



# 2007 Minerals Yearbook

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## MEXICO

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# THE MINERAL INDUSTRY OF MEXICO

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The mineral industry of Mexico was among the most profitable economic sectors of the country. Mineral production has had a long tradition in the Mexican economy since colonial times when Mexico was a major mineral supplier in the world market, principally of silver. In terms of its market potential, the size of its labor force, and its ongoing economic development, Mexico's place in the economy of Latin America was among the most important of all the Latin American countries. In 2007, Mexico was the 11th most populated country in the world with a population of 108,700,891. Its three largest cities in terms of population are México Distrito Federal (D.F.), Guadalajara, and Monterrey. Mexico D.F. had a population of 19,028,000 and was the third most populous city in the world (UN Statistics Division, 2007; U.S. Census Bureau, 2008). The value of mining production in Mexico increased by more than 2.5% in 2007 compared with production in 2006 and represented a major source of revenue for the Government. Mining employment increased by 5% with the addition of 13,995 new jobs, and mining, particularly of metallic minerals, continued to have the highest level of growth among the economic activities that contributed foreign reserves to the national accounts (Secretaría de Economía, 2007, 2008; Quiroz Reyna, 2008).

Mexico was one of the world's leading mineral producers of several mineral commodities. In 2007, the country was the world's second ranked producer of bismuth, fluor spar, and silver and the third ranked producer of celestite, fuller's earth, and strontium. Mexico also was the fourth ranked producer of wollastonite; the fifth ranked producer of barite and lead; the sixth ranked producer of bentonite, cadmium, molybdenum, and perlite; the seventh ranked producer of arsenic, diatomite, graphite, gypsum, lime, salt, and zinc ore; the eighth ranked producer of feldspar, kaolin, and manganese; the tenth ranked producer of cement and sulfur, the eleventh ranked producer of industrial sand and gravel; and the twelfth ranked producer of copper ore (Bolen 2008; Brooks, 2008a, b; Carlin, 2008; Corathers, 2008; Dolley, 2008; Kostick, 2008; Magyar, 2008; Miller, 2008; Ober, 2008; Olson, 2008; Secretaría de Economía, 2008; Smith, 2008; Tolcin, 2008a, b; van Oss, 2008; Virta, 2008).

During 2007, Mexico experienced the largest increase in gold production in the world because of production from new projects. The volume of gold production increased by 9.6%, which represented a value increase of 26%, or \$876 million. Because the price of silver on the world market increased by an annual average of 15.9% per kilogram, the net value of silver production increased by 11%, or \$986 million. Production of silver, however, decreased by 4.3% because of strikes in the Cananea Mine in the State of Sonora, the San Martín Mine in the State of Zacatecas, and the Taxco Mine in the State of Guerrero, which were operated by Grupo Mexico S.A.B de C.V. and (Camara Minera de Mexico 2007, p. 12).

The mining industry in Mexico is sensitive to the political and economic developments in the country. This was especially true in 2007, a year in which political developments strongly

affected the country's domestic and foreign policies, particularly its economic policies. In 2006, after a very close and heavily disputed presidential campaign, the candidate of the Partido Acción Nacional (PAN), who was also the energy minister from the previous administration, was elected President. The candidate from the Partido de la Revolución Democrática (PRD) contested the election, and a period of legislative activity ensued that made difficult the day-to-day operation of the Cámara de Diputados, which is the main legislative body (Mundo, El, 2006a).

These events constituted a major problem for the new administration, which had wanted to push forward its announced economic and energy reforms. The new government did not have a majority in the assembly, however, and was presented with the prospect of relying on political alliances with the Partido Revolucionario Institucional (PRI), which had ruled Mexico for more than 70 years but was voted out of office in 2000 (Mundo, El, 2006b).

The oil and energy agenda of the new President included several policies that traditionally had met political resistance, such as a reform of the energy law, proposed deregulation of portions of the national oil monopoly Petroleos Mexicanos (PEMEX), and plans to make oil and natural gas exploration, exploitation, and development accessible to private investment. These proposals were met with strong opposition and, by the end of 2007, the proposals had not been acted upon and were not envisioned to be negotiated until sometime in 2008 (Mundo, El, 2008).

PEMEX was not only of symbolic value to the Mexican Government but of great practical importance as well because it remained the single largest state-owned entity; it provided the Mexican Government with one-fourth of its budget and, as such, any discussions of privatization of PEMEX or any of its component parts has historically been met with political opposition (Secretaría de Economía, 2008).

To increase Mexico's attractiveness to investment in general, the new administration hoped to boost Mexico's growth by ensuring fiscal sustainability and prudent fiscal management. In 2007, innovation in the domestic industry became one of the stated objectives of the new government because it was seen as a way to promote better economic conditions; increase competition; and increase the quality, quantity, and availability of services to the domestic consumer. Given its large population and vast market, Mexico was attractive to foreign and national investors. The new government expressed its commitment to continue investing and further developing the road infrastructure through public-private partnerships and concessions for toll roads. Development of the infrastructure was expected to increase the attractiveness of investing in the mining sector, particularly in areas that are difficult to reach (Organization for Economic Co-operation and Development, 2007, p. 1-7).

In order of importance, oil revenues, tourism, remittances by Mexican immigrants back to their families, and the mineral industry were the main sources of foreign currency reserves for

the country. However, the hardening of immigration policies and the economic slowdown in the United States decreased these remittances by more than 4% in 2007 to a total of \$24 billion. The economic slowdown in the United States also affected the tourism industry, which gave the mineral industry a relative increase in importance to the Mexican economy. The mineral industry grew more than any of these other sectors and the value of mineral production increased dramatically in recent years, in part because of the increase in the prices of copper and silver on the international markets (Camara Minera de Mexico, 2007; Secretaria de Economía, 2008).

Because of the size and age structure of its population (the median age was 24), Mexico had an ample and growing labor pool. Mexico's population was projected to increase by 1.1% for the period 2005-10; 77% of this population was urban, and the urban population was projected to increase by 1.5% in the same period (Instituto Nacional de Estadística, Geografía e Informática, 2008a). The reported unemployment rate, which had been stable for 2 years, increased in 2007 to 3.71%, which was 0.11% higher than the previous year although a large sector of the population worked in the informal economy (Instituto Nacional de Estadística, Geografía e Informática, 2008a; Secretaria de Economía, 2008).

Mexico's economy is the second largest in Latin America, after Brazil. The nominal GDP of Mexico in 2007 was \$1.89 trillion when calculated using official exchange rates, or \$1.353 trillion based on purchasing power parity (Instituto Nacional de Estadística, Geografía e Informática, 2008a; U.S. Central Intelligence Agency, 2008). Mexico's GDP grew by 3.3% in 2007, and the country had an inflation rate of 4% (Economist, The, 2008).

Mexico is a vast country, with an area that covers 1,972,550 square kilometers (761,601 square miles), which is roughly three times the size of Texas. The climate and landscape is extremely varied and includes three distinct regions: a semi-arid and prairie-filled north, which is climatically very similar to the southwestern part of the United States; a western and west-central part of the country, which is dominated by mountain ranges with peaks above 10,000 feet; and rainforest and jungle regions in the eastern and the southern parts of the country. The principal mineral-rich areas for producing copper, gold, silver, and zinc, as well as other minerals, are located in the northern and the west-central parts of the country. The main oil-producing areas are located in the eastern and southern parts of the country (Secretaria de Economía, 2008; U.S. Central Intelligence Agency, 2008).

### **Minerals in the National Economy**

During 2007, Mexico's mineral industry was characterized by significant growth in employment, investment, and production. The economic situation of Mexico benefited from the general increase in the price of mineral commodities. The net value of production increased even though the production of some mineral commodities decreased.

The mineral sector contributed significantly to reducing the country's trade deficit. Compared with 2006, the value of nonferrous metals increased by 62% and the value of precious

metal production increased by 61%. The value of steel-related minerals (coal, coke, iron, and manganese) increased by 16%. The increase in the value of industrial minerals was more modest but still significant at 12.6% (Secretaría de Economía, 2007, p. 65).

Of the minerals produced in Mexico, copper had the highest value, representing 37% of the total. This was despite a significant decrease in production at Mexico's two top-producing mines, the Cananea and La Caridad Mines, which were owned by Grupo México. Silver had the second highest value with 24% of the total mining production value; and zinc, gold, and molybdenum followed with 15%, 12%, and 5.6% of the total, respectively (Secretaría de Economía, 2007, p. 65).

In terms of value, the State of Sonora produced almost 24% of Mexico's total nonfuel mineral production. The States of Zacatecas and Chihuahua followed with 17.4% and 13%, respectively. The States of Coahuila, Durango, and San Luis Potosi also contributed significantly to the value of nonfuel mineral production (Secretaría de Economía, 2007, p. 22).

In 2007, Mexico's total exports were valued at \$271.8 billion. Exports of crude oil and mineral fuel products were valued at \$42.8 billion, and the total value of nonfuel mineral trade was \$17.1 billion. Nonfuel mineral exports increased to \$9.5 billion in 2007 compared with \$8.1 billion in 2006, which was an increase of 17.8%. Of this amount, \$8.6 billion was from metals and \$869 million was from industrial minerals. Iron ore accounted for almost 29% of the total value of exports followed by silver (20.4%), copper (14.3%), and zinc (6.5%) (Secretaría de Economía, 2007, p. 31-32; Instituto Nacional de Estadística, Geografía e Informática, 2008b).

Total imports in 2007 were valued at \$260.6 billion, of which nonfuel minerals accounted for \$7.6 billion. Aluminum, iron ore, and copper, in order of value, were the leading nonfuel mineral imports (Secretaria de Economía, 2007, p. 218; Instituto Nacional de Estadística, Geografía e Informática, 2008b).

According to the Camara Minera de Mexico (Camimex) one of the big challenges for the mineral industry was finding qualified personnel for the development of mineral projects. Because the growth of the mineral industry seemed likely to continue, the mineral industry in Mexico had introduced a series of incentive packages to develop professionals in the field within the country. One of these programs was the creation of scholarships and training programs in Mexican technical schools and universities (Camara Minera de Mexico, 2007).

### **Government Policies and Programs**

Natural resources and, in particular, minerals are considered part of the national patrimony of Mexico under its Constitution. Article 27 deals with issues of ownership and exploitation of natural resources. However, the Mining Law, which became effective in 1992 and was subsequently modified and expanded in 1996 and again in April 2005, clarifies and spells out the legal framework for exploration, production, and exploitation of the mineral resources of the Nation. The Mining Law allows a 100% private equity ownership stake in the exploration, development, and production of mining resources, including resources previously reserved for direct Government

exploitation, such as coal, iron phosphorus, potassium, and sulfur. Oil and its derivatives, as well as radioactive materials, are not covered by this law. In the mineral fuels sector, 2007 marked the beginning of talks on energy reform and the possible opening of the oil, natural gas, and derivatives sector to private investment, although no results were expected until sometime in 2008. Production concessions are granted for 6 years and are not renewable. Production concessions are awarded for 50 years and are renewable for a similar period.

Revisions to the Mining Law have decreased the administrative procedures and established time limits for most of these procedures. The public service manual of mining-related issues, which was first published in July 1999, spells out the established regulations and administrative procedures for all mining matters.

The mining sector is administered by the Secretaria de Economia, and the Direccion General de Minas is the organization in charge of making revisions to the Mining Law and its regulations, as well as granting concessions and titles.

Another important law concerning all Mexican resources is the Law of Foreign Investment, which regulates the degree and form of foreign investment in Mexico and, in particular, in the natural resources sector, which is an area that was previously barred to foreign investment and ownership. This law was published in 1993 and has been revised and amended by decrees in 1995, 1996, 1998, 1999, and most recently, in 2000. In particular, Articles 10 through 14 deal with foreign investment in the mining sector and the exploitation and development of geographic areas considered restricted by the Government.

As the nonfuel mining sector continued to grow and increased its participation in the national economy, suggestions were raised by Camimex on how to develop the sector further. Chief among the reforms considered most necessary was the strengthening of the legal enforcement of labor contracts and the mediation of labor disputes. In 2007, protracted strikes and serious contract disputes led to labor interruptions and halts in production, which had serious economic impact on the affected mines and the mine workers alike. Another legal issue that Camimex identified as chief among the necessary reforms was the need to clarify the land-owning and rights-granting law in the areas under Ejido administration. Ejido properties are communal lands in rural areas that are administered locally by appointed officials and are intended to benefit the inhabitants of the region. Although land reforms have tackled the issue in the past, more transparency and ease in the transmission of rights of exploitation is considered necessary to avoid costly and protracted legal challenges by the different entities claiming ownership of the land and the mineral deposits found on these areas. Another issue of chief concern was the climate of rising insecurity that had been developing in the country. Attacks on PEMEX gas pipelines were affecting the steel industry, which consumed 30% of the country's natural gas production. The rise in instances of theft at copper and gold sites increased the need for companies to double their investment in private security, and the mining industry declared that one of its principal needs was more public investment in security projects at the Federal, State and local levels (Camara Minera de Mexico, 2007).

The General Law of Ecological Balance and Environmental Protection (LGEEPA), which is the keystone of environmental

legislation, was passed in 1988. Those environmental responsibilities that had resided in various Government agencies were transferred to the Secretaria de Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP) in 1994. In 2000, the agency became the Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT). Under SEMARNAT, mineral exploration and mining require a number of environmental permits and authorizations to conform to the statutes of the LGEEPA. These requirements include a preliminary environmental impact statement for all major activities of the projects. SEMARNAT also requires all mines and plants to have an operating license, as well as permits for 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.

The regulation of environmental impact statements was initiated in 2000. Under the new rules, environmental impact reports for beneficiation plants, gas and oil pipelines, and mines must be approved by SEMARNAT. According to this agency, the level of sites considered contaminated with dangerous byproducts, including from mining and manufacturing, remained stable since 2006 at 330 registered sites; this, however, was an increase from the 297 registered sites in the 2000-04 period. The index of physical volume of production of dangerous residuals produced by the mining sector showed there was a steady increase between 2000 and 2007 of more than 8% in terms of the value of production. Although, in general terms, still lower than that produced by the manufacturing sector, the rate of growth of dangerous residuals produced by the manufacturing sector is about 5% of the value of production (Secretaria de Medio Ambiente y Recursos Naturales, 2008).

## Production

Labor disputes at the Cananea Mine in the State of Sonora, which was operated by Grupo Mexico and considered to be one of the leading copper mines in the world, contributed to the decrease in the production of copper and silver, and the strikes at the mining units in Taxco and Zacatecas contributed to the decrease in the production of silver. The mine production of copper reported by Camimex decreased by 1.3%, or by 323,000 metric tons (t) compared with that of 2006; however, the level of production was later revised upwards by the Instituto Nacional de Estadística (Inegi) to 335,000 t. In either case, the production was lower than the record high in 2005 of more than 429,000 t. The decrease was, in part, owing to the strike at the copper mines in Cananea, which, according to Grupo Mexico, was responsible for a decrease in production of more than 91,000 t. Zinc mine production also decreased by about 20,000 t because of the strikes (Camara Minera de Mexico, 2007; Grupo Mexico S.A.B de C.V., 2007).

Base metals, especially copper and zinc, became the most important segment in the mining sector in 2007 because of their effect on the total value of production. The price of copper reached its highest level in nominal terms and the second highest in real terms since 1908 with an average price in 2007 of \$7.25 per kilogram, which was an increase of 8.2% compared with the previous year's price. Mexico became the 12th ranked

world producer of mined copper with production of more than 335,000 t and a total production value of \$2.27 billion. Mined zinc production decreased in 2007 by 3.6% with respect to the previous year and it had a value of \$1.34 billion. Refined zinc production in 2007 increased by 15% following a decrease of about 15% in 2006. Lead metal production in Mexico decreased to 200,000 t, or by 13% compared with output in 2006; however, the increase in the price of lead produced a net increase in terms of production value of 67% compared with the previous year's total of \$253 million. The production of molybdenum increased dramatically by 158% in 2007 in response to its high price on the international market. Mexicana de Cobre's La Caridad Mine was the main producer of molybdenum and accounted for 98% of Mexico's total production. The production of cadmium increased by 15% whereas arsenic production decreased by 68% and antimony production decreased by 46% compared with production in 2006. The steel industry in Mexico grew by 6.8% in 2007 and produced more than 17.6 million metric tons (Mt). Considerable investment was made in already existing mines and a number of new projects began production in 2007. The projected increase in production from new operations in 2007 was expected to be 3,800 t of lead, 3,600 t of zinc, 484 t of silver, and 18 t of gold (Camara Minera de Mexico, 2008a).

The value of nonmetallic mineral production reached a record high of \$583 million and included production of fluorite, gypsum, salt, silica, sodium sulfate, and others. The mining unit Las Cuevas in the State of San Luis Potosi was the richest fluorite mine in the world with production of 840,000 t in 2007.

Other minerals with notable increases in production were cadmium, coal, ferroalloys, gold, iron ore, and manganese.

### Structure of the Mineral Industry

A few large domestic companies produced a significant portion of Mexico's metallic mineral output whereas medium- and small-size companies produced many of the industrial minerals. State-owned PEMEX controlled the petroleum sector.

The Secretaría de Economía (2007, p. 36-37, 40, 531-533) reported that a total of 204 mining companies with direct foreign investment had 410 ongoing exploration projects in Mexico in 2007. The State of Sonora attracted 50 of the projects; Chihuahua, 41; and Coahuila 11. Subsidiaries of more than 150 Canadian mining companies were active in Mexico, and subsidiaries of companies based in the United States accounted for 31 of the international mining companies. Of the 390 projects in 2006, 327 were still in the exploration phase during that year. Gold and silver were the primary targets for 312 of those 390 projects. Investment during 2007 totaled \$2.7 billion, of which more than \$936 million was invested in new mining operations (Cámara Minera de Mexico, 2008b). Of the amount of investment reported to Camimex, 40% was for new projects, 25% was for equipment, 15% was for exploration, and 14% was for capacity expansion. Employment in the mineral sector increased by 5% and totaled more than 292,000. The most dynamic sector of the industry in terms of employment was the metallic minerals sector. More than 56% of the value of mining production came from three northern States in Mexico—Chihuahua, Coahuila, and Sonora. Sonora was the most

important producing State, accounting for 30.7% of all mineral production, by value, in the country—principally copper, gold, and silver (Camara Minera de Mexico, 2008a).

### Mineral Trade

In 2007, Mexico was a net exporter of nonfuel minerals in terms of value, registering a trade surplus of \$1.9 billion, mostly owing to its exports of precious minerals. However, Mexico's exports of precious minerals were lower than in 2006 by 4.6%.

The total value of Mexico's mineral production, excluding mineral fuels, was \$9.59 billion, of which 90.9% was metallic minerals and 9.1% was nonmetal minerals. Industrial metals accounted for 67.5% of all nonfuel mineral exports.

Nonfuel mineral imports were valued at \$7.62 billion. Of this amount, industrial minerals had a value of \$5.56 billion and accounted for 73% of all nonfuel mineral imports. Overall, this was a decrease of 1.7% in the amount of industrial mineral imports from the previous year and a 2.4% reduction in the amount of total nonfuel mineral imports in 2007 compared with imports of the previous year.

Mexico's principal export partners were the United States and Canada [which were fellow signatories of the North American Free Trade Agreement (NAFTA)] followed by, in order of the value of trade, Spain, Japan, Germany, Colombia, and China. Mexico's principal import partners were the United States and China, followed by, in order of the value of imported goods, Japan, South Korea, Germany, Canada, and Brazil (UN Comtrade, 2008).

Mexico's exports of crude oil decreased by 5.9% owing, in part, to lower production. Exports of natural gas, however, increased dramatically by 323% (Petroleos Mexicanos, 2008).

The role of China in the mineral production of Mexico increased significantly in 2007 both as a consumer of minerals produced in Mexico and the world in general, but also as a direct participant. A Chinese investment strategy in Mexican mining operations became clear in 2007 when the Jinchuan Group Ltd. offered \$214 million to the junior company Tyler Resources Inc. for exploration near the Bahuerachi project in the State of Chihuahua, which is a project that produced copper, gold, molybdenum, silver, and zinc.

### Commodity Review

#### Metals

**Copper.**—Copper production decreased by 1.3% compared with that of 2006, and the production, in terms of value, amounted to \$2.27 billion, which represented the largest share in the value of nonfuel mineral production in Mexico in 2007. According to Grupo Mexico, the strike at the Cananea Mine reduced copper production for the year by 91,000 t. New operations also began producing copper in 2007. The Canadian company Frontera Copper Corp. in Alamos, State of Sonora, produced 24,380 t of copper. This production was inferior to that expected because Mexicana de Cobre was unable to supply sulfuric acid because of the lack of production of concentrates in Cananea. Of the currently producing projects,

the Milpillas Mine, which was operated by Industrias Peñoles S.A. de C.V., produced 6,400 t of copper in 2007.

Several copper projects were under development. Grupo Mexico's Arco project, which is located in Ensenada in the State of Baja California, was expected to produce 190,000 t of copper and 3.75 t of gold annually beginning in 2012. According to the company, the capital investment in this project would be \$1.79 billion.

Baja Mining was negotiating an investment of \$568 million in the El Boleo project in the State of Baja California Sur. The feasibility study indicated a projected annual production of 55,750 t of copper, 6,300 t of zinc, and 1,535 t of cobalt during a project lifespan of 25 years. Production was expected to begin in 2009.

**Gold.**—Production of gold in Mexico increased significantly in 2007. A large portion of the increase was owing to production increases from the mines owned by Goldcorp Inc. The company's El Sauzal Mine produced more than 9,500 kilograms (kg), which was an increase of 2.4% compared with 2006 production, and this represented 20% of the country's national production in 2007. Another reason for the increase in the country's gold production was the commissioning of the Ocampo gold and silver mine, which was owned by Gammon Lake de México S.A. de C.V., in the State of Chihuahua. The Ocampo Mine produced its first doré in February 2006; commercial production began on January 1, 2007. Gold production from the mine totaled about 4.8 t in 2007. Ore from El Cubo Mine of Cia. Minera El Cubo, S.A. de C.V., which was a sister company of Gammon Lake, also was processed at the Ocampo facility (Gammon Lake Resources Inc., 2007).

Gold output was expected to continue to increase in the near future as a number of projects neared completion. One of these new projects, the Peñasquito, which is located in the State of Zacatecas, was expected to begin commercial production in 2008. Glamis Gold Ltd., which initiated the development of the Peñasquito project, was acquired by Goldcorp in 2006. Peñasquito had proven and probable reserves of 17.9 million kg of silver, 310,000 kg of gold, and considerable values of lead and zinc. Production was expected to average about 710,000 kilograms per year (kg/yr) of silver, about 137,800 t/yr of zinc, 71,100 kg/yr of lead, and 12,100 kg/yr of gold. Goldcorp subsidiary Luismin also owned Los Filos gold deposit in the State of Guerrero. Los Filos began production in 2007 and was expected to achieve an output level of more than 9,300 kg/yr of gold when in full production (Glamis Gold Ltd. 2006; Goldcorp Inc., 2006; 2007, p. 4, 17). La Herradura Mine, which is located in Caborca, State of Sonora, and is operated by Minera Penmont (where Industrias Peñoles has a main stake), produced 6.1 t of gold in 2007. La Cienega Mine, which was operated by Industrias Peñoles, produced 4.47 t of gold and 31.8 t of silver during 2007.

The new gold operations that began in 2007 included the Cerro San Pedro project in the State of San Luis Potosí, which was owned by Minera San Xavier S.A. (a subsidiary of the Canadian company Metallica Resources Inc.). It produced 830 kg of gold and 12.68 t of silver.

Minera Santa Rita, which was a subsidiary of Capital Gold Corp., began operations at its El Chanate project with an investment of \$20 million and an estimated production of 1.5 t/yr of gold. Industrias Peñoles invested \$30.5 million in

El Saucito and the Velardeña Mines in the States of Zacatecas and Durango, respectively, and extended its operations in La Cienega Mine in the State of Durango and La Herradura Mine in the State of Sonora.

**Lead.**—The value of total lead production in Mexico increased in 2007 by 67%, although actual production decreased by 17%. This was because the price of lead increased to \$2.57 per kilogram from \$1.28 per kilogram in 2006, which was an increase of nearly 100%.

The Naica Mine, which was owned by Industrias Peñoles, continued to be the leading producer of lead in Mexico with an output of 28,000 t in 2007. Production of lead, silver, and zinc from this mine decreased at the beginning of the year because of a flood in the mine.

**Molybdenum.**—Molybdenum production in the country increased by 157%. This increase in production was motivated by the rise in the price molybdenum to \$66.71 per kilogram from \$5.20 per kilogram in the period between 2001 and 2007. The highest price was in 2005 when the price was \$69.89 per kilogram. La Caridad Mine, which was owned by Mexicana de Cobre, S.A., produced 98% of the molybdenum in the country.

**Silver.**—The Proaño Mine, which was owned by Industrias Peñoles, is located in Fresnillo in the State of Zacatecas. This mine remained the leading silver mine in the world, producing 1,043 t in 2007 and accounting for 45% of total national production. The Alamo Dorado Mine, which was owned by the Canadian company Pan American Silver Corp., began operating in the second trimester of 2007 and reached an annual production of 118 t of silver and 416 kg of gold by the end of the year. La Colorada Mine, which was owned by the same corporation and also located in Zacatecas, increased its production by 14% in 2007, reaching an output of 180 t for the year. Grupo de Minería Mexico closed its silver operation in Taxco because of a depletion of reserves; labor unrest prevented exploration to extend the life of the mine (Jornada, La, 2007).

**Zinc.**—Production of zinc in Mexico decreased in 2007 by 3.6% compared with production levels in 2006 owing principally to strikes in the San Martín and the Taxco Mines of Grupo Mexico. Lower production achieved at the Francisco I. Madero, the Naica, and the Sabinas Mines was also partly responsible for the decrease in production.

The Charcas Mine, which is located in the State of San Luis Potosí and was owned by Minera Mexico, continued to be the leading producer of zinc in the country. The mine produced 63,974 t of zinc in 2007. Industrias Peñoles owned the Bismark Mine in Chihuahua and the Francisco I. Madero Mine in Zacatecas; the mines produced 40,851 t and 61,082 t of zinc, respectively, in 2007.

### ***Industrial Minerals***

Mexico was an important world producer of industrial minerals. In 2007, despite a mixed behavior in terms of volume of production, the total value of industrial mineral production increased by 8.4% and accounted for 7.2% of the total value of mineral production in the country. Mexico ranked second in the world in the production of celestite and fluorite.

Production of diatomite increased by 32.5% in 2007; the operation in Zacoalco de Torres in the State of Jalisco was the principal producer. Other minerals that had significant production increases were kaolin (23.3%) and wollastonite (22.4%) owing to increases in production from the Pilares Mine in the State of Sonora. Pilares was the only mine in Mexico that produced these resources. The volume of production of celestite dropped by 25.4% because of weakening world demand, and that of graphite dropped by 16.6% because of lower production from extraction operations in Sonora.

Sulfur production decreased by 4% to 1.0 Mt compared with 1.74 Mt in 2006. This decrease was owing to the closing of PEMEX plants and climatic changes in the States of Chiapas and Tabasco, where much of the production originated (Camara Minera de Mexico, 2008a).

### **Mineral Fuels**

**Coal.**—Mexico produced 11.9 Mt of coal in 2007, which was an increase of 9% compared with production in 2006. The international price of coal increased by 73% in 2007, which increased the value of coal production in Mexico by 15% to \$459 million. Coke production (not including imported metallurgical coke) decreased by 2.1%, however.

The distribution of reserves among Mexico's main coal concession holders was as follows: Minera Carbonifera Rio Econdido S.A. de C.V. (Micare) (affiliated with Grupo Acerero del Norte S.A. de C.V.), 53%; Materiales Industrializados S.A. de C.V. (MINSIA), 38%; Grupo Mexico, 5%; and Carbonifera de San Patricio S.A. de C.V., 4%.

**Oil and Natural Gas.**—PEMEX's level of oil production had been decreasing in recent years, partly because of declining oil reserves. In 2007, production was 5.3% less than in the previous year, and 8.9% below the level in 2004. For the first time in 6 years, income from the oil industry decreased by 1.7% in real terms despite the increase in the price of oil.

Natural gas production increased by 13.1% compared with that of the previous year. The production of petrochemicals increased by 7.3% compared with that of the previous year.

### **Outlook**

The mineral sector in Mexico was the country's most dynamic industrial sector with a level of growth that was the highest in the country in 2007, overtaking, in order of economic importance, the oil industry, tourism, and remittances by nationals living abroad. For the fourth straight year, the mineral industry broke its production record in terms of value. The Mexican Government expects its main macroeconomic variables to remain stable, including inflation, which is expected to remain at 4% for the immediate future. The Government estimates that growth in the coming years will be closely tied to that of the United States, which is Mexico's principal trade partner. Keeping the exchange rate stable is a priority of the Government, and the promotion of investment in the mining sector is expected to continue, as evidenced by the Government's creation of the Subsecretaria de Minas, an agency

created exclusively to coordinate and promote the development of the mining industry in Mexico.

For the second year in a row, however, the mineral value of production was affected by strikes and by problems with local communities, which resulted in an estimated loss of \$2.4 billion, according to Camimex. The Government considers the resolution of labor and land exploitation issues and the clarification of legal rights for mining companies to be a priority to continue to attract foreign investment.

During the period 2007-12 investment in the mining sector is projected to total more than \$14.8 billion provided fuel prices remain competitive and infrastructure and labor issues are treated as a priority by the Government (Camara Minera de Mexico, 2007).

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TABLE 1  
MEXICO: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2003	2004	2005	2006	2007
<b>METALS</b>					
<b>Aluminum, metal:</b>					
Primary	--	--	--	--	--
Secondary	495,900	519,500	574,100	600,000 <sup>e</sup>	600,000 <sup>e</sup>
Total	495,900	519,500	574,100	600,000 <sup>e</sup>	600,000 <sup>e</sup>
Antimony <sup>3</sup>	434	503	565	778	414
Arsenic <sup>4</sup>	1,729	1,829	1,664	1,595	513
<b>Bismuth:</b>					
Mine output, Bi content <sup>5</sup>	1,064	1,014	970	1,186	1,170
Metal, refined	1,064	1,014	970	1,186	1,170
<b>Cadmium:</b>					
Mine output, Cd content	1,616	1,662	1,627	1,399	1,605
Metal, refined	1,590	1,594	1,627	1,396	1,605
<b>Copper:</b>					
Mine output, Cu content:					
By concentration or cementation	279,254	327,432	336,367	280,840 <sup>r</sup>	276,530
Leaching, electrowon	76,399	78,108	92,675	46,696 <sup>e</sup>	58,972 <sup>e</sup>
Total	355,653	405,540	429,042	327,536 <sup>r</sup>	335,502
Metal:					
Anode and blister, primary	220,100	271,000	301,200	260,200	222,600
Refined:					
Primary	314,399	368,308	410,375	373,400	345,904 <sup>e</sup>
Secondary <sup>c</sup>	6,000	6,000	6,000	6,000	6,000
Total	320,399	374,308	416,375	379,400 <sup>e</sup>	351,904 <sup>e</sup>
<b>Gold:</b>					
Mine output, Au content	20,406	21,824	30,356	38,961	47,710
Metal, refined	22,177	24,496	26,782	29,200 <sup>r</sup>	30,226
<b>Iron and steel:</b>					
Iron ore, mine output: <sup>6</sup>					
Gross weight	11,265	11,483	11,687	10,983	12,205
Fe content	6,759	6,890	7,012	6,590	7,323
Metal:					
Pig iron	4,183	4,278	4,047	3,790	4,078
Direct-reduced iron	5,473	6,345	5,973	6,167	6,265
Total	9,656	10,623	10,020	9,957	10,343
Ferroalloys, electric arc furnace: <sup>7</sup>					
Ferromanganese	56	72	90	62	70
Silicomanganese	81	103	105	97	109
Total	137	175	195	159	179
Crude steel	15,159	16,737	16,202	16,447 <sup>r</sup>	17,563
Rolled products <sup>8</sup>	12,214	13,126	13,702	14,473 <sup>r</sup>	14,727
<b>Lead:</b>					
Mine output, Pb content	139,348	118,484	134,388	135,025	137,133 <sup>e</sup>
Metal:					
Smelter:					
Primary <sup>9</sup>	137,483	107,414	116,539	117,315	89,838
Secondary <sup>e</sup>	110,000	110,000	110,000	110,000	110,000
Total <sup>e</sup>	247,000	217,000	227,000	227,000	200,000
Refined:					
Primary <sup>10</sup>	137,483	107,414	103,691	117,315	89,838
Secondary <sup>e</sup>	110,000	110,000	110,000	110,000	110,000
Total <sup>e</sup>	247,000	217,000	214,000	227,000	200,000

See footnotes at end of table.

TABLE 1—Continued  
MEXICO: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2003	2004	2005	2006	2007	
METALS—Continued						
Manganese ore: <sup>11</sup>						
Gross weight <sup>c</sup>	320,000	377,000	369,000	346,000	348,000	
Mn content	114,550	135,893	132,872	124,417	152,446	
Mercury, mine output, Hg content <sup>c</sup>	15	15	15	15	15	
Molybdenum, mine output, Mo content	3,524	3,731	4,245	2,519	6,491	
Silver:						
Mine output, Ag content	kilograms	2,568,877	2,569,478	2,894,161	3,028,395 <sup>r</sup>	3,135,430
Metallurgical products, Ag content:						
In copper bars	do.	236,468	235,970	251,838	272,432	238,755
Mixed gold and silver bars	do.	193,453	189,128	83,076	147,089	224,765
Metal, refined, primary	do.	2,310,283	1,860,996	2,014,304	1,749,144	1,665,618
Tin:						
Mine output, Sn content	2	NA	NA	NA	NA	
Metal, smelter, primary	1,790	25	17	25	19	
Zinc:						
Mine output, Zn content	413,991	426,360	455,625	468,924 <sup>r</sup>	452,012	
Metal, refined, primary	320,364	316,834	327,205	279,734	321,932	
INDUSTRIAL MINERALS						
Abrasives, natural <sup>12</sup>	NA	NA	NA	NA	NA	
Barite	287,451	306,668	268,657	199,605	185,921	
Cement, hydraulic <sup>13</sup>	thousand metric tons	33,593	34,992	37,452	40,362	40,670
Clays:						
Bentonite	464,056	564,017	425,630 <sup>r</sup>	435,273	613,895	
Common	13,242,893	15,127,163	41,190,217	38,527,423	37,970,190	
Fuller's earth	152,917	129,502	107,265	102,400	34,175	
Kaolin	798,407	654,711	877,147	961,800	970,598	
Diatomite	53,395	59,818	62,132	62,948	82,519	
Feldspar	346,315	364,166	373,411	459,209	438,696	
Fluorspar:						
Acid-grade	thousand metric tons	409	402	325	466	630
Metallurgical-grade	do.	347	441	551	470	303
Total	do.	756	843	876	936	933
Graphite, natural, amorphous	8,730	14,769	12,357	11,773	9,900	
Gypsum and anhydrite, crude (yeso)	6,986,491	9,221,458	6,251,969	6,075,893	6,918,973	
Lime, hydrated and quicklime <sup>c</sup>	thousand metric tons	6,500	6,500	6,500	6,500	6,500
Magnesium compounds:						
Magnesite	--	--	27,900	33,000	33,900	
Magnesia <sup>14</sup>	53,885	76,356	89,957	87,520	79,135	
Mica, all grades	506	424	120	150	9,600	
Nitrogen, N content of ammonia	438,948	559,782	422,508	486,624	624,720	
Perlite	194,463	188,027	91,724	81,719 <sup>r</sup>	54,405	
Phosphate rock <sup>15</sup>	5,500	350	350	7,500	14,100	
Salt, all types	thousand metric tons	7,547	8,566	9,508	8,378 <sup>r</sup>	8,856
Sodium compounds: <sup>c</sup>						
Carbonate, soda ash, synthetic	290,000	290,000	290,000	290,000	290,000	
Sulfate, natural, bloedite <sup>16</sup>	626,100	648,000	647,000	652,000 <sup>r</sup>	645,000	
Stone, sand and gravel:						
Calcite, common	3,425,623	18,545,973	3,712,097	1,934,483	2,483,605	
Dolomite	565,896	1,158,929	1,308,977	1,282,590	1,123,225	
Limestone	thousand metric tons	56,253	72,763	57,568	69,822	62,600
Marble	3,529,274	2,824,181	3,595,970	4,404,288 <sup>r</sup>	3,547,081	
Quartz, quartzite, glass sand (silica)	1,689,042	2,055,940	2,120,878	2,661,770	2,950,438	
Sand	thousand metric tons	62,060	63,059	62,199	62,248	68,141
Gravel	do.	76,332	74,224	65,927	68,017	78,233
Strontium minerals, celestite	130,329	87,610	110,833	128,321	96,902	

See footnotes at end of table.

TABLE 1—Continued  
MEXICO: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2003	2004	2005	2006	2007
<b>INDUSTRIAL MINERALS—Continued</b>					
<b>Sulfur, elemental, byproduct:</b>					
Of metallurgy <sup>c</sup>	thousand metric tons	575	575	575	575
Of petroleum and natural gas	do.	1,052	1,122	1,020 <sup>r</sup>	1,074
Total <sup>c</sup>	do.	1,630	1,700	1,600 <sup>r</sup>	1,650
Talc		114,870	101,896	64,827	40,535 <sup>r</sup>
Vermiculite		312	218	233 <sup>r</sup>	177
Wollastonite		31,234	28,224	27,132	44,280
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
<b>Coal:</b>					
<b>Run of mine:</b>					
Metallurgical	thousand metric tons	6,648	5,786	4,653	4,309
Steam	do.	6,530	5,687	7,097	6,573
Total	do.	13,178	11,473	11,750	10,882
Washed metallurgical coal <sup>c</sup>	do.	2,000	2,000	2,000	2,000
<b>Coke:<sup>17</sup></b>					
Metallurgical	do.	1,414	1,401	1,447	1,529
Breeze	do.	49	44	45	40
Total	do.	1,463	1,445	1,492	1,569
<b>Gas, natural:</b>					
Gross	million cubic meters	46,509	47,269	49,803	55,364
Marketable (dry)	do.	31,323	32,499	32,530	35,610
<b>Petroleum:</b>					
Crude	thousand 42-gallon barrels	1,230,415	1,234,795	1,216,545	1,188,440
Condensate, natural gas liquids	do.	152,570	161,330	155,490	155,855
Total	do.	1,382,985	1,396,125	1,372,035	1,344,295
<b>Refinery products:</b>					
Liquefied petroleum gas	do.	12,410	10,220	11,169	9,271
Motor gasoline	do.	162,425	170,346	166,112	166,513
Jet fuel	do.	21,900	22,667	23,105	23,652
Distillate fuel oil, diesel	do.	112,420	118,516	116,143	119,757
Lubricants	do.	1,825	1,971	1,898	1,862
Residual fuel oil	do.	144,905	134,320	128,042	118,698
Asphalt	do.	9,490	9,928	10,695	11,790
Other, refinery fuel and losses	do.	5,840	28,870	31,316	33,798
Total	do.	471,215	496,838	488,480	485,341

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto NA Not available. -- Zero.

<sup>1</sup>Table includes data available through September 30, 2007.

<sup>2</sup>In addition to the commodities listed, additional types of crude construction materials are produced, but output is not reported, and available information is inadequate to make reliable estimates of output.

<sup>3</sup>Sb content of antimonial lead.

<sup>4</sup>Arsenic content of white arsenic.

<sup>5</sup>Refined metal. Bismuth content of impure smelter products no longer reported.

<sup>6</sup>Iron ore pellets.

<sup>7</sup>Reported by Cámara Nacional del Hierro y del Acero.

<sup>8</sup>Includes flat, nonflat, and seamless pipe steel products.

<sup>9</sup>Lead content of impure bar, antimonial lead, and refined metal.

<sup>10</sup>Includes lead content of antimonial lead.

<sup>11</sup>Mostly oxide nodules; includes smaller quantities of direct-shipping carbonates and oxide ores for metallurgical and battery applications.

<sup>12</sup>The previous series, which was based on exports comprising mostly pumice stone and emery (a granular, impure variety of corundum), is believed to be incomplete. Available information is inadequate to make reliable estimates of output.

<sup>13</sup>Includes grey and white portland and masonry cement.

<sup>14</sup>Reported by Industrias Peñoles, S.A. de C.V. as the only major producer. Includes caustic, electromelt, hydroxide, and refractory.

<sup>15</sup>Includes only output used to manufacture fertilizers.

<sup>16</sup>Series reflects output reported by Industrias Peñoles, S.A. de C.V. plus an additional 40,000 metric tons of estimated output by other producers.

<sup>17</sup>Includes coke made from imported metallurgical coal.

TABLE 2  
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities <sup>1</sup>	Annual capacity
Aluminum, primary	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%, and 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.
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.
Bismuth	metric tons Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Torreón, Coah.	1,200.
Cement	CEMEX México (CEMEX, S.A.B. de C.V., 100%)	Ensenada, B.C.N.; Torreón, Coah.; Barrientos, D.F.; Arotonilco and Huichapan, Hgo.; Guadalajara and Zapotilco, 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%, and other, 51%)	Apasco, Mex.; Ramos Arizpe, Coah.; Macuspana, Tab.; Tecoman, Col.; Orizaba, Ver.; and 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 México, 36%, and private Mexican, 64%)	Chihuahua, Ciudad Juárez, and Samalayuca, Chih.	2,000.
Do.	Lafarge México (Lafarge Group, 100%)	Vito, Hgo.	600.
Do.	Corporación Moctezuma, S.A. (Cementos Molins, S.A., 50%, and Buzzi Unicem SpA, 50%)	Tepetzingo, Mor.	2,400.
Do.	Corporación Moctezuma, S.A. (Cementos Molins, S.A., 50%, and Buzzi Unicem SpA, 50%)	Cerritos, S.L.P.	2,400.
Coal	Minera Monclova, S.A. [Altos Hornos de México, 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.B. de C.V., 90%)	Nueva Rosita, Coah.	1,500.
Do.	Minera Carbonífera Río Escondido, S.A. [Grupo Acerero del Norte, S.A. de C.V. [Altos Hornos de México (AHMSA), 100%]	Mina I, Mina II, and Tajo I at Nava and Piedras Negras, Coah.	6,500.
Copper	Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	La Caridad Mine, smelter, refinery, SX-EW <sup>2</sup> plant, and rod plant at Nacoziari de Garcia, Son.	350 smelter, 50 SX-EW, <sup>2</sup> 300 refinery, 150 rod plant.
Do.	Mexicana de Cananea, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	Mine and SX-EW <sup>2</sup> plant at Cananea, Son.	29,200 mill, 33 SX-EW. <sup>2</sup>
Do.	Minera María S.A. de C.V. (Grupo Frisco, 100%)	Mine and SX-EW <sup>2</sup> plant at Cananea, Son.	20 SX-EW. <sup>2</sup>
Do.	Cobre de México, S.A. de C.V. (Grupo Conduxmex)	Primary refinery in Mexico City and secondary refinery in Villagran, Gto.	150.
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 Billiton Ltd., 14%)	Plant in Tamos, Ver.	140.
Do.	do.	Plant in Teziutlan, Pue.	38.
Do.	do.	Plant in Gomez Palacio, Dgo.	35.

See footnotes at end of table.

TABLE 2—Continued  
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities <sup>1</sup>	Annual capacity
Fluorspar		Cía. Minera Las Cuevas, S.A. de C.V. (Mexichem, S.A. de C.V.)	Salitera (Zaragoza), S.L.P.	520.
Do.		Fluorita de México, S.A. de C.V. (Corp. Alfil, 51%, and Applied Industrial Minerals Corp., 49%)	Mines at La Encantada district and plant at Muzquiz, Coah.	150.
Gold, mine	kilograms	Minera Fresnillo, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Proaño (Fresnillo) Mine, Zac.	1,200.
Do.	do.	Minas de las Altas Pimerias, S.A. de C.V. (Goldcorp Inc., 100%)	El Sauzal Mine, Chih.	10,000.
Do.	do.	Industrias Peñoles, S.A. de C.V., 56%, and Newmont Mining Corp., 44%	La Herradura Mine, Son.	6,900.
Do.	do.	Luismin, S.A. de C.V. (Goldcorp Inc., 100%)	San Dimas Gold, Dgo. (two mines)	6,500.
Do.	do.	Gammon Lake de Mexico, S.A. de C.V. (Gammon Lake Resources Inc., 100%)	Ocampo Mine, Chih.	5,000.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	La Cienega Mine, Dgo.	4,500.
Do.	do.	Cía. Minera de Santa Gertrudis (Grupo Ariztegui, 51%, and Phelps Dodge Corp., 49%)	Santa Gertrudis Mine, Son.	1,600.
Do.	do.	Cía. Minera El Cubo, S.A. de C.V. (Gammon Lake Resources Inc., 100%)	El Cubo Mine, Gto.	1,200.
Do.	do.	Exploraciones El Dorado, S.A. de C.V., 70%, and Minerales Sotula, 30%	La Colorada Mine, Son.	800.
Do.	do.	Alamos Gold Inc.	Mulatos Mine, Son.	4,700.
Do.	do.	Sociedad Cooperativa Minero Metalúrgica Santa Fe de Guanajuato (private Mexican, 100%)	Guanajuato, Gto.	438.
Gold, refined	do.	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Torreón, Coah.	22,700.
Graphite		Grafitos Mexicanos, S.A. (Cummings Moore Graphite Co., 25%, and 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%, and Domtar, Ltd., 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. (Hylsamex, S.A. de C.V., 51%, and Mittal Steel, 49%)	Peña Colorada mine and pellet plant near Manzanillo, Col.	3,500.
Do.		Altos Hornos de Mexico, S.A. de C.V. (AHMSA) [Grupo Acerero del Norte, S.A. de C.V. (GAN), 78.9%]	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. (Ternium S.A., 86.68%)	Cerro Nahuatl, Col. and Aquila Mine, Mich.	1,500.
Lead and zinc		Industrial Minera México, S.A. de C.V. [(IMMSA) (Grupo México, S.A.B. 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 Monterrey, N.L.; and zinc refinery at S.L.P.	70 lead, mine; 110 refined zinc.
Do.		Industrias Peñoles, S.A. de C.V. (private Mexican, 97%, and private United States, 3%)	Mines at La Encantada, Coah.; Fresnillo, Zac.; Naica, Chih.; Bismark, Son; Rey de Plata, Gro. (Industrias Peñoles S.A. de C.V., 51%, and Dow Mining Co., 39%); metallurgical complex at Torreón, Coah., with silver, lead, and zinc smelter and refineries operated by Met-Mex Peñoles (Industrias Peñoles S.A. de C.V., 100%)	180 refined lead, 240 refined zinc.

See footnotes at end of table.

TABLE 2—Continued  
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities <sup>1</sup>	Annual capacity
Lead and zinc—Continued		Industrias Peñoles, S.A. de C.V. (private Mexican, 97%, and private United States, 3%)	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.
Manganese		Cía. Minera Autlán, S.A. de C.V. (Grupo Ferrominero, S.A. de C.V., 81.75%, and private Mexican, 18.25%)	Molango, Naopa, and Nonoalco Mines, Hgo.	600 ore and concentrate.
Molybdenum		Mexicana de Cobre, S.A. (Grupo México, S.A.B. de C.V., more than 90%)	La Caridad Mine and molybdenum plant, Son.	6.
Petroleum <sup>3</sup>	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%, and Mitsubishi Corp., 49%)	Solar salt complex at Guerrero Negro, B.C.S.	6,000.
Silver	kilograms	Minera Fresnillo, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Proaño (Fresnillo) Mine, Zac.	1,100,000.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	La Cienega Mine, Dgo.	65,800.
Do.	do.	Minera Bismark, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Bismark Mine, Chih.	7,000.
Do.	do.	Co. Minera Sabinas, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Sabinas Mine, Zac.	157,000.
Do.	do.	Minera Tizapa, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 50%)	Tizapa Mine, Mex.	140,000.
Do.	do.	Minas Peñoles S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 50%)	Francisco I. Madero Mine, Zac.	63,000.
Do.	do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	San Martín Mine, Sombrerete, Zac.; Taxco, Gro.; Charcas, S.L.P.; Santa Eulalia, Chih.; and refinery at Monterrey, N.L.	335,000.
Do.	do.	Pan American Silver Corp.	La Colorada Mine, Zac.	100,000.
Do.	do.	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A. de C.V., 100%)	Torreón, Coah.	2,900,000 refinery.
Do.	do.	Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 100%)	La Caridad metallurgical complex, Son.	466,500.
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		Altos Hornos de Mexico, S.A. de C.V. (AHMSA) [Grupo Acerero del Norte, S.A. de C.V. (GAN), 78.9%]	Steelworks at Monclova, Coah.	3,316 steel, 3,800 pellet.
Do.		Hylsamex, S.A. de C.V. (Ternium S.A., 86.68%)	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.		Mittal Steel Lazaro Cardenas (Mittal Steel, 100%)	Facilities at Lazaro Cardenas, Mich.	5,300 steel, 4,000 pellet.
Do.		Siderúrgica Lázaro Cárdenas-Las Truchas, S.A. de C.V. (SICARTSA) (Grupo Villacero, 100%)	Port Lazaro Cardenas, Mich.	2,350 steel, 1,850 pellet.
Do.		Tubos de Acero de México, S.A. (private Mexican, 100%)	Veracruz, Ver.	1,000.

See footnotes at end of table.

TABLE 2—Continued  
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities <sup>1</sup>	Annual capacity
Strontium (celestite)	Cía. Minera La Valenciana (private Mexican, 100%)	San Agustin Mine, Torreon, Coah.	50.
Sulfur	Petróleos Mexicanos, S.A. de C.V. (PEMEX)	Nationwide petroleum operations	890.
Tin <sup>4</sup>	Fundidora Marni, S.A.	San Luis Potosi, S.L.P.	NA.
Do.	PIZUTO, S.A.	do.	NA.

Do., do. Ditto. NA Not available.

<sup>1</sup>State abbreviations used in this table include the following: Baja California Norte (B.C.N.), Baja California Sur (B.C.S.), Campeche (Cam.), Chihuahua (Chih.), Coahuila (Coah.), Colima (Col.), Distrito Federal (D.F.), Durango (Dgo.), Guanajuato (Gto.), Guerrero (Gro.), Hidalgo (Hgo.), Jalisco (Jal.), Mexico (Mex.), Michoacan (Mich.), Morelos (Mor.), Nuevo Leon (N.L.) Oaxaca (Oax.), Puebla (Pue.), San Luis Potosi (S.L.P.), Sinaloa (Sin.), Sonora (Son.), Tabasco (Tab.), Veracruz (Ver.), Yucatan (Yuc.), and Zacatecas (Zac.).

<sup>2</sup>Solvent extraction-electrowinning.

<sup>3</sup>Petróleos Mexicanos, S.A. de C.V. operated six refineries with an installed capacity of 1.68 million barrels per day.

<sup>4</sup>Smelter output from mostly imported concentrates.