



2012 Minerals Yearbook

MEXICO

THE MINERAL INDUSTRY OF MEXICO

By Alberto Alexander Perez

In 2012, Mexico's real gross domestic product (GDP) was \$1.61 trillion, which was about a 3.6% increase from that of 2011. Mexico's official unemployment rate was 5% (U.S. Central Intelligence Agency, 2014).

The world prices of several nonprecious metal commodities decreased in 2012, in part because of slowed economic growth in the world. Mexico, as a significant producer of several of these commodities, was negatively affected by the decreased prices. The price of silver, which was one of Mexico's most economically significant mineral commodities, decreased compared with that of 2011, but the rate of decrease was lower than for the other metal commodities that Mexico produced. The price of silver, according to The Silver Institute, averaged \$31.15 per troy ounce in 2012 (Cámara Minera de México, 2012, p. 7; Silver Institute, The, 2014).

In 2012, the mineral and metal processing industry in Mexico accounted for 10% of industry's share of Mexico's GDP and 3% of the total GDP; the value of the mineral industry increased by 14% from that of 2011, reaching its highest level ever at \$23.012 billion. Employment in the mineral industry increased by 18,833 people to about 328,000 (Cámara Minera de México, 2012, p. 8).

Mexico was among the leading world producers of several mineral commodities. In 2012, the country was the world's leading producer of silver; the second-ranked producer of bismuth and fluor spar; and the third-ranked producer of celestite, sodium sulfate, and wollastonite. Mexico also was the 4th-ranked producer of lead; the 5th-ranked producer of cadmium, diatomite, and molybdenum; the 7th-ranked producer of zinc; the 8th-ranked producer of barite, graphite, and gypsum; the 9th-ranked producer of salt; the 10th-ranked producer of copper ore; the 11th-ranked producer of gold, kaolin, manganese, and silica sand; the 12th-ranked producer of feldspar, phosphate rock, and sulfur; and the 15th-ranked producer of iron ore (Cámara Minera de México, 2012, p. 107; Carlin, 2013; Corathers, 2013; George, 2013a, b; Guberman, 2013; Kostick, 2013; Miller, 2013; Polyak, 2013; Tolcin, 2013a, b).

Minerals in the National Economy

The mineral industry (excluding hydrocarbons) was the fourth most important source of foreign currency for the country in terms of value after the auto industry, electronics, and crude oil exports. Of the total mineral industry production in Mexico in 2012, gold accounted for a 29.2% share, by value, followed by silver (25.3%), copper (19.6%), zinc (5.5%), coke (4.3%), iron ore (3.8%), lead (2.4%), coal (2%), and molybdenum (1.8%). Other mineral commodities accounted for the remaining 6.1% (Cámara Minera de México, 2012, p. 10).

Government Policies and Programs

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 that became effective in 1992 and was subsequently modified and expanded in 1996 and again in April 2005 and June 2006, clarifies and spells out the legal framework for the exploration, production, and processing of the country's mineral resources. Crude oil exploitation is not covered by this law, and only the exploitation of gas produced underground by mineral coal is classified as being covered under this law (Cámara de Diputados del H. Congreso de la Unión, 2013, p. 1–9).

In February, Mexico and the United States signed an agreement concerning the development of trans-boundary hydrocarbon reservoirs in the Gulf of Mexico (this accord does not include submerged lands under the jurisdiction of the State of Texas), and the Mexican Senate approved the agreement in April. The agreement would establish a framework that would allow lease holders on the United States side of the boundary to cooperate with the Mexican national oil company *Petróleos Mexicanos, S.A. de C.V. (PEMEX)* to jointly explore for and exploit hydrocarbon resources. The agreement allows exploration and exploitation of a trans-boundary reservoir as a unit, with the stated purpose of promoting efficient production of the resource, reducing waste, and limiting the drilling of unnecessary wells. Furthermore, in cases where a unitization agreement is not reached between the involved parties, the agreement allows for unilateral production by each side (up to the amount of hydrocarbons that occur on each party's side of the boundary), and it includes mechanisms to resolve disputes that may arise during the development of specific reservoirs (U.S. Department of the Interior, 2012).

The *Ley de la Comisión Nacional de Hidrocarburos* [Law of the National Commission on Hydrocarbons] regulates the exploration for and extraction and exploitation of crude oil and associated commodities, with the exception of gas produced by mineral coal. Crude oil resources belong to the nation as a whole, and the extraction of crude oil is managed by Government-owned PEMEX. Reforms that could take place by 2014 would open up the Mexican oil industry for private investment and, in some cases, allow portions of its industrial structure to be privatized. Owing to the scope of the reforms, however, this process is likely to be slow and intensely debated in the Mexican Congress (Cámara de Diputados del H. Congreso de la Unión, 2013, p. 1–9).

In October 2012, the *Reglamento de la ley Minera* [Rules of the Mining Law] was published in the *Diario Oficial de la Federación*, which is the official journal of the Federal Government. These rules explain how the mining law is to be applied and how the procedures are to be followed. The rules had been discussed and under revision for the past several years,

and they are part of a series of reforms intended to streamline governmental procedures in the mineral industry in Mexico (Cámara de Diputados del H. Congreso de la Unión, 2012, p. 1–37).

The Mining Law allows a 100% private equity ownership stake in the exploration, production, and development of mineral resources, including resources previously reserved for direct Government exploitation, such as coal, iron ore, phosphorus, potassium, and sulfur. Neither oil and its derivatives nor radioactive materials are covered by this law. Exploration concessions are granted for 6 years and are not renewable. Production concessions are awarded for 50 years and are renewable for an additional 50 years (Cámara de Diputados del H. Congreso de la Unión, 2006, p. 1–33).

The mineral sector is administered by the Secretaría de Economía. The Dirección 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 Mexico's natural resources is the Law of Foreign Investment. This law 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 from 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 mineral sector and the development and exploitation of geographic areas considered restricted by the Government (Cámara de Diputados del H. Congreso de la Unión, 2012, p. 1–34).

The General Law of Ecological Balance and Environmental Protection (LGEEPA), which is the keystone of the country's environmental law, was passed in 1988. Those environmental responsibilities that had resided in various Government agencies were transferred to the Secretaría de Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP) in 1994. In 2000, the agency became the Secretaría 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. The 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 dumps and tailings, electrical transformers, gas and dust emissions, noise, and the storage of oil and fuel.

The regulation of environmental impact statements was initiated in 2000. Under these rules, environmental impact reports for beneficiation plants, gas and oil pipelines, and mines must be approved by the SEMARNAT (Secretaría de Medio Ambiente y Recursos Naturales, 2008).

Production

In 2012, mineral production in Mexico generally increased in comparison with the levels of production in 2011. In particular,

there were major increases in the production of talc [by 804% to a reported 463,214 metric tons (t)] and bauxite (by 566%) (Secretaría de Economía, 2013). In the case of bauxite, the increase was likely owing to secondary production and not to the discovery of a new deposit. The reason for the increase in the production of talc was not known. Among the other mineral commodities, significant increases in the production of metals in 2012 included that of refined primary lead (by 21.7%), refined gold (18.9%), iron ore (16.4%), mined silver (12.1%), manganese ore (10.1%), copper ore (9.2%), and refined copper anode and blister (7.5%). Significant increases in the production of industrial minerals included that of fuller's earth (by 111%), calcite (98.3%), bentonite (69.6%), quartz (41.3%), kaolin (35.6%), gypsum (31.8%), wollastonite (16.2%), nitrogen (14.9%), and strontium (13.6%). Production of mineral fuels remained at about the same levels as in 2011, with the exception of coal, which decreased by 13.7%. Crude oil production by PEMEX was about 930 million barrels (Mbbbl) and gross natural gas production totaled 59,470 million cubic meters (table 1; *Petróleos Mexicanos, S.A. de C.V.*, 2013, p. 6).

Structure of the Mineral Industry

Several mineral-producing companies engaged in notable mine acquisitions and transactions in 2012. On December 27, 2011, Mexichem S.A. de C.V. (Mexichem) received authorization from the Government to purchase Grupo Alfil's Fluorita de Mexico S.A. de C.V. Mexichem subsequently purchased the company in January 2012. This transaction added to Mexichem's importance as a globally ranked producer of fluorspar. In October, AuRico Gold Inc. of Canada sold its Ocampo unit and the Venus and Los Jarros projects in the State of Chihuahua to Minera Frisco S.A. de C.V. and joined with Minera Frisco in a 50-50 joint venture in the Orion project in the State of Nayarit. The value of these transactions was \$750 million (AuRico Gold Inc., 2012; Mexichem S.A. de C.V., 2012; Secretaría de Economía, 2013, p. 14).

A few large domestic companies produced a significant portion of Mexico's mineral output, including Cementos Mexicanos S.A.B. de C.V. (CEMEX), Compañía Minera Autlan S.A. de C.V. (Minera Autlan), Empresas Frisco S.A. de C.V. (Frisco), Fresnillo plc., Grupo Acerero del Norte S.A. de C.V. (GAN), Grupo Mexico S.A.B. de C.V. (Grupo Mexico), and Industrias Peñoles S.A.B. de C.V. Medium- and small-size companies produced many of the industrial minerals. State-owned PEMEX controlled the crude petroleum, refining, and natural gas production sector (table 2).

The Secretaría de Economía reported that, in 2012, a total of 287 companies were involved in 857 projects in Mexico that had received direct foreign investment. Of these companies, 205 had their central offices in Canada and 46 were headquartered in the United States; 9 were headquartered in China; 6, in Australia; 4 each, in Japan, the Republic of Korea, and the United Kingdom; 2, in India; and 1 each, in Belgium, Brazil, Chile, Italy, Luxembourg, Peru, and Spain. Precious metals, particularly gold and silver, were the primary targets for 571 of the projects (Secretaría de Economía, 2013, p. 546–547).

Mineral Trade

In 2012, Mexico was a net exporter of nonfuel minerals, in terms of value, registering a trade surplus of \$12.66 billion. The value of its precious metals exports increased by 0.04% compared with that of 2011, and those of gold alone, by 3.5% (Secretaría de Economía, 2013, p. 11).

Mexico's principal export partners were the United States and Canada (which were fellow signatories of the North America Free Trade Agreement) and also, in order of the value of trade, Spain, Japan, Germany, Colombia, and China. Mexico's principal import partners were the United States and China; other significant sources of imports were, in order of the value of trade, Japan, the Republic of Korea, Germany, Canada, and Brazil (United Nations Statistics Division, 2013).

Only nine Chinese companies had investments in the Mexican mineral industry. China's influence as a destination for Mexican mineral exports, however, was considerable.

Commodity Review

Metals

Copper.—In 2012, the volume of mined copper production in Mexico increased by 9.2% compared with that of 2011. Of all the country's copper production, 78% took place in the State of Sonora, mainly from the following municipalities: Cananea (214,724 t), Nacozari de Garcia (121,071 t), Alamos (30,591 t), and Santa Cruz (22,916 t). The remaining sources of Mexican copper production were principally the States of Zacatecas and San Luis Potosi (51,262 t and 23,158 t, respectively); however, several other States also produced copper in lesser amounts (Secretaría de Economía, 2013, p. 147).

Of the principal companies producing copper in Mexico, Grupo Mexico was the most significant, accounting for 70% of all copper production in Mexico. Other significant producers were, in order of volume of production, Industrias Peñoles, Capstone Mining, NEMISA, and Minera Frisco (Grupo Mexico S.A.B. de C.V., 2013, p. 6; Secretaría de Economía, 2013, p. 148).

The Chinese company Jinchuan Group controlled the Bahuerachi project in the State of Chihuahua. In 2012, the project was in the feasibility stage. The project had estimated resources of about 525 million metric tons (Mt) of ore with grades of 0.4% copper and 0.55% zinc. The estimated required investment for the project was \$900 million.

Grupo Mexico stated that it would invest \$1 billion in the Buenavista Mine, which was owned by Buenavista del Cobre S.A. de C.V. (a fully owned subsidiary of Grupo Mexico). The investment was to be used to continue the Lixiviation ESDE III project and to incorporate a new concentrator at the plant. Grupo Mexico stated that when the project is finished, it would increase the capacity of the mine to 120,000 metric tons per year (t/yr) from 88,000 t/yr. The concentrator was expected to be finished by 2015 and would have a capacity of 188,000 t/yr.

Korean Resources Corp. (KORES) invested \$443.3 million in Compañía Minera y Metalúrgica El Boleo S.A. P. I. de C.V. (MMB), which increased its share in the company to 73.8%. KORES's stated intent was eventually to own 90% of the

company. Once it reaches the production stage, the El Boleo project was expected to produce the following in the first 6 years of production: 56,750 metric tons per year (t/yr) of copper, 25,400 t/yr of zinc, and 1,679 t/yr of cobalt (Cámara Minera de México, 2012, p. 21).

Gold.—In 2012, according to data from the Instituto Nacional de Estadística y Geografía (INEGI), Mexico's gold mine production increased by 16% compared with that of 2011. This increase was owing to the increase in capacity of existing mines and the start of new projects, among which the most significant were the Peñasquito Mine (owned by Goldcorp Inc. of Canada), the San Jose Mine (owned by Fortuna Silver Inc. of Canada), El Aguila Mine (owned by Gold Resources Corp. of the United States), and the Nochebuena Mine (owned by Fresnillo plc) (Cámara Minera de México, 2012, p. 164).

The State of Sonora continued to be the principal producer of gold in Mexico. The State produced 29% of the national mined gold output, and it increased its volume of production by 9% compared with that of 2011. Other important States that produced gold were Zacatecas, which produced 21% of the national mined gold output and registered an increase of 27.5% compared with production in 2011; Chihuahua (19% of total production and an increase of 29% compared with that of 2011); and Guerrero, Durango, and San Luis Potosi (Cámara Minera de México, 2011, p. 124–126).

The principal companies producing mined gold in Mexico were Goldcorp, which produced 26.1% of total production; Fresnillo, which produced 14.8%; Agnico Eagle, which produced 7.3%; Newmont Mining Corp. of the United States, which produced 6.6%; Alamos Gold Inc. of Canada, which produced 6.3%; Minera Frisco S.A.B de C.V., which produced 6.1%; and New Gold Inc. of Canada, which produced 4.3%. The remaining 28% was produced by several other small companies (Cámara Minera de México, 2012, p. 164).

Production at the Peñasquito Mine, which was owned by Goldcorp, increased by 48.9% to 12.78 t. Peñasquito continued to be the leading gold producing mine in Mexico, by volume, in 2012.

Los Filos Mine, which was also owned by Goldcorp, produced 10.58 t of gold and ranked as the second largest gold mine in terms of output in the country. La Herradura Mine, which was owned by Fresnillo and Newmont, produced 9.78 t, which was an increase of 2.83 t compared with that of 2011, and which made it the third largest gold mine in Mexico in terms of output. Production of gold at the San Jose Mine, which was owned by Fortuna Silver, increased by 300% to 559 kilograms (kg) in 2012 (Cámara Minera de México, 2011, p. 16, 164).

Minera Frisco finished the expansion of its El Coronel and San Felipe Mines in 2012. The new additions to these mines were to begin operating in March and April 2013, respectively. The expansions would increase ore processing capacity by 65,000 t/yr in the case of El Coronel and 22,500 t/yr in the case of San Felipe.

Minera Frisco also announced that it would start mine operations in three new mining units in 2013: El Concheño, El Porvenir, and San Francisco del Oro Tajo. El Concheño unit would be a gold and silver open pit mine in the

State of Chihuahua and would have a processing capacity of 15,000 t/yr. El Porvenir, which is located in Aguascalientes, would also be an open pit gold and silver mine and would have a processing capacity of 10,000 t/yr. The San Francisco del Oro Tajo Mine would also have a processing capacity of 10,000 t/yr.

Finally, Argonaut Gold Inc. of Canada started operations at the old La Colorada Mine in the State of Sonora in the first trimester of 2012. The mine produced 635 kg of gold for the year (Cámara Minera de México, 2011, p. 16, 163–165).

Iron and Steel.—According to the Cámara Minera de México (CAMIMEX), Mexico does not have significant iron ore reserves; however, its production from existing reserves is sufficient to meet domestic demand (Cámara Minera de México, 2010, p. 22). In 2012, Mexico increased its iron ore production (Fe content) by 3.6%, producing 8 Mt in Fe content and 14.9 Mt in gross weight. Production was from the States of Colima, Durango, and Michoacan. Iron ore exploration had increased during the past 5 years in response to increased demand, principally from China. Minera del Norte had increased its reserves since 2008 by 18.6% to 664 Mt, and Peña Colorada had also increased its reserves by 38% to 345 Mt during the same period. The companies with the largest percentage increase in reserves during the same period were Ternium S.A. (increased by 64%) and ArcelorMittal (increased by 73%), both of Luxembourg.

Iron ore exports to China decreased in 2012 by about 10%, principally because of new regulations, which include requiring a permit to export iron ore. Mexico exported 4.4 Mt of iron ore in 2012 and imported 1.37 Mt; this trade was done mostly by private traders and mineral commodity consolidators. Most of the ore was shipped through the Port of Lazaro Cardenas in the State of Michoacan and the Port of Manzanillo in the State of Colima (Cámara Minera de México, 2010, p. 22; 2012, p. 186).

Crude steel production decreased slightly in 2012, and pig iron production remained about the same. Mexico produced 18.1 Mt of crude steel and was the 13th-ranked producer of steel, by tonnage, in the world in 2012. Altos Hornos de Mexico S.A. (AHMSA), ArcelorMittal, DeAcero S.A. de C.V., and Ternium were the principal steel producers in the country and together accounted for 79.5% of Mexico's total crude steel production (table 1; Cámara Minera de México, 2010, p. 24; World Steel Association, 2013, p. 6).

Lead.—In 2012, the output of lead mine production in Mexico increased by 6% and reached for a second year in a row a level of production not seen in at least 30 years. The principal States that produced lead in Mexico were, in order by tonnage of production, Zacatecas, Chihuahua, and Durango (table 1; Cámara Minera de México, 2012, p. 25).

Goldcorp's Peñasquito Mine remained the leading lead mine in Mexico in terms of lead content of mine production. In 2012, Peñasquito produced 69,705 t of lead.

In 2012, Industrias Peñoles continued to be a major producer of lead in Mexico. The company produced a combined total of 43,150 t of lead from its Naica Mine (18,190 t), Francisco I. Madero Mine (9,140 t), Sabinas Mine (7,760 t), Tizapa Mine (6,240 t), and Bismark Mine (1,820 t).

Fresnillo produced a combined total of 24,639 t of lead from its Fresnillo Mine (16,190 t), La Cienega Mine (5,680 t), and

El Saucito Mine (2,770 t). Production from the Fresnillo Mine was a byproduct of the mining of other minerals, principally silver. Grupo Mexico produced a combined total of 19,978 t of lead from its Santa Barbara Mine (16,470 t), Santa Eulalia Mine (1,990 t), and Charcas Mine (1,520 t) (table 1; Cámara Minera de México, 2012, p. 25; Secretaría de Economía, 2013, p. 338–340).

Molybdenum.—Mexico, which was the fifth-ranked producer of molybdenum in the world, increased its production of molybdenum by 5% to 11,366 t in 2012. Grupo Mexico was the only molybdenum producer in the country; the company obtained most of its output in 2012 (10,968 t) from La Caridad Mine in the State of Sonora.

Grupo Mexico stated that development of a molybdenum processing plant at its Buenavista de Cobre project was 87% complete. This plant would have the capacity to produce an additional 2,000 t/yr of molybdenum. Also, the company announced that it was continuing with plans to complete a second molybdenum plant that would have an additional 2,600 t/yr of production capacity. Grupo Mexico expected that this second plant would be operational by 2015.

Mercator Minerals Ltd. of Canada indicated that its El Creston project in Sonora was advancing. Mercator expected to begin production of molybdenum in 2016 with a potential output of 11,000 t/yr (table 1; Cámara Minera de México, 2012, p. 26).

Silver.—Mexico's silver mine output in 2012 was 5,358 t, which was the highest annual level of silver production ever registered in Mexico, and it represented an increase in production of 12.1% compared with that of 2011. Mexico was again the leading silver producer in the world in 2012, accounting for 21% of world silver production (table 1; George, 2013b).

The principal companies producing silver in Mexico were Fresnillo (24.5%), Goldcorp (14.2%), Pan American Silver Corp. of Canada (7.4%), Industrias Peñoles (7.1%), Grupo Mexico and First Majestic Silver Corp. of Canada (5.7% each), Coeur d'Alene Mines Corp. of the United States and Primero Mining Corp. of Canada (4.9% each), and Minera Frisco (3.1%); small companies accounted for the remainder of production. Approximately 30% of Mexico's production was obtained through dore; the rest was found principally in concentrates of copper, lead, and zinc, for which the capacity for refining has not been sufficient for the quantity obtained. The Fresnillo Saucito Mine and the Peñasquito Mine produced concentrates of zinc that contained high percentages of silver (Cámara Minera de México, 2013, p. 169).

In 2012, the only new silver projects were El Gallo Mine, La Colorada Mine, and the Nochebuena Mine. The main reason for the increased production in 2012 was the consolidation and increased production in other mines, such as at El Aguila Mine, the Peñasquito Mine, and the San Jose Mine.

The State of Zacatecas, where the Fresnillo Mine is located, accounted for 43.5% of all the silver produced in Mexico. In 2012, Fresnillo remained the world's leading silver mine in terms of annual output, producing 820.5 t in 2012 and accounting for 15.3% of all silver produced in Mexico (Cámara Minera de México, 2013, p. 19, 168).

Goldcorp's Peñasquito Mine produced 737.15 t of silver. Peñasquito was the second-ranked producer of silver, in terms of the volume of output, in Mexico after Fresnillo.

In April, the Canadian company Pan American Silver acquired the Dolores Mine (located in the State of Chihuahua), which was previously owned by Minefinders Inc. of Canada. With this purchase, Pan American increased to three the number of operating mines that it owned in Mexico; the other two mines were the Alamo Dorado Mine, which is located in the State of Sonora, and La Colorada Mine, which is located in the State of Zacatecas. The three mines produced a combined output of 385.7 t in 2012.

Industrias Peñoles significantly increased its silver production in 2012 when the new installations at its mining unit Tizapa began operations. Tizapa's silver production in 2012 was 143.8 t; Industrias Peñoles' total production of silver in 2012 was 370.1 t (Cámara Minera de México, 2011, p. 18; Industrias Peñoles S.A.B. de C.V., 2013, p. 6)

In October, Fresnillo approved the feasibility study for the San Julian silver project, which is located on the borders of the States of Chihuahua and Durango. The project would require an investment of \$500 million. In its first year of operations, the project was projected to produce 177.3 t of silver and 40.4 kg of gold. These volumes were expected to continue to increase gradually until the mines reached an average production rate of 298.6 t/yr of silver and 1.24 t/yr of gold at full capacity by the second half of 2014 (Cámara Minera de México, 2011, p. 127–128; 2013, p. 18).

Zinc.—Production of zinc metal in Mexico decreased slightly in 2012 compared with that of 2011. The level of zinc mine output increased by 4.5% (table 1).

Industrias Peñoles was the principal producer of zinc in Mexico. The company produced 157,257 t of zinc from its five units: Francisco I. Madero (45,460 t), Bismark (39,500 t), Tizapa (35,510 t), Sabinas (19,830 t), and Naica (16,960 t) (Cámara Minera de México, 2012, p. 23; Secretaría de Economía, 2012, p. 361).

Industrias Peñoles stated that its new project, Velardeña in the State of Durango, was slated to begin production in April 2013. The company had invested \$203 million, and the mine was expected to produce 70,000 t/yr of zinc. Industrias Peñoles also announced that the feasibility study for its Rey de la Plata project had been approved in 2012. The new mining unit would cost \$268 million, and it would produce, in order of expected volume of output, zinc, silver, lead, and gold by 2015.

Goldcorp's Peñasquito Mine was Mexico's largest mine in terms of zinc output. In 2012, the mine produced about 147,000 t of zinc, which was an increase of 13% compared with output in the previous year.

The Charcas Mine (owned by Minera Mexico S.A. de C.V.) in the State of San Luis Potosí was the second-ranked producer of zinc in the country; the mine produced 89,884 t in 2012. Industrias Peñoles' Francisco I. Madero Mine in the State of Zacatecas produced 45,460 t, which made it the third-ranked zinc-producing mine in the country (Cámara Minera de México, 2012, p. 23).

Industrial Minerals

Fluorspar was the most valuable of Mexico's nonmetallic mineral commodities in 2012, accounting for 22.9% of the value

of nonmetallic minerals produced; salt was the second most valuable at 15.6%; followed by sulfur, 14%; silica sand, 13%; sodium sulfate, 10.2%; phosphate rock, 9.3%; gypsum, 3.6%; kaolin, 2.5%; and diatomite, 2.1% (table 1; Cámara Minera de México, 2012, p. 191).

Fluorspar.—In 2012, Mexichem bought the plants and concessions of Fluorita de Mexico and became the main producer of fluorite in the country. Mexichem reported that it had produced 640,000 t of concentrate at its Las Cuevas plant, 140,000 t at its Rio Verde plant, and 50,000 t at its Múzquiz plant. Mexichem stated that it expected production at the Las Cuevas plant to increase to 670,000 t in 2013 and production at the Rio Verde plant to increase to 150,000 t (Mexichem S.A. de C.V., 2012; Cámara Minera de México, 2012, p. 196).

Gypsum.—Gypsum production increased in Mexico by 21% in 2012. The principal producer of gypsum in Mexico was Compañía Occidental Mexicana S.A. de C.V., which had reserves of 16.6 Mt in 2012. More than 55% of the national production of gypsum took place in the municipality of Mulege, which is located in the State of Baja California Sur (tables 1, 2; Cámara Minera de México, 2012, p. 199).

Phosphate Rock.—In 2012, the phosphate rock mine owned and operated by Roca Fosforica de Mexico S.A. de C.V. (Rofomex), which was a subsidiary of Grupo Fertinal S.A. de C.V., produced 1.72 Mt of concentrate compared with 1.69 Mt in 2011. This increase was owing to the modernization of the equipment in the mine. Production for 2013 was projected to be 2 Mt. The Rofomex Mine is located in San Juan de la Costa in the State of Baja California Sur (table 1; Cámara Minera de México, 2012, p. 197).

Talc.—In 2012, the production of talc increased by 804% to 463,214 t in 2012 from 51,221 t in 2011, as reported by the Servicio Geológico Mexicano. No information about the source of the increase was available (Secretaría de Economía, 2012, p. 513).

Wollastonite.—Wollastonite production in Mexico increased in 2012 by 16.2% compared with production in 2011, and its value increased by 34.4% compared with that of the previous year. The Pilares Mine (owned by Minera Roca Rodando S.A. de C.V.) in the State of Sonora was the only mine in the country that produced wollastonite (tables 1, 2; Cámara Minera de México, 2012, p. 199).

Mineral Fuels

Coal.—Mexico's production of coal in 2012 totaled 29.9 Mt, which was a decrease of 13.7% compared with that of 2011. Minera del Norte [a subsidiary of Altos Hornos de Mexico (AHMSA), which is a part of Grupo Acerero del Norte S.A. de C.V. (GAN)] reported a decrease in its production of coal by 17.3% to 11.8 Mt. Minera del Norte was the principal coal producer in Mexico. Materiales Industrializados S.A. de C.V. (Minsa) also reported a 42.1% decrease in production to 579,000 t. Grupo Mexico, on the other hand, reported increased production of 36.4%, to 325,300 t, and Carbonifera San Patricio S.A. de C.V. also reported increased production in 2012 (tables 1, 2; Cámara Minera de México, 2012, p. 33).

Coke.—Coke production in Mexico increased in tonnage (by 0.2% to 2.16 Mt) and also in value (by 13.2%) in 2012 compared with the amount and value, respectively, in 2011. Companies that reported increased production included Minera del Norte (by 2.9%, to 1.6 Mt) and Grupo Mexico (by 7.4%, to 91,300 t). Companies that reported decreased production included ArcelorMittal (by 11.5%, to 415,000 t) and Minsa (by 25% to 12,000 t) (table 1, 2; Cámara Minera de México, 2012, p. 34).

Crude Petroleum and Natural Gas.—Mexico's crude oil production consists of 54% heavy crude oil, 33% light crude oil, and 13% extra light crude oil. In 2012, PEMEX reported that it had produced an average of 2,548,000 barrels per day (bbl/d). This production originated in the company's 449 fields located on 12 properties. Seventy-four percent of production came from, in order of volume produced, the Ku-Maloob-Zaap, the Cantarell, the Litoral Tabasco, and the Abkatun-Pol Chuc properties located in the marine region of the Gulf of Mexico.

In 2012, production at Cantarell decreased by 0.17% whereas production in the Kab, the Sihil, and the Yaxche oilfields increased significantly. The average production of these three fields combined was 139,000 bbl/d in January 2012, and by yearend, production had increased to 218,000 bbl/d. PEMEX also reported that the combined output from the Kuil and the Tsimin fields (which began producing in August 2012) and the Pareto field (which had begun producing in March 2011) amounted by year's end to 43,000 bbl/d. These results are, according to PEMEX, in line with its strategy to manage the decreased oil production that had been taking place in Mexico during the past few years.

According to PEMEX, natural gas production decreased in 2012 by 4% compared with levels in 2011 owing largely to a decline in nonassociated gas production. The decrease was a response to multiple factors, including a programmed reduction in drilling activities and the completion of wells at the Burgos and the Veracruz properties, a decrease in the value of natural gas in the United States, and an industrial accident that took place in September and that negatively affected the Burgos property.

Production increased at the Abkatun-Pol Chuc and the Litoral de Tabasco properties as well as at the ATG property. These increases offset in part the previously stated decreases in production.

In 2012, PEMEX completed 1,238 wells, of which 97% were slated for development and 3% for additional exploration. Of the 1,201 development wells, 970 were crude oil producers and 189 were natural gas producers.

As a result of its exploration activities in the deep waters of the Gulf of Mexico, PEMEX made several discoveries that confirmed the occurrence of light crude oil in the Perdido Fold Belt. The Trion-1 well, which is located 28 kilometers (km) south of the border with the United States and 177 km from the State of Tamaulipas, and the Supremu-1 well, which is located 39 km from the U.S. border and 250 km from the coast of Tamaulipas, was drilled to a total depth of 2,900 meters (m), making it the deepest well ever drilled by PEMEX and the eighth deepest in the world. Currently, the well had reached a depth of 4.5 km.

PEMEX contracted the services of Wild Well Control Inc. in May 2012. Wild Well Control is a company that specializes

in implementing contingency plans for wells in water depths greater than 500 m and in ultra-deep waters, as well as shallow water control systems, in the event of an oil spill.

In October, PEMEX also signed an agreement with British Petroleum Plc to share technical information to build, operate, and maintain PEMEX's well-capping system for deep waters in the Gulf of Mexico (Petróleos Mexicanos, S.A. de C.V., 2013, p. 8–11).

Outlook

In 2012, mineral production in Mexico increased as a whole, and the overall value of its production increased dramatically, especially in the precious metals sector. This continued the trend of 2011. Production of metals will likely continue to be the most dynamic and profitable part of the mineral industry. Gold and silver exploration is continuing, with several new projects scheduled to commence production within 3 to 5 years, and many other mines are slated to reach their productive stages in 2013. The base-metals sector will likely profit from the development of these mines, as the majority of the mines are polymetallic projects.

In the area of industrial minerals, production tends to be correlated with international prices and internal consumption. As the Mexican economy recovers, construction is expected to accelerate, particularly work on public projects, and this will likely boost the production of cement in the country. Fluorspar production is expected to increase in 2013, according to its principal producer, Mexichem, and phosphate rock production will likely continue to increase at the Rofomex plant in the State of Baja California Sur.

The mineral industry as a whole represents a very important source of foreign currency for Mexico, competing with the automobile, electronics, crude oil, and the tourism industries, as well as with remittances by nationals living abroad. The continued growth of the Mexican economy has helped all domestic industries, and the Mexican Government expects that the country's economy will continue to grow in the coming years. Steps by PEMEX to manage its declining crude oil production will continue, as it seems that its actions have been successful in slowing the rate of decreased production. PEMEX has stated that it foresees the replacement rate of future reserves to remain above 100% in the foreseeable future (Petróleos Mexicanos, S.A. de C.V., 2013, p. 10).

The economy was forecasted to grow at a rate of 1.2% for 2013; however, inflation is expected to increase by 4% for the same year. Controlling inflation, therefore, is likely to be one of the Government's priorities and greatest challenges. The Mexican Government estimates that growth in the coming years will be closely tied to that of the United States, as the United States is Mexico's principal commercial partner (U.S. Central Intelligence Agency, 2014).

References Cited

- AuRico Gold Inc., 2012, AuRico Gold completes the sale of Ocampo: AuRico Gold Inc. (Accessed January 15, 2014, at <http://www.auricogold.com/investor-information/press-releases/press-release-details/2012/AuRico-Gold-Completes-the-Sale-of-Ocampo1132353/default.aspx>.)

- Cámara de Diputados del H. Congreso de la Unión, 2006, *Ley minera*: Mexico City, Mexico, Cámara de Diputados del H. Congreso de la Unión, 33 p. (Accessed December 17, 2013, at <http://www.diputados.gob.mx/LeyesBiblio/pdf/151.pdf>.)
- Cámara de Diputados del H. Congreso de la Unión, 2012, *Ley de Inversion extranjera*: Mexico City, Mexico, Cámara de Diputados del H. Congreso de la Unión, 37 p. (Accessed December 17, 2013, at <http://www.diputados.gob.mx/LeyesBiblio/pdf/44.pdf>.)
- Cámara de Diputados del H. Congreso de la Unión, 2013, *Reglamento de la ley minera*: Mexico City, Mexico, Cámara de Diputados del H. Congreso de la Unión, 17 p. (Accessed January 25, 2014, at <http://www.diputados.gob.mx/LeyesBiblio/pdf/151.pdf>.)
- Cámara Minera de México, 2010, *Informe anual 2010*: Mexico City, Mexico, Cámara Minera de México, 142 p. (Accessed December 12, 2014, at <https://www.camimex.org.mx/files/9113/5409/1179/2010.pdf>.)
- Cámara Minera de México, 2011, *Informe anual 2011*: Mexico City, Mexico, Cámara Minera de México, 170 p. (Accessed December 12, 2014, at <https://www.camimex.org.mx/files/1713/5409/1184/2011.pdf>.)
- Cámara Minera de México, 2012, *Informe anual 2012*: Mexico City, Mexico, Cámara Minera de México, 168 p. (Accessed December 12, 2014, at <https://www.camimex.org.mx/files/7013/5409/1184/2012.pdf>.)
- Carlin, J.F., Jr., 2013, *Bismuth*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 30–31.
- Corathers, L.A., 2013, *Manganese*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 100–101.
- George, M.W., 2013a, *Gold*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 66–67.
- George, M.W., 2013b, *Silver*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 146–147.
- Grupo Mexico S.A.B. de C.V., 2013, *Informe anual 2012*: Mexico Federal District, Mexico, Grupo Mexico S.A.B. de C.V., 75 p. (Accessed January 15, 2014, at <http://www.gmexico.com/files/FINANCIEROGMINGLES2012.pdf>.)
- Guberman, D.E., 2013, *Lead*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 90–91.
- Industrias Peñoles S.A.B. de C.V., 2013, *Informe anual 2012*: Mexico Federal District, Mexico, Industrias Peñoles S.A.B. de C.V., 142 p. (Accessed January 15, 2014, at <http://cs.penoles.com.mx/cs/groups/public/documents/document/bmv0/mday/~edisp/prodextranet002498.pdf>.)
- Instituto Nacional de Estadística y Geografía, 2013, *Estadística de la industria mimnerometalurgica*: Instituto Nacional de Estadística y Geografía, February 28. (Accessed January 18, 2014, at http://www.inegi.org.mx/inegi/contenidos/notasinformativas/ind_miner/2013/02/NI-IM.pdf.)
- Kostick, D.S., 2013, *Salt*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 134–135.
- Mexichem S.A. de C.V., 2012, *Mexichem Fluor announces the acquisition of Fluorita de Mexico*: Mexichem S.A. de C.V., January. (Accessed January 18, 2014, at http://www.mexichem.com/English/detalle_noticia.php?id=124.)
- Miller, M.M., 2013, *Fluorspar*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 56–57.
- Petróleos Mexicanos, S.A. de C.V., 2013, *Anuario estadístico 2012*: Mexico Federal District, Mexico, Petróleos Mexicanos, S.A. de C.V., 69 p. (Accessed December 10, 2013, at http://www.ri.pemex.com/files/content/pemex_Anuario_a.pdf.)
- Polyak, D.E., 2013, *Molybdenum*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 106–107.
- Secretaría de Economía, 2013, *Anuario estadístico de la minería ampliada 2012*: Mexico Federal District, Mexico, Secretaría de Economía, 568 p. (Accessed January 25, 2014, at http://www.sgm.gob.mx/productos/pdf/Capitulo_IV.pdf.)
- Secretaría de Medio Ambiente y Recursos Naturales, 2008, *Conjunto de indicadores basicos del desempeño ambiental*: Mexico Federal District, Mexico, Secretaría de Medio Ambiente y Recursos Naturales, p. 1. (Accessed February 17, 2008, at <http://www.semarnat.gob.mx/leyesynormas/normas/Normas Oficiales Mexicanas vigentes/NOM-ECOL-120.pdf>.)
- Silver Institute, The, 2014, *Silver price history*: The Silver Institute. (Accessed January 10, 2014, at <https://www.silverinstitute.org/site/silver-price/silver-price-history/2011-present/>.)
- Tolcin, A.C., 2013a, *Cadmium*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 36–37.
- Tolcin, A.C., 2013b, *Zinc*: U.S. Geological Survey Mineral Commodity Summaries 2013, p. 188–189.
- United Nations Statistics Division, 2013, *Snapshot [Mexico 2012]*, in *United Nations commodity trade statistics database (UN Comtrade)*: United Nations Statistics Division database. (Accessed January 17, 2014, at <http://comtrade.un.org/db/ce/ceSnapshot.aspx?r=484>.)
- U.S. Central Intelligence Agency, 2014, *Mexico*, in *The world factbook*: U.S. Central Intelligence Agency. (Accessed January 10, 2014, at <https://www.cia.gov/library/publications/the-world-factbook/geos/mx.html>.)
- U.S. Department of the Interior, 2012, *Agreement between the United States and Mexico concerning transboundary hydrocarbon reservoirs in the Gulf of Mexico*: U.S. Department of the Interior. (Accessed January 12, 2014, at <http://www.interior.gov/news/doinews/Agreement-between-the-United-States-and-Mexico-Concerning-Transboundary-Hydrocarbon-Reservoirs-in-the-Gulf-of-Mexico.cfm>.)
- World Steel Association, 2013, *Steel statistical yearbook 2012*: Brussels, Belgium, World Steel Association, 120 p.

TABLE 1
MEXICO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2008	2009	2010	2011	2012	
METALS³						
Antimony ⁴	380	74	71	5	414	
Arsenic ⁵	--	--	--	--	513	
Bauxite	20,000	20,000	21,250	14,400	96,000	
Bismuth:						
Mine output, Bi content ⁶	1,132	854	982	935	800	
Metal, refined	1,132	854	952	935	800	
Cadmium:						
Mine output, Cd content	1,550	1,510	1,464	1,485	1,482	
Metal, refined	1,550	1,510	1,464	1,485	1,482	
Copper:						
Mine output, Cu content:						
By concentration or cementation	214,644	170,597	168,855	336,739	367,852	
Leaching, electrowon	53,975	57,151	68,754	65,691	71,679	
Total	268,619	227,748	237,609	402,430	439,531	
Metal:						
Anode and blister, primary	200,200	169,000	124,000 ^r	239,000 ^r	261,000	
Refined:						
Primary	308,000	255,700	242,200 ^r	395,000	365,000	
Secondary ^c	6,000	5,000	5,000	5,000	5,000	
Total	314,000	260,700	247,200 ^r	400,000	370,000	
Gold:						
Mine output, Au content	kilograms	50,365	51,393	72,596	88,648	102,802
Metal, refined	do.	37,760	19,410	29,000	32,729	38,926
Iron and steel:						
Iron ore, mine output: ⁷						
Gross weight	thousand metric tons	11,688	11,677	13,998	12,806	14,915
Fe content	do.	7,013	7,073	7,931	7,763	8,047
Metal:						
Pig iron	do.	4,450	3,925	4,707 ^r	4,620	4,612
Direct-reduced iron	do.	6,012	4,147	5,368	5,854	5,587
Total	do.	10,462	8,072	10,075 ^r	10,474	10,199
Ferroalloys, electric arc furnace: ⁸						
Ferromanganese	do.	97	42	81	74	70 ^e
Silicomanganese	do.	114	85	134	139	130 ^e
Total	do.	211	127	215	213	200 ^e
Crude steel	do.	17,209	13,957	16,710	18,101	18,095
Rolled products ⁹	do.	14,174	12,994	14,491	15,482	15,927
Lead:						
Mine output, Pb content		141,173	143,838	192,062	223,717	238,091
Metal:						
Smelter:						
Primary ¹⁰		91,364	85,411	110,980	101,729	112,431
Secondary ^c		110,000	110,000	110,000	110,000	110,000
Total ^e		201,364	195,411	220,980	212,000	222,000
Refined:						
Primary ¹¹		91,364	85,411	110,980	80,473 ^r	97,951
Secondary ^c		110,000	110,000	110,000	110,000	150,000
Total ^e		201,000	195,000	221,000	190,000	248,000

See footnotes at end of table.

TABLE 1—Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2008	2009	2010	2011	2012
METALS—Continued					
Manganese ore: ¹²					
Gross weight ^e	471,964	329,400	485,447	474,820	523,000
Mn content	169,907	118,577	174,761	170,935	188,294
Mercury, mine output, Hg content ^e	15	15	15	--	--
Molybdenum, mine output, Mo content	7,811	10,166	10,849	10,787	11,366
Silver:					
Mine output, Ag content kilograms	3,236,312	3,553,841	4,410,749	4,777,710	5,358,195
Metallurgical products, Ag content:					
In copper bars do.	154,266	104,922	--	--	--
Mixed gold and silver bars do.	207,457	353,930	572,901	817,981	923,056
Metal, refined, primary do.	2,101,454	1,845,029	2,230,024	2,336,141	2,329,963
Tin, metal, smelter, primary	15	--	--	--	--
Zinc:					
Mine output, Zn content	453,588	489,766	570,004	631,859	660,349
Metal, refined, primary	305,188	313,044	322,508	202,846	202,773
INDUSTRIAL MINERALS					
Barite	140,066	152,790	143,225	134,727	139,997
Cement, hydraulic ¹³ thousand metric tons	37,139	35,160	34,503	35,400 ^r	36,184
Clays:					
Bentonite	374,933	511,429	590,998	563,795	956,224
Common	40,522,818	10,036,832	9,111,988	7,721,040	7,700,000 ^e
Fuller's earth	66,123	108,139	170,350	107,436	227,496
Kaolin	85,092	78,086	120,094	120,003	163,148
Diatomite	128,536	80,807	91,710	84,231	84,537
Feldspar	445,519	347,510	398,849	382,497	380,441
Fluorspar:					
Acid-grade thousand metric tons	592	641	719	731	749
Metallurgical-grade do.	466	405	348	475	487
Total do.	1,057	1,046	1,067	1,206	1,236
Graphite, natural, amorphous	7,229	5,105	6,628	7,348	7,520
Gypsum and anhydrite, crude (yeso)	5,135,151	5,756,936	3,559,579	3,560,000 ^e	4,692,510
Magnesium compounds:					
Magnesite	43,053	34,700	39,400	45,598	44,700
Magnesia ¹⁴	85,477	72,600	84,200	85,700 ^r	88,400
Mica, all grades	5,000	5,000	160	--	160
Nitrogen, N content of ammonia	736,512	861,034	824,373	765,500 ^r	879,700
Perlite	43,180	51,395	31,779	31,779 ^r	30,750
Phosphate rock ¹⁵	290,728	426,547	452,220	507,181	517,398
Salt, all types thousand metric tons	8,809	7,445	8,430	8,812	8,730
Sodium compounds: ^e					
Carbonate, soda ash, synthetic	290,000	290,000	290,000	290,000	290,000
Sulfate, natural, bloedite ¹⁶	658,000	646,000	620,000 ^r	630,500	638,000
Stone, sand and gravel:					
Calcite, common	2,352,109	2,555,544	3,185,369 ^r	2,366,160	4,694,156
Dolomite	1,233,993	982,650	1,499,744	2,785,314	2,111,114
Limestone thousand metric tons	64,857	62,000	64,678	54,344	55,725
Marble	2,495,649	2,800,512	2,495,649 ^r	4,431,447	3,820,517
Quartz, quartzite, glass sand (silica)	2,779,075	2,483,605	2,607,650	2,542,143	3,592,813
Sand thousand metric tons	72,570	89,172	89,036	86,324	92,374
Gravel do.	87,416	78,777	76,789	68,965	71,870
Strontium minerals, celestite	29,621	36,127	31,429	40,669	46,192

See footnotes at end of table.

TABLE 1—Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2008	2009	2010	2011	2012	
INDUSTRIAL MINERALS—Continued						
Sulfur, elemental, byproduct:						
Of metallurgy ^c	thousand metric tons	700	700	800	800	800
Of petroleum and natural gas	do.	1,041	1,114	992	959 ^r	1,010
Total	do.	1,741	1,814	1,792	1,759	1,810
Talc		17,576	33,421	870	51,221	(16)
Vermiculite		132	291	98	--	--
Wollastonite		46,844	29,728	46,548	47,523	55,204
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Run of mine:						
Metallurgical	thousand metric tons	5,491	13,555	16,318	20,967	16,276
Steam	do.	10,403	9,496	11,247	13,718	13,656
Total	do.	15,894	23,051	27,565	34,685	29,932
Washed metallurgical coal	do.	2,000 ^e	2,000 ^e	4,767 ^r	5,061	4,903
Coke: ¹⁷						
Metallurgical	do.	1,459	1,240	1,553	2,016	2,047
Breeze	do.	88	75	95	105	118
Total	do.	1,547	1,315	1,648	2,121	2,165
Gas, natural:						
Gross	million cubic meters	71,523	72,660	72,615	68,153	59,470
Marketable (dry)	do.	31,897	32,237	33,632	34,986	34,000 ^e
Petroleum:						
Crude	thousand 42-gallon barrels	1,019,080	949,365	940,240	930,750	930,020
Condensate, natural gas liquids	do.	133,590	135,050	137,605	140,160	148,190
Total	do.	1,152,670	1,084,415	1,077,845	1,070,910	1,078,210
Refinery products:						
Liquefied petroleum gas	do.	9,454	9,891	9,308	7,811	7,800 ^e
Motor gasoline	do.	164,506	172,097	154,833	146,110	146,000 ^e
Jet fuel	do.	23,360	20,841	18,944	20,550	20,500 ^e
Distillate fuel oil, diesel	do.	125,378	123,005	105,668	99,937	99,000 ^e
Lubricants	do.	1,862	1,533	1,570	1,351	1,300 ^e
Residual fuel oil	do.	105,376	115,413	117,530	112,238	110,000 ^e
Asphalt	do.	12,520	11,643	9,089	9,527	9,500 ^e
Other, refinery fuel and losses	do.	34,201	36,900	11,571	13,834	13,800 ^e
Total	do.	476,655	491,323	428,513	411,358	408,000 ^e

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through January, 27, 2014.

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

³Primary production of aluminum ceased by the closure of Aluminios y Derivados de Veracruz (Aluder) because of high energy costs.

⁴Sb content of antimonial lead.

⁵Arsenic content of white arsenic.

⁶Refined metal. Bismuth content of impure smelter products no longer reported.

⁷Iron ore pellets.

⁸Reported by Cámara Nacional del Hierro y del Acero.

⁹Includes flat, nonflat, and seamless pipe steel products.

¹⁰Lead content of impure bar, antimonial lead, and refined metal.

¹¹Includes lead content of antimonial lead.

¹²Mostly oxide nodules; includes smaller quantities of direct-shipping carbonates and oxide ores for metallurgical and battery applications.

¹³Includes gray and white portland and masonry cement.

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

¹⁵Includes only output used to manufacture fertilizers.

¹⁶The Secretaría de Economía reported total production of 463,214 metric tons in 2012, but that number has not been verified.

¹⁷Includes coke made from imported metallurgical coal.

TABLE 2
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
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.B. de C.V., 100%)	Torreon, Coah.	1,200.
Cement	CEMEX México (Cementos Mexicanos, S.A.B. de C.V., CEMEX 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%, 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 Juarez, 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.	do.	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. GAN [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 ² plant, 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.B. de C.V., 90%)	Mine and SX-EW ² plant at Cananea, Son.	29,200 mill, 33 SX-EW. ²
Do.	Minera María S.A. de C.V. (Grupo Frisco, 100%)	Mine and SX-EW ² plant at Cananea, Son.	20 SX-EW. ²
Do.	Cobre de México, S.A. de C.V. (Grupo Conduxex)	Primary refinery in Mexico City and secondary refinery in Villagran, Gto.	150.
Ferroalloys	Cía. Minera Autlán, S.A.B 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 2012

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities ¹	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. (Mexichem S.A. de C.V.)	Mines at La Encantada district and plant at Muzquiz, Coah.	150.
Gold, mine	kilograms	Fresnillo plc. (Industrias Peñoles S.A.B. de C.V., 77.1%)	Proaño (Fresnillo) Mine, Zac.	1,200.
Do.	do.	Minas de las Altas Pimerías, S.A. de C.V. (Goldcorp Inc., 100%)	El Sauzal Mine, Chih.	10,000.
Do.	do.	Fresnillo plc., 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.B. de C.V., 100%)	La Cienega Mine, Dgo.	4,500.
Do.	do.	Animas Resources Ltd., 100%	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.	Pediment Gold Corp. (Pediment Gold Corp., 100%)	La Colorada Mine, Son.	800.
Do.	do.	Alamos Gold Inc., 100%	Mulatos Mine, Son.	4,700.
Do.	do.	Great Panther Silver Ltd., 100%	Guanajuato, Gto.	438.
Gold, refined	do.	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A.B. 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. (ArcelorMittal Holdings AG, 50%, and Grupo Imsa S.A. de C.V. 50%)	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.B. de C.V. (private Mexican, 100%)	Mines at La Encantada, Coah.; Fresnillo, Zac.; Naica, Chih.; Bismark, Son.; Rey de Plata, Gro. (Industrias Peñoles S.A.B. de C.V., 51%, and Dowa 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.B. 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 2012

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Lead and zinc—Continued		Industrias Peñoles, S.A.B. 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.	11.
Petroleum ³	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	Fresnillo Plc. (Industrias Peñoles S.A.B. de C.V., 77.1%)	Proaño (Fresnillo) Mine, Zac.	1,100,000.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	La Cienega Mine, Dgo.	65,800.
Do.	do.	Minera Bismark, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Bismark Mine, Chih.	7,000.
Do.	do.	Co. Minera Sabinas, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Sabinas Mine, Zac.	157,000.
Do.	do.	Minera Tizapa, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 51%; Dowa Holdings Ltd., 39%; Sumitomo Corp., 10%)	Tizapa Mine, Mex.	140,000.
Do.	do.	Minas Peñoles S.A. de C.V. (Industrias Peñoles, S.A.B. 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 Martin Mine, Sombretete, 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., and Alamo Dorado, Son.	200,000.
Do.	do.	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Torreon, 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.B. 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 2012

(Thousand metric tons unless otherwise specified)

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

Do., do. Ditto. NA Not available.

¹State 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.).

²Solvent extraction-electrowinning.

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

⁴Smelter output from mostly imported concentrates.