001. The mine, which is a high-silver-grade producer with significant gold credits, produced more than 110,300 kg of silver, which was almost four times that of 2001. During the second year of production, underground ore production increased significantly and reached the level of 408,000 t by midyear. During the year, gold and silver precipitates from San Sebastian were refined by Peñoles in the State of Coahuila. In addition to precipitate, the company began producing doré in the fourth quarter. Hecla's capital investment for the San Sebastian Mine and its Velardena plant was $1.8 million, which included the construction of a new tailing pond, the expansion of the leach circuit, a carbon-in-column recovery circuit, and other improvements (Hecla Mining Co., 2003, p. 14-15).

Mexico was the world's largest silver producer. In 2002, mine production decreased slightly to 2,746 t. The largest producer was Peñoles,which produced more than 60% of Mexico's silver mine output in 2002. Peñoles owned the world richest mine, Fresnillo (Proaño) in the State of Zacatecas. During the year, the mine, with one of the lowest cash costs in the industry, produced almost 60% of Peñoles silver, with about 970,000 kg (reported as 31.2 million troy ounces). The mine has been in production since 1550 (Industrias Peñoles, S.A. de C.V., 2003, p. 1).

La Colorada Mine in the State of Zacatecas produced about 19,500 kg (reported as 626,035 troy ounces) of silver in 2002; this was a slight decrease compared with that of 2001. The mine also produced small amounts of lead and zinc. Initially, mill production was about 200 metric tons per day (t/d) from the mine's sulfide ore. In early 2002, however, the mine owner, Pan American Silver Corp., completed a supplementary feasibility study to produce 600 t/d from a zone of oxidized ore, which had been discovered in 1999. The study estimated the cost of the expansion to be $20 million. About one-half of the expansion was financed by the International Finance Corp., and the remainder was funded by the company. Construction of the oxide production circuit began in July. The company expected expanded production to begin in 2003. As of December 31, 2002, La Colorada's proven and probable reserves were estimated to be 2,293,500 t of oxide ore with 440 grams per ton (g/t) silver and 0.54 g/t gold and 346,880 t of sulfide ore with 558 g/t silver, 0.46 g/t gold, 2.01% zinc, and 1.02% lead (Pan American Silver Corp., 2003§).

Iron and Steel.—Mexico, which was the second largest producer of steel in Latin America in 2002, produced about 25% of the crude steel in the region. The iron and steel industry in Mexico benefited from a slight increase in world prices, a 6% increase in domestic demand for steel products, tariff rates established to prevent dumping by foreign producers, and efficiency improvements by the domestic producers (Cámara Minera de México, 2003 p. 81; Hylsamex, S.A. de C.V., 2003a§). Production of iron ore increased by 13% to 9.9 Mt, after a 22% decrease in 2001. Production of pig iron continued to decrease by 8% to 4 Mt, which was a level of production slightly lower than that of 1995, but that of direct-reduced iron increased by 24% to 4.6 Mt, which was slightly higher than that achieved in 1997. Hylsamex, which was one of the large integrated companies, increased production of iron ore and pellets. Its Las Encinas pelletizing plant and Náuhatl Mine resumed operation in January and March, respectively. The company's pellet production increased by 85% to 3 Mt (Hylsamex, S.A. de C.V., 2003c§).

In 2002, production of steel increased by 6% to about 14 Mt, about the same level produced in 1998. The largest integrated producers were AHMSA (a subsidiary of GAN), Hylsamex, Ispat Mexicana, S.A. de C.V. in Lázaro Cárdenas (a subsidiary of Ispat International N.V.), State of Michoacán, and Siderúrgica Lázaro Cárdenas-Las Truchas, S.A. de C.V. During 2002, Hylsamex sales totaled almost 2.8 Mt. More than 80% of the company's sales were for the domestic market (Hylsamex, S.A. de C.V., 2003c§). Hylsamex reached an agreement to refinance its debt during the year. This reduced the company's consolidated debt by 21%, increased the amortization period, and increased the company's capital by $263 million (Hylsamex, S.A. de C.V., 2003a§). The company's stock value decreased by 36% (Hylsamex, S.A. de C.V., 2003b§).

Another company that reached an agreement with its creditors and restructured its debt during the year was Ispat Mexicana. Mexico was a partner in the North American Free Trade Agreement (NAFTA). As a company that exports slab in a NAFTA country, the company beneficiated from the exemption of 30% tariffs that the United States imposed on imports exceeding 5.4 Mt for the year. Ispat Mexicana exported 67% of the slab produced during the year to Canada and the United States. The company's production and slab price increased by 18% each (Ispat International N.V., 2003, p. 12-13).

Lead and Zinc.—Mexican mine production of lead increased by 17% from the 118,247 t (revised) produced in 2001. The largest producer continued to be Peñoles with about 63% of the total. Naica, which was located in the State of Chihuahua, was Peñoles' largest producing lead mine with an output of about 48,000 t. IMMSA produced 29,200 t, or 21% of the lead mined in Mexico in 2002 from four of its mines. Santa Bárbara in the State of Chihuahua was IMMSA's largest producing mine with 18,700 t (Grupo México, S.A. de C.V., 2003, p. 24). Mexico's refinery production of primary lead was about 238,200 t, which was a 6% decrease from the 253,500 t (revised) produced in 2001.

Mine production of zinc increased by 4% to 446,100 t compared with that of 2001. Peñoles was Mexico's leading producer of zinc with 266,000 t, or 60% of the country's total. Peñoles' zinc mine production increased by 22% in 2002. Its new mine Francisco I. Madero in the State of Zacatecas, which was inaugurated in September 2001, produced 31% , or about 83,000 t of the company's mined zinc in 2002. In December, Francisco I. Madero reached full production capacity to become Mexico's leading zinc mine (Industrias Peñoles, S.A. de C.V., 2003, p. 15). Production from the mine was being refined at Peñoles' subsidiary Met-Mex Peñoles, S.A. de C.V. in Torreon in the State of Coahuila, which had a capacity of 220,000 t/yr of zinc The second leading producing zinc mine was Charcas of Unidad Minera Charcas (a subsidiary of Grupo México) in the State of San Luis Potosí with a production of 68,000 t (Grupo México, S.A. de C.V., 2003, p. 16).

Mexico's production of refined zinc decreased slightly to 302,122 t in 2002. Peñoles produced 69% of Mexico's refined zinc. The Met-Mex electrolytic plant reached a production capacity utilization of 95% (Industrias Peñoles, S.A. de C.V., 2003, p. 41).

Manganese and Ferroalloys.—In 2002, production of manganese (metal content of ore produced) decreased by 11% to about 88,400 t (table 1). Production was by Minera Autlán, S.A. de C.V. The company produced battery-grade manganese dioxide, ceramic-grade manganese dioxide, manganese carbonate, manganous oxide, and oxide nodules. The company had three ferroalloy plants in Mexico. It produced silicomanganese and medium- and low-carbon ferromanganese in the Tamos plant in the State of Veracruz. The Teziutlan plant in the State of Puebla produced silicomanganese. The Gomez Palacio plant in the State of Durango, which produced ferromanganese and silicomanganese, was inactive during the year (Cámara Minera de México, 2003, p. 85). Output of ferromanganese decreased by 35% to 39, 000 t, and production of silicomanganese decreased by 1% to 73,000 t (table 1).

Industrial Minerals

Fluorspar.—Mexico was the world's second leading producer of fluorspar after China; it produced about 14% of the world's total. Mexico's production of fluorspar increased slightly to 622,477 t. The State of San Luis Potosí was the leading producer with 76% of the country's production (Consejo de Recursos Minerales, 2003, p. 317, 319). Cía. Minera Las Cuevas, S.A. de C.V., which had operations in the States of Coahuila and San Luis Potosí, was the leading producer with a capacity of 520,000 t/yr.

Gypsum.—Gypsum production increased by 8% to 6.7 Mt. Production was from 22 States. The leading producer was the State of Baja California Sur with 36% of the total production, which was exported mainly to Canada, Japan, and the United States. Caopas, S.A. de C.V. was the leading producer of gypsum in the State of Baja California Sur. Caopas began production in 1990 from its El Pilar quarry in Santa Rosalía. The company had a production capacity of 1.5 Mt/yr and had plans to double its production capacity by September 2003 with the installation of a new 8.85-kilometer conveyor belt from the mine to the secondary crushing plant (Caopas, S.A. de C.V., 2003§). The second leading producing State was Morelos with 16% of the total.

Mineral Fuels

Coal.—Production of coal decreased by 6% to 11.4 Mt after a decrease of 14.8% in 2001. The principal producer was Minera Carbonífera Río Escondido (MICARE) in Nava, State of Coahuila, from two open pits and three underground deposits. In 2002, MICARE produced 6.2 Mt of thermal coal, which was a 9% increase compared with that of 2001 (Cámara Minera de México, 2003 p. 90).

Petroleum and Natural Gas.—Production of crude petroleum and condensate increased by less than 1% compared with that of 2001. Mexico had 4,590 producing wells in 309 oilfields and 185 offshore platforms. More than 80% of crude production was from offshore wells, 59% of which was produced from Cantarell, which was the largest oilfield in Mexico; it was located in the Marina Norte region. This region, which also includes the Ku, the Maloob, and the Zaap fields, produced 68% of Mexico's crude petroleum. Heavy crude accounted for 68% of the production. Light and super-light crude were about 18% and 14% of the total, respectively. Of the total crude distributed, 54% was sent to export terminals, and 37% went to the domestic refineries. The petrochemical plants received 5%, and the maquiladora industry received 4% of the crude produced (Petróleos Mexicanos, S.A. de C.V., 2003a, p.18-20).

Production of natural gas decreased by 2% compared with that of 2001. With about 16% of the production, Cantarell was the largest producing field. Mexico's natural gas production has been decreasing since 1998 (Petróleos Mexicanos, S.A. de C.V., 2003a, p. 21).

On January 1, 2003, Mexico's total hydrocarbons reserves were 50.032 billion barrels (Gbbl) of crude oil equivalent. Of this total, 20.077 Gbbl of crude oil equivalent, or 40%, was in proven reserves. In recent years, reserves have been decreasing as exploration efforts have not replaced production (Petróleos Mexicanos, S.A. de C.V., 2003a, p. 15). As reserves have continued to decrease, PEMEX's programs have been focused on developing new reserves and increasing production of light crude petroleum and nonassociated natural gas.

Refinery Products.—PEMEX had six refineries in operation in 2002. Refinery production increased by less than 1% to 1.276 million barrels per day. The country, which operated at about 85% of capacity, was a net importer of refinery products. The Government investment in the sector, however, increased significantly with $1.48 billion dedicated to the company's refining network. The goal was to reduce the country's import reliance of refinery products by modernizing and expanding individual refinery capacities and to make improvements to increase their productivity. During 2002, 63% of PEMEX investment in the refining network was for the reconfiguration of the Madero and the Tula refineries and for changes to the reconfiguration of the Cadereyta refinery, which resulted in an increased production of gasoline of 11,000 barrels per day from the latter. Work on Cayereyta in the State of Nuevo León included a new coke plant, which increased the refinery's ability to process Mexico's heavy crude (Petróleos Mexicanos, S.A. de C.V., 2003b, p. 21-25).

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TABLE 1
MEXICO: PRODUCTION OF MINERAL COMMODITIES [1]

(Metric tons unless otherwise specified)

Commodity[2]		1998	1999	2000	2001	2002
METALS						
Aluminum, metal:						
Primary		61,848	62,736	61,200	51,500	39,000
Secondary		217,857	362,866	350,000 e	350,000 e	350,000 e
Total		279,705	425,602	411,200	401,500	389,000
Antimony:						
Mine output, Sb content		338	126	39	--	--
Metal[3]		1,301	273	52	81	155
Arsenic[4]		2,573	2,419	2,522	2,381	1,946
Bismuth:						
Mine output, Bi content[5]		1,204	548	1,112	1,390	1,126
Metal, refined		1,030	412	1,083	1,390	1,126
Cadmium:						
Mine output, Cd content		1,739	1,311	967	1,245	1,609
Metal, refined		1,218	1,275	1,268	1,421	1,382
Copper:						
Mine output, Cu content:						
By concentration or cementation		335,822	330,232	308,966	306,779	260,574
Leaching, electrowon		48,819	50,952	55,600	60,500	69,300
Total		384,641	381,184	364,566	367,279	329,874
Metal:						
Anode and blister		378,302	352,700	323,000	344,500	271,000
Refined:						
Primary		432,000	411,952	396,000	409,000	388,300
Secondary[e]		15,000	14,000	15,000	15,000	35,000
Total		447,000	425,952	411,000	424,000	423,300
Gold:						
Mine output, Au content	kilograms	25,426	23,755	26,375	23,543	21,324
Metal, refined	do.	25,298	22,050	24,074	25,749	23,594
Iron and steel:						
Iron ore, mine output:						
Gross weight	thousand tons	10,557	11,475	11,325	8,783	9,941
Fe content	do.	6,334	6,885	6,795	5,270	5,965
Metal:						
Pig iron	do.	4,532	4,808	4,856	4,363	3,996
Direct-reduced iron	do.	5,584	6,070	5,589	3,674	4,574
Total	do.	10,116	10,878	10,445	8,037	8,570
Ferroalloys, electric arc furnace:[7]						
Ferromanganese	do.	87	80	91	60	39
Silicomanganese	do.	105	114	108	74	73
Total	do.	192	194	199	134	112
Crude steel	do.	14,182	15,243	15,586	13,292	14,051
Rolled products[8]	do.	10,789	11,319	11,747	11,105	11,200
Lead:						
Mine output, Pb content		166,060	125,656	137,975	136,413	138,707
Metal:						
Smelter:						
Primary[9]		163,645	111,136	143,223	143,523	128,241
Secondary, refined[e]		60,000 r	110,000 r	110,000 r	110,000 r	110,000
Total[e]		224,000	221,000	253,000	254,000	238,000
Refined:						
Primary[10]		163,206	108,978	142,856	143,345	128,201
Secondary, refined[e]		60,000 r	110,000 r	110,000 r	110,000 r	110,000
Total[e]		223,000	219,000	253,000	253,000	238,000

See footnotes at end of table.

TABLE 1--Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES [1]

(Metric tons unless otherwise specified)

Commodity[2]		1998	1999	2000	2001	2002
METALS--Continued						
Manganese ore:[11]						
Gross weight		510,000	459,000	435,000	277,000	245,000
Mn content		187,103	169,107	156,117	99,751	88,358
Mercury, mine output, Hg content[e]		15	15	15	15	15
Molybdenum, mine output, Mo content		5,949	7,961	6,886	5,518	3,428
Silver:						
Mine output, Ag content	kilograms	2,686,021	2,466,981	2,620,495	2,759,985	2,746,989
Metallurgical products, Ag content:						
In copper bars	do.	395,251	357,017	276,438	283,539	208,360
Mixed gold and silver bars	do.	237,868	259,715	249,136	195,086	183,383
Metal, refined, primary	do.	2,100,493	1,596,876	2,037,131	2,330,811	2,500,000
Tin:						
Mine output, Sn content		5	4	4	8	9
Metal, smelter, primary		1,078	1,258	1,200	1,107	1,756
Tungsten, mine output, W content		130	11	--	--	--
Zinc:						
Mine output, Zn content		395,391	362,811	392,791	428,828	446,104
Metal, refined, primary		230,325	218,913	235,073	303,810	302,122
INDUSTRIAL MINERALS						
Abrasives, natural[12]		9,274	6,208	7,000 [e]	690 [r]	949
Barite		161,555	157,953	127,420	142,017 [r]	163,620
Cement, hydraulic	thousand tons	27,744	29,413	31,677	29,966	31,069
Clays:						
Bentonite		185,729	208,611	269,730	415,133	432,941
Common		5,601,071	6,964,647	9,689,936	13,257,459 [r]	13,258,195
Fuller's earth		48,016	47,522	51,685	148,194	142,706
Kaolin		339,013	489,993	532,268	681,709 [r]	745,498
Diatomite		66,812	65,146	96,448	69,474	62,322
Feldspar		197,866	262,241	334,439	329,591	332,101
Fluorspar:						
Acid-grade	thousand tons	331	323	335	343	343
Metallurgical-grade	do.	267	234	300	276	279
Total	do.	598	557	635	619	622
Graphite, natural:						
Amorphous		42,893	27,781	30,330	21,442	14,065
Crystalline		568	--	--	--	--
Total		43,461	27,781	30,330	21,442	14,065
Gypsum and anhydrite, crude (yeso)		7,045,197	6,953,756	5,654,060	6,237,056	6,739,834
Lime, hydrated and quicklime[e]	thousand tons	6,500	6,500	6,500	6,500	6,500
Magnesium compounds:						
Magnesite		274	308	335	250 [r]	--
Magnesia[13]		78,022 [r]	70,631 [r]	76,470 [r]	37,565 [r]	40,194
Mica, all grades		890	971	1,658	648	456
Nitrogen, N content of ammonia		1,449,300	1,002,700	700,600	547,500	537,000
Perlite		54,840	61,596	68,702	80,297	85,703
Phosphate rock[14]		756,349	950,649	1,052,464	787,283	4,764
Salt, all types	thousand tons	8,412	8,236	8,884	8,501	7,802
Sodium compounds[e]						
Carbonate, soda ash, synthetic		290,000	290,000	290,000	290,000	290,000
Sulfate, natural, bloedite[15]		597,100	591,300	560,400	547,000	591,500
Stone, sand and gravel:						
Calcite, common		592,412	682,249	820,149	2,711,889	2,914,127
Dolomite		785,516	415,284	403,664	670,797	457,665
Limestone	thousand tons	44,372	45,449	58,267	63,346	59,421

See footnotes at end of table.

TABLE 1--Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES [1]

(Metric tons unless otherwise specified)

Commodity[2]		1998	1999	2000	2001	2002
INDUSTRIAL MINERALS--Continued						
Stone, sand and gravel--Continued:						
Marble		663,945	744,377	1,034,529	4,155,745	3,615,728
Quartz, quartzite, glass sand (silica)		1,733,439	1,700,527	1,802,545	1,720,211	1,778,715
Sand	thousand cubic meters	54,703	58,912	67,491	67,712	63,576
Gravel	do.	43,947	45,050	50,176	57,157	68,239
Strontium minerals, celesite		118,230	164,682	157,420	145,789	94,015
Sulfur, elemental, byproduct:						
Of metallurgy[e]	thousand tons	474	474	474	572	575
Of petroleum and natural gas	do.	913	856	851	878	887
Total[e]	do.	1,390	1,330	1,330	1,450	1,460
Talc		18,843	18,981	20,569	77,650	82,077
Vermiculite		--	--	--	--	300
Wollastonite		41,264	44,126	30,836	39,830	42,756
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Run of mine:	thousand tons					
Metallurgical	do.	4,823	4,748	6,372	5,242	5,097
Steam	do.	7,566	8,555	7,915	6,935	6,308
Total	do.	12,389	13,303	14,287	12,177	11,405
Washed metallurgical coal		1,826	1,944	2,259	2,000 [e]	2,000 [e]
Coke:[16]						
Metallurgical	do.	2,166	2,187	2,185	2,025	1,412
Breeze	do.	37	41	50	40	39
Total	do.	2,203	2,228	2,235	2,065	1,451
Gas, natural:						
Gross	million cubic meters	49,506	49,506	48,349	46,624	45,716
Marketed	do.	29,105	27,999	28,847	28,984	30,139
Petroleum:						
Crude	thousand 42-gallon barrels	1,120,550	1,060,690	1,099,380	1,141,355	1,159,642
Condensate, natural gas liquids	do.	156,585	159,505	159,870	158,045	148,920
Total	do.	1,277,135	1,220,195	1,259,250	1,299,400	1,308,562
Refinery products:						
Liquefied petroleum gas	do.	10,512	11,315	9,089	10,147	11,425
Motor gasoline	do.	150,344	148,117	143,445	142,423	145,343
Jet fuel	do.	20,842	21,097	20,185	20,696	20,696
Kerosene	do.	694	292	110	110	--
Distillate fuel oil, diesel	do.	105,850	99,244	96,871	102,784	97,419
Lubricants	do.	1,971	3,030	2,190	1,898	1,789
Residual fuel oil	do.	162,717	156,184	154,249	159,104	164,104
Asphalt	do.	10,841	11,060	11,352	10,476	10,512
Other, refinery fuel and losses	do.	21,241	18,394	17,263	14,854	14,416
Total	do.	485,012	468,733	454,754	462,492	465,704

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. -- Zero.

[1]Table includes data available through February 2004.

[2]In addition to the commodities listed, additional types of crude construction materials are produced, but output is not reported; available information is inadequate to make estimates of output levels.

[3]Sb content of antimonial lead and impure bars plus refined metals.

[4]Arsenic content of white and black (impure) arsenic trioxide.

[5]Refined metal plus bismuth content of impure smelter products.

[6]Reported figure.

[7]Reported by Cámara Nacional del Hierro y del Acero.

[8]Includes flat, nonflat, and seamless pipe steel products.

[9]Lead content of impure bar, antimonial lead, plus refined metal.

[10]Includes lead content of antimonial lead.

TABLE 1--Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES [1]

[11]Mostly oxide nodules; includes smaller quantities of direct-shipping carbonates and oxide ores for metallurgical and battery applications.
[12]Based on exports that comprise mostly pumice stone and emery (a granular, impure variety of corundum).
[13]Reported by Industrias Peñoles, S.A. de C.V. as the only major producer. Includes caustic, electromelt, hydroxide, and refractory.
[14]Includes only output used to manufacture fertilizers.
[15]Series reflects output reported by Industrias Peñoles S.A., de C.V. plus an additional 40,000 metric tons estimated output by other producers.
[16]Includes coke made from imported metallurgical coal.

TABLE 2
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Aluminum		Aluminio y Derivados de Veracruz, S.A. de C.V. (private Mexican, 100%)	Smelter in Veracruz, Ver.	65.
Antimony		Cía. Minera y Refinadora Mexicana, S.A. (private Mexican, 51%; Cookson Ltd., 49%)	San Jose Mine, Catorce, S.L.P.	365.
Barite		Barita de Sonora, S.A. [Grupo Acerero del Norte, S.A. de C.V. (GAN), 100%]	Mazatan, Son.	219.
Bismuth		Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Torreon, Coah.	1.2.
Do.		Minerales y Arcillas, S.A. de C.V. (private Mexican, 100%)	San Francisco del Huerto Mine in San Pedro, Coah., La Escondida and Angelita Mines and plant in Galeana	55.
Do.		Barita de Santa Rosa, S.A. de C.V. (private Mexican, 100%)	Muzquiz, Coah.	256.
Cement		Cementos Mexicanos, S.A. de C.V. (CEMEX) (private Mexican, 100%)	Ensenada, B.C.N.; Torreon, Coah.; Barrientos, D.F.; Arotonilco and Huichapan, Hgo.; Guadalajara and Zapotilic, Jal.; Hidalgo and Monterrey, N.L.; Tepeaca, Pue.; Tamuin and Valles, S.L.P; Hermosillo and Yaqui, Son.; and Merida,Yuc.	26,650.
Do.		Cementos Apasco, S.A. de C.V. (Holcim Group, 49%)	Apasco, Mex.; Ramos Arizpe, Coah.; Macuspana, Tab.; Tecoman, Col.; Orizaba, Ver.; Acapulco, Gro.	8,900.
Do.		Cooperativa La Cruz Azul, S.C.L. (private Mexican, 100%)	Cruz Azul, Hgo., Lagunas, Oax.	5,000.
Do.		Cementos de Chihuahua, S.A. de C.V. (CEMEX, 36%; private Mexican, 64%)	Chihuahua, Cuidad Juarez, and Samalayuca, Chih.	2,000.
Coal		Minerales de Monclova, S.A. [Altos Hornos de Mexico, S.A. de C.V. (AHMSA), 100%]	Mimosa and Palau Mines and Muzquiz washing plant at Palau, Coah., and coking plant at Monclova, Coah.	3,000.
Do.		Carbonífera de San Patricio, S.A. de C.V. (private Mexican, 100%)	Progreso, Coah.	1,314.
Do.		Industrial Minera México, S.A. de C.V. [(IMMSA) (Grupo México, S.A. de C.V., 90%)]	Nueva Rosita, Coah.	1,500.
Do.		Minera Carbonífera Río Escondido, S.A. (GAN, 51%; Mission Energy, 49%)	Mina I, Mina II, and Tajo I at Nava and Piedras Negras, Coah.	4,000.
Copper		Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A. de C.V., 90%)	La Caridad Mine, smelter, refinery, and rod plant at Nacozari de Garcia, Son.	350 smelter, 50 SX-EW;[2] 300 refinery; 150 rod plant.
Do.		Mexicana de Cananea, S.A. de C.V. (Grupo México, S.A. de C.V., 90%)	Mine and smelter at Cananea, Son.	29,200 mill; 33 SX-EW.[2]
Ferroalloys		Cía. Minera Autlán, S.A. de C.V. (Grupo Ferrominero, S.A. de C.V., 54%; Minas de Basis, S.A. de C.V., 32%; BHP Ltd., 14%)	Plant in Tamos, Ver.	140.
Do.		do.	Plant in Teziutlan, Pue.	38.
Do.		do.	Plant in Gomez Palacio, Dgo.	35.
Fluorspar		Cía. Minera Las Cuevas, S.A. de C.V. (Grupo Industrial Camesa, S.A. de C.V.)[3]	Salitera (Zaragoza), S.L.P.	520.
Do.		Fluorita de México, S.A. de C.V. (Corp. Alfil, 51%; Applied Industrial Minerals Corp., 49%)	Mines at La Encantada district and plant at Muzquiz, Coah.	150.
Gold	kilograms	Cía. Fresnillo, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Fresnillo/Proano Mine, Zac.	1,000.
Do.	do.	Minera Piedmont S. de R.L. de C.V. (Industrias Peñoles, S.A. de C.V., 56%; Newmont Mining Corporation, 44%)	La Herrdura Mine, Son.	6,300.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A. de C.V.)	La Cienega Mine, Dgo.	3,700.

See footnotes at end of table.

TABLE 2--Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Gold--Continued:	do.	Minas Luismín, S.A. de C.V. (Wheaton River Minerals Ltd.., 100%)	Tayoltita and Santa Rita, Dgo.; San Antonio, Sin; San Martin, Qro.; La Guitarra, Mex.	2,700.
Do.	do.	Cía. Minera de Santa Gertrudis (Grupo Ariztegui, 51%; Phelps Dodge Corp., 49%)	Santa Gertrudis Mine, Son.	1,600.
Do.	do.	Exploraciones El Dorado, S.A. de C.V., 70%; Minerales Sotula, 30%	La Colorada Mine, Son.	800.
Do.	do.	Walhalla Mining Co. NL (private foreign, 100%)	Amelia Mine, Son.	1,300.
Do.	do.	Cía. Minera las Torres, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Guanajuato, Gto.	438.
Do.	do.	Cía. Minera El Cubo, S.A. de C.V. (private Mexican, 100%)	do.	128.
Do.	do.	Sociedad Cooperativa Minero Metalúrgica Santa Fe de Guanajuato (private Mexican, 100%)	Guanajuato, Gto.	438.
Do.	do.	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Torreon, Coah.	22,700 refinery.
Graphite		Grafitos Mexicanos, S.A. (Cummings Moore Graphite Co. of the United States, 25%; private Mexican, 75%)	Lourdes and San Francisco Mines, Son.	60.
Do.		Grafito Superior, S.A. de C.V. (Superior Graphite Co., 100%)	Covalmar, Santa Clara, and Rio Mayo Mines, and plant in Son.	25.
Gypsum		Cía. Occidental Mexicana, S.A. (private Mexican, 51%; Domtar, Ltd. of Canada, 49%)	Santa Rosalia on San Marcos Island, B.C.S.	2,500.
Iron ore		Consorcio Minero Benito Juárez Peña Colorada, S.A. de C.V. (Ispat International N.V., 49%; Hylsamex, S.A. de C.V., 51%)	Peña Colorada mine and pellet plant near Manzanillo, Col.	3,500.
Do.		AHMSA (GAN, 74%)	La Perla Mine, Chih.; Hercules Mine, Coah.; and Cerro de Mercado Mine, Dgo.	5,000.
Do.		Siderúrgica Lázaro Cárdenas-Las Truchas, S.A. de C.V. (SICARTSA) (Grupo Villacero, 100%)	Ferrotepec, Volcan, and Mango deposits in Las Truchas project area and pellet plant, Mich.	2,350.
Do.		Hylsamex, S.A. de C.V. (Grupo Industrial ALFA, 100%)	San Ramon and Aquila Mines	1,500.
Lead and zinc		IMMSA (Grupo México, S.A. de C.V., 90%)	Charcas, S.L.P.; San Martín, Zac.; Santa Eulalia, Chih.; Taxco, Gro.; Rosario, Sin.; Santa Barbara, Chih.; Velardena, Dgo; lead refinery at Monterry, N.L.; zinc refinery at S.L.P.	70 lead; 110 refined zinc.
Do.		Industrias Peñoles, S.A. de C.V. (private Mexican, 97%; private U.S., 3%)	Mines at La Encantada, Coah.; Fresnillo, Zac.; Naica, Chih.; Bismark, Son; Rey de Plata, Gro. (Penoles, 51%; Dowa Mining Co., 39%); metallurgical complex at Torreon, Coah., with silver, lead, and zinc smelter and refineries operated by Met-MexPenoles (Penoles, 100%)	180 refined lead; 220 refined zinc.
Do.		do.	Francisco I. Madero Mine, Zac.	100,000 zinc.
Do.		Minera San Francisco del Oro, S.A. de C.V. (Empresas Frisco, S.A. de C.V., 100%)	San Francisco del Oro, near Hidalgo del Parral, Chih.	15 lead; 21 zinc.
Do.		Minera Real de Angeles, S.A. de C.V. (Empresas Frisco, S.A. de C.V., 100%)	Noria de Angeles, Zac.	45 lead; 47 zinc.
Manganese		Cía. Minera Autlán, S.A. de C.V. (Grupo Ferrominero, S.A. de C.V., 81.75%; private Mexican, 18.25%)	Molango, Naopa, and Nonoalco Mines, Hgo.	600 ore and concentrate.
Molybdenum		Mexicana de Cobre, S.A. (Grupo México, S.A. de C.V., more than 90%)	La Caridad Mine and molybdenum plant, Son.	6.
Petroleum[4]	thousand barrels per day	Petróleos Mexicanos, S.A. de C.V. (PEMEX) (Government, 100%)	Comalcalco, Poza Rica, Ver., and Gulf of Campeche, Cam., Districts	3,500.
Salt		Exportadora de Sal, S.A. (Fideicomiso de Fomento 51%; Mitsubishi Corp., 49%)	Solar salt complex at Guerrero Negro, B.C.S.	6,000.

See footnotes at end of table.

TABLE 2--Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Silver	kilograms	Industrias Peñoles, S.A. de C.V. (private Mexican, 97%; private U.S., 3%)[5]	Naica, Chih.; Fresnillo, Zac.; Las Torres, Gto., La Cienega, Dgo.; Tizapa, Gro.; La Encantada, Coah.; and other locations	750,000.
Do.	do.	Cía. Fresnillo, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Fresnillo/Proano Mine, Zac.	950,000.
Do.		IMMSA (Grupo México, S.A. de C.V., 90%)	San Martín Mine, Sombrerete, Zac.; Taxco, Gro.; Charcas, S.L.P.; Santa Eulalia, Chih.; refiney at Monterrey, N.L.	467.
Do.		Minera Real de Angeles, S.A. de C.V. (Empresas Frisco, S.A. de C.V., 100%)	Open pit mine and concentrator at Noria de Angeles, Zac.	924.
Do.		Minera Hecla, S.A. de C.V. (Hecla Mining Co.)	San Sebastian Mine and Verladena plant, Dgo.	29,500 mine.
Do.	metric tons	do.	do.	450,000 mill.
Do.	kilograms	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A. de C.V.,100%)	Torreon, Coah.	1,240,000 refinery.
Do.	do.	Pan American Silver Corp.	La Colorada Mine, Zac.	24,300
Sodium sulfate		Química del Rey, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Plant at Laguna del Rey, Coah.	620.
Steel		AHMSA (GAN, 74%)	Steelworks at Monclova, Coah.	3,700 steel; 3,550 pellet.
Do.		Hylsamex, S.A. de C.V. (Grupo Industrial ALFA, 100%)	Steel works and direct-reduction units at Monterrey, N.L., and Puebla, Pue.; pelletizing plant in Col.	3,100 steel; 1,500 pellet.
Do.		DEACERO, S.A. de C.V. (private Mexican, 100%)	Steelworks at Saltillo, Coah., and Celaya, Gto.	1,450.
Do.		ISPAT Mexicana, S.A. de C.V. (Ispat International N.V., 100%)	SICARTSA II plant facilities at Lazaro Cárdenas, Mich.	5,300 steel; 4,000 pellet.
Do.		SICARTSA (Grupo Villacero, 100%)	Port Lazaro Cardenas, Mich.	2350 steel; 1,850 pellet.
Do.		Tubos de Acero de México, S.A. (private Mexican, 100%)	Veracruz, Ver.	1,000.
Strontium (celestite)		Cía. Minera La Valenciana (private Mexican, 100%)	San Agustin Mine, Torreon, Coah.	50.
Sulfur		PEMEX	Nationwide petroleum operations	890.
Tin[5]		Fundidora Marni, S.A.	San Luis Potosi, S.L.P.	NA.
Do.		PIZUTO, S.A.	do.	NA.

NA Not available.

[1]State abbreviations: Baja California Norte (B.C.N.), Baja California Sur (B.C.S.), Campeche (Cam.), Chiapas (Chia.), Chihuahua (Chih.), Coahuila (Coah.), Colima (Col.), Distrito Federal (D.F.), Durango (Dgo.), Guanajuato (Gto.), Guerrero (Gro.), Hidalgo (Hgo.), Jalisco (Jal.), Mexico (Mex.), Michoacan (Mich.), Nuevo León (N.L.) Oaxaca (Oax.), Puebla (Pue.), Queretaro (Qro.), San Luis Potosí (S.L.P.), Sinaloa (Sin.), Sonora (Son.), Tabasco (Tab.), Veracruz (Ver.), Yucatan (Yuc.), and Zacatecas (Zac.).

[2]Solvent extraction-electrowinning.

[3]Grupo Industrial Camesa, S.A. de C.V. was owned by Banco Internacional (34%), Banco del Atlántico (34%), Banamex (17%), Noranda Inc. of Canada (4%), Free Float (12%).

[4]PEMEX operates six refineries with an installed capacity of 1.68 million barrels per day.

[5]Smelter output from mostly imported concentrates.