



# 2014 Minerals Yearbook

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## MOROCCO AND WESTERN SAHARA

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# THE MINERAL INDUSTRIES OF MOROCCO AND WESTERN SAHARA

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## MOROCCO

The Kingdom of Morocco was the world's leading exporter of phosphate in all forms; it was the world's second-ranked producer of phosphate rock after China and was responsible for about 14% of the world's phosphate rock output. Morocco also was the world's second-ranked producer of arsenic trioxide and barite after China, and it accounted for 24% and about 15%, respectively, of world totals. In 2014, Morocco was the 15th-ranked producer of silver and held Africa's largest silver mine. Additionally, Morocco produced a wide range of minerals that included cement, clays, copper, crude oil, feldspar, fluorspar, iron ore, lead, natural gas, pyrophyllite, salt, talc, and zinc (table 1; OCP Group, 2015, p. 11; Silver Institute, The, 2015, p. 26; Edelstein, 2016; Jasinski, 2016; McRae, 2016a, b).

Morocco's metallurgic provinces include, from the south of the country to the north, the Anti-Atlas, the High Atlas, the Middle Atlas, and the Rif. The Anti-Atlas province contains occurrences of manganese, precious metals (gold and silver), and strategic metals (cobalt, tin, titanium, and tungsten). The Middle and High Atlas provinces (the Atlas Belt) contain occurrences of barite, copper, iron, lead, manganese, and zinc. The Rif province contains occurrences of base metals and industrial minerals. The hydrocarbons exploration areas included three onshore and two offshore regions. The onshore regions consisted of the Cretaceous and Jurassic successions in Western Sahara, the TAGI sands and Jurassic reservoirs, and the Mesorif region in northwestern Morocco. The offshore regions comprised the Continental Shelf extension and the Jurassic, Cretaceous, and Tertiary sections, which is an offshore segment that extends from Rabat in the north to Tarfaya in the south (Office National des Hydrocarbures et des Mines, 2014b; 2015a, p. 16–17).

In 2014, the pace of mineral sector development activities, which included exploration and production, continued at faster and greater levels than those in previous years owing to a favorable investment environment, political stability, and security compared with other countries in North Africa. The Government continued its involvement with a number of international mining and energy companies in both conventional and unconventional offshore and onshore crude oil and natural gas concessions, mining partnerships, and construction of solar and wind energy powerplants (Office National des Hydrocarbures et des Mines, 2015a, p. 10–11).

### Minerals in the National Economy

Morocco's real gross domestic product (GDP), which was \$110 billion in nominal value, increased by only 2.4% in 2014 compared with an increase of 4.7% in 2013. The value the mining sector added to Morocco's economy increased by 4.2%

in real terms in 2014 from a decrease of 1.5% in 2013 and a decrease of 2.1% in 2012. The changes in the value added by the construction and processing industry sectors were 1.4% and 1.0%, respectively, in 2014 compared with 1.6% and -0.6%, respectively, in 2013. The diversity and total value of the exploited minerals enabled Morocco's mineral sector (including phosphate and other subsectors) to play an important role in the national economy by contributing about 10% of the country's GDP and by providing about 30% of total exports. Morocco's mineral industry was the leading foreign exchange earning sector for the Government, and the phosphate rock industry continued to be a major source of those export earnings (Bank Al-Magrib, 2015, p. 22; Office National des Hydrocarbures et des Mines, 2015a, p. 8; International Monetary Fund, 2016, p. 4, 25).

Morocco was one of the top recipients of foreign investment in Africa. The flow of foreign direct investment (FDI) to Morocco increased by 9.1% to about \$3.6 billion in 2014 from \$3.3 billion in 2013, and the flow of FDI out of Morocco increased by 34% to \$444 million from \$332 million in 2013. The value of FDI inward stock in Morocco at yearend 2014 was \$51.7 billion compared with \$8.8 billion at yearend 2000, and the value of FDI outward stock also increased to \$4.2 billion in 2014 compared with \$402 million in 2000. The value of FDI inflows in announced greenfield projects increased to \$4.6 billion in 2014 from \$2.5 billion in 2013. FDI went mainly to the real estate sector, then to the industry, tourism, trade, energy and mining, and infrastructure sectors. The major sources of the FDI inflows to Morocco were France (28.4%), the United Arab Emirates (13.5%), and Saudi Arabia (12.8%) (Bank Al-Magrib, 2015, p. 68; United Nations Conference on Trade and Development, 2015, p. A3, A7, A16).

### Government Policies and Programs

In 2013, the Moroccan Council of Government approved Bill 33–13, which was an overhaul of the country's 1951 Mining Code and Code Bill No. 1–73–412 of August 13, 1973. As of yearend 2014, the new mining law (Bill 33–13) had not been approved by the country's legislative body, which includes the House of Representatives and the House of Councilors. The new law was designed to attract investors, boost exports, and help ensure that companies respect the Government's labor and environmental laws. The Government's objective was to triple revenues from the mining industry by 2025, to increase the value of investment in mineral exploration tenfold, and to double the number of direct jobs in the sector to 30,000. The Government established targets for the mining industry (other than phosphate rock and phosphate-based fertilizers and products) that included increasing the value of the industry's economic activity to more than \$2 billion, increasing investment in exploration to

\$500 million, and creating 15,000 new job opportunities (Manar and Mankoub, 2014; Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, 2015a).

The Government agency responsible for oversight of the energy and mining sectors is the Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement (MEM), [Ministry of Energy, Mines, Water, and Environment]. Under the MEM, a wide range of central and regional agencies worked on managing activities related to electricity consumption and production, geologic studies, hydrocarbon exploration and production, mining, and development of renewable energy. The Ministère de l'Équipement, du Transport et de la Logistique [Ministry of Equipment, Transport and Logistics] was responsible for regulating building materials activities, including quarries. The Office National des Hydrocarbures et des Mines (ONHYM) [National Office of Hydrocarbons and Mines] is the primary agency responsible for the exploration and promotion of the country's mineral resources (Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, 2015b).

The Office National de Recherches et d'Exploitations Pétrolières (ONAREP) [The National Office of Research and Petroleum Exploitation] is responsible for overseeing the energy sector. The Government promoted investment in the hydrocarbon sector by offering fiscal incentives that allow international oil and gas companies to acquire up to a 75% share of production in return for investing a portion of their profits in further exploration in the country's open areas onshore and offshore. The royalty on crude oil is 10% and that on natural gas is 5%, and a corporate tax holiday for 10 years is given for crude oil and natural gas discoveries (Office National des Hydrocarbures et des Mines, 2015b).

Morocco was the leading importer of hydrocarbons in North Africa in 2014. Thus, the Government was focused on reducing its fuel and electricity imports and on meeting the projected increase in power demand (6.5% per year) through renewable energy sources. The Government was in the process of investing \$13 billion in expanding the country's capacity for hydroelectric, solar, and wind power generation, which could increase the share of renewables in the energy mix to 42% by the year 2020 from the current share of 8%. The Government sought to install 2,000 megawatts (MW) of solar power generating capacity by 2020 by building large-scale solar powerplants using modern solar thermal, photovoltaic, and concentrated solar power techniques at five locations—the Ain Beni Mathar in central Morocco, the Boujdour in Western Sahara, the Laayoune in Western Sahara, the Ouarzazate, and the Tafaya south of Agadir. These powerplants were expected to meet 20% of the country's electricity demand when completed in 2019. The Ouarzazate thermo-solar powerplant would have a total capacity of 580 MW by 2018. Construction on the first phase of the 160-MW-capacity Ouarzazate thermo-solar powerplant began in 2013, and was expected to be completed in 2015. The first and second phases of the Ouarzazate thermo-solar powerplant were expected to cover 3,000 hectares and would generate electricity that would meet the needs of 1.5 million people in the Ouarzazate area (Phys.org, 2013; Zafar, 2014).

## Production

The output of phosphate rock increased by 4% to 27.4 million metric tons (Mt) in 2014 from 26.4 Mt in 2013; it continued to be the country's most important mineral commodity and accounted for most of the value and volume of the mining output in 2014. Overall, the mining sector's (excluding phosphate rock subsector) output increased by 3.4% in 2014 compared with a decrease of 1.8% in 2013. Other notable increases in the quantity of mineral commodity production in 2014 compared with that of 2013 included that of copper (content of concentrates), by 63%; copper concentrates (gross weight), by 44%; nickel, by 26%; and fuller's earth, by 25%. Notable decreases in Morocco's mineral commodity production in 2014 compared with that of 2013 included iron ore, by 92%; montmorillonite, by 59%; gold, by 27%; manganese, by 18%; lead, by 11%; and salt and crude steel, by 10% each (table 1; Office National des Hydrocarbures et des Mines, 2015a, p. 9).

## Structure of the Mineral Industry

The ONHYM was created in 2005 by the merger of the Bureau de Recherches et de Participations Minières [Office of Research and Mining Investments] and the Office National de Recherches et d'Exploitations [The National Office of Research and Development]. All minerals are the property of the Government, which issued, through ONHYM, permits and licenses for the exploration and exploitation of mineral resources. In 2014, mining legislation continued to be based on the 1951 Mining Law, and was enforced through executive orders and the Directorate of Mines. Exploration permits were awarded for an initial 3-year period for an area that covered up to 16 square kilometers (km<sup>2</sup>). The permits were renewable for 4 additional years. Exploitation permits were awarded for 4-year periods, and were renewable for 12 years in 4-year increments. The Government provided incentives for mining companies that included tax exemptions on imported equipment for investment that exceeded \$25 million and a reduced tax rate of 17.5% for companies that exported their output and for companies that supplied ores to mineral processing and beneficiation companies. The Government also contributed 5% of the project value to mining projects that invested more than \$25 million. The Government contribution went to infrastructure development, such as building roads and supplying electricity and water to the project areas (Office National des Hydrocarbures et des Mines, 2014a, 2015c).

Managem S.A., also known as Groupe Managem, was a publicly listed company that produced base metals, such as cobalt, copper, lead, and zinc; precious metals, such as gold and silver; and industrial minerals, such as arsenic, fluorspar, and sodium sulfate. Managem was the leading metal mining company in Morocco; it conducted mineral exploration, marketing, processing, and services through its subsidiaries. Managem operated mining development projects in Morocco and some other African countries and employed more than 5,600 people in 2014 (Managem S.A., 2016, p. 13, 20).

Although Morocco had a long history of mining, an established infrastructure, and a low sovereign risk, its mineral

resources were relatively unexplored compared with many other countries in Africa. The ONHYM had several ongoing mining projects, including 65 drilling programs at Ras Tarf in Al Hoceima Province; Aghracha, Lahjeira, and Imlily in Awsered Province; Mfis in Errachidia Province; and Iraouene-Mouzaref in Zagora Province. In February, the ONHYM approved a partnership agreement with Maya Gold and Silver Inc. of Canada for the development and exploitation of the Boumadine polymetallic deposit, which is located in the Errachidia Province (Office National des Hydrocarbures et des Mines, 2015a, p. 36, 39).

In March, the ONHYM signed an agreement with SANC Mining Maroc Co. that postponed SANC's obligation to ONHYM owing to difficulties that prevented the company from starting its project on time. In May, the ONHYM approved the transfer of the mining license that covered the Zgounder silver deposit to Zgounder Millenium Silver Mining. The ONHYM also was working with Kasbah Resources Ltd. of Australia on the development of tin resources at the Achmmach tin mine; with Metalex Ventures Ltd. of Canada, which was exploring for diamond and gold in southern Morocco; and with Tolsa Group of Spain, which was exploring for bentonite in northern Morocco (Office National des Hydrocarbures et des Mines, 2015a, p. 38).

In 2014, the ONHYM conducted 43 exploration studies throughout the country; 27 were its own projects and 16 were carried out in partnership with domestic and international mining companies. The ONHYM studies included 16 precious-metals explorations (for gold, molybdenum, niobium, polymetallic minerals, and rare-earth elements), 18 base-metals and energy substances studies (on cobalt, copper, iron ore, lead, nickel, uranium, and zinc), 6 industrial minerals studies, 2 mineral research studies (on diatomite, magnesite, and electrometallurgical silica), and 1 study on the geothermal potential of Morocco (Office National des Hydrocarbures et des Mines, 2015a, p. 11, 36).

Artisanal mining has been practiced for many years in Morocco, especially in the Tafilalet and Figuig regions near Meknes. Artisanal mining for barite, lead, and zinc ores was legal within the Central d'Achat et de Développement de la Région Minière du Tafilalet and Figuig (CADETAF), and mined products were sold to local collection centers, which were equipped with chemical analysis, storage, and weighing facilities. The Government took steps to support artisanal mining at CADETAF by improving working conditions and by increasing productivity and safety (Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, 2015c).

The phosphate rock mining and the phosphate fertilizer manufacturing sector accounted for about 4.3% of the country's GDP in 2014. The Government was planning to increase Morocco's share of the world's phosphate commodity market to 40% from 28% by focusing on increasing its exports to Brazil, India, and other countries in Africa (OCP Group, 2015, p. 10). The Office Chérifien des Phosphates [Office of Moroccan Phosphates] (OCP), which is also known as the OCP Group, was responsible for phosphate rock and phosphate-based fertilizer production in Morocco. The OCP, which was the country's sole producer of phosphate rock, exported most of its output, and

used the revenues to help the Government reduce the country's trade deficit. The OCP's subsidiaries and joint ventures in the mining and processing sector included Euro Maroc Phoshore (EMAPHOS), Indo Maroc Phosphore S.A. (IMACID), Jorf Fertilizer Co. V, Pakistan Maroc Phosphore, Paradeep Maroc Phosphates Ltd., Phosphates de Bou Craa S.A., Prayon, and Zuari Maroc Phosphates Ltd. (OCP Group, 2015, p. 98).

## Mineral Trade

In 2014, Morocco's total exports increased to \$23.8 billion from \$22.0 billion in 2013 and the value of imports increased to \$46.2 billion from \$45.2 billion in 2013. Exports of phosphate rock and phosphate-based products increased to \$4.6 billion in 2014 from \$4.4 billion in 2013. Most of the increase was attributed to a higher volume of fertilizer exports and to increases in prices compared with the previous year. The value of hydrocarbon imports decreased to \$11.0 billion in 2014 from \$12.2 billion in 2013. The decrease was attributed to the decline in crude oil prices on world markets (OCP Group, 2015, p. 10; United Nations Statistics Division, 2015).

In 2014, Morocco exported 8.7 Mt of phosphate rock, 3.2 Mt of diammonium phosphate, 2.0 Mt of phosphoric acid, 1.0 Mt of triple superphosphate, and 349,000 metric tons (t) of compound fertilizer (NPK). The country imported 4.5 Mt of sulfur to produce 11.9 Mt of sulfuric acid and 1,000 t of potash for use in fertilizer manufacturing (Arab Fertilizer Association, 2015, 49, 53, 57, 62, 67, 72, 74).

U.S. exports to Morocco decreased to \$2.1 billion in 2014 from \$2.5 billion in 2013. The major minerals and metal-related exports included, in descending order of value, fuel oil (\$559 million), natural gas liquids (\$236 million), coal and other fuels (\$182 million), petroleum products (\$90 million), nonmetallic minerals (\$42 million), metallurgical-grade coal (\$25 million), steelmaking materials (about \$19 million), and iron and steel mill products (\$2 million). U.S. imports from Morocco decreased slightly to \$995 million in 2014 from \$976 million in 2013. This total included, in descending order of value, chemical fertilizers (\$277 million), sulfur and nonmetallic minerals (\$119 million), semiconductors (about \$77 million), inorganic chemicals (\$15 million), and precious metals (about \$6 million) (U.S. Census Bureau, 2015a, b).

## Commodity Review

### Metals

**Cobalt and Nickel.**—Compagnie de Tifnout Tighanimine, a subsidiary of Managem, mined cobalt and nickel ore at the Bou-Azzer Mine. The Bou-Azzer underground mine is located 35 kilometers (km) south of Marrakech in southern Morocco within the central Anti-Atlas Mountain range. Cobalt production increased slightly (by 3%) in 2014 in terms of metal content compared with that of 2013. The mine had the capacity to produce 2,000 t of cobalt metal and employed 1,600 people. Nickel was produced as a byproduct of cobalt production at the Guemassa polymetallic complex near Marrakech, where the metal was concentrated as nickel hydroxide during

metal concentration processes. Managem nickel production increased to 220 t in 2014 from 175 t in 2013 (table 1; Managem S.A., 2015b).

**Copper.**—In 2014, output of mined copper increased by 44% to 66,480 t from 46,320 t in 2013 and copper in concentrate increased by 63%. The increase was attributed to the start of production at the Oumjrane Mine. Managem completed the feasibility study for the Bouskour copper project and progressed in developing a feasibility study for the Tizert copper project, where mineral resources were estimated to be 238,000 t of copper. Managem had been mining copper at the Blieda Mine, which is located in the central Anti-Atlas Mountain region and is operated by Société Minière de Bou Gaffer (SOMIFER) (a subsidiary of Managem). Production at Blieda was 17,291 t of copper in concentrate in 2014, and mineral resources were estimated to be 30.7 Mt. Output at the Akka Mine was 29,795 t of copper in concentrate in 2014, which was a 22% increase from that of 2013. The mine is located 280 km southwest of Agadir in the Anti-Atlas Mountain region, and was operated by Akka Gold Mining Co. (a majority-owned Managem company) (Managem S.A., 2016, p. 62, 63, 72–73, 84).

**Gold.**—The output of the Akka gold mine, which was operated by Akka Gold Mining Co., decreased by 19% to 377 kilograms (kg) in 2014 from 463 kg in 2013. The decrease was attributed to the company's change of focus from gold to copper production at the mine. In 2014, Managem ended gold production at the mine, and terminated about 300 jobs at the mine. The mine closure was attributed to nonviable gold reserve levels. In 2014, Managem also concluded its gold exploration work at the Tizegouine-Moumjjoud prospect at the South Akka prospect following inconclusive results. Managem continued development of the gold deposit at Had Imwan, which is located in Taroudant Province, and identified 665,000 t of resources grading 2.02 grams per metric ton (g/t) gold (Managem S.A., 2015a; 2016, p. 61, 64, 73).

In 2014, Maya Gold held both exploration and exploitation licenses for its 80-km<sup>2</sup> Amizmiz project in southwestern Marrakech Province, where it was exploring for high-grade gold deposits. Maya Gold confirmed that the property had polymetallic gold-bearing veins in multiple zones. The drilling at Amizmiz was focused on the AZ and the TRN zones in order to better define the information in the National Instrument (NI) 43–101 technical report, which was filed by Maya Gold with the Canadian security administrators in 2011 and stated that the estimated inferred resource was 10,574 kg of gold (Maya Gold and Silver Inc., 2015b).

Other companies that were exploring for gold in Morocco were the Archean Group of India, which carried out a feasibility study for the Tafrent gold deposit in Ouarzazate Province. Archean estimated the mineral resources at the Tafrent deposit to be 6.1 Mt grading 1.18 g/t at a cutoff rate of 0.8 g/t. Metalex Ventures Ltd. of Canada was exploring with ONHYM in the Tichla region, and Newmont Mining Corp. of the United States completed a partnership agreement with ONHYM in which Newmont completed a geochemical survey using the bulk-leach-extractable-gold method to identify anomalies north of the Akka Mine in the western High Atlas region, but no significant gold mineralization was intersected. PHAM Mining of Canada

was prospecting for gold in the Tichka East project in El Haouz Province (Office National des Hydrocarbures et des Mines, 2015a, p. 34–35).

**Silver.**—According to the Silver Institute's World Silver Survey, Morocco's silver mine output increased to 276,000 kg in 2014 from 254,000 kg in 2013, and ranked the country 15th and 17th, respectively, in world production in 2014 and 2013. The supply of silver from recycled old scrap decreased to about 29,000 kg in 2014 compared with 31,000 kg in 2013, and the fabrication of silver was estimated to be 19,000 kg, including 8,000 kg of industrial applications and 10,000 kg of jewelry and silverware. In 2014, silver was produced by Managem at the Imiter Mine, which produced 185,577 kg, and by Maya Gold at the Zgounder Mine, which had partial year output of 3,331 kg. The discrepancy between the reported output of 188,808 kg from both mines and the World Silver Survey's estimate of 254,000 kg may be attributed to the use of the Imiter Mine's capacity of 230,140 kg (7.4 million ounces) instead of the actual reported output by Managem Group in its annual report for 2014 (table 1; Maya Gold and Silver Inc., 2015d; Silver Institute, 2015, p. 81, 83, 85, 87, 91).

Maya Gold held exploration and exploitation licenses for six properties in Morocco—the Amizmiz, Azegour Mine, the Boumadine polymetallic mine, Permit 233263, the Touchkat, and the Zgounder silver mine. The Boumadine Mine, which is located in western Morocco near Tinejad, had an estimated historical (1992) polymetallic reserve of 261,485 t grading 3.8% zinc, 1.5% lead, 200 g/t silver, and 3.5 g/t gold. In 2013, Maya Gold created a new joint venture, Zgounder Millenium Silver Mining, with ONHYM (15% interest) to explore and develop the Boumadine polymetallic deposit, which includes copper, gold, lead, silver, and zinc (Maya Gold and Silver Inc., 2015a).

On July 22, Zgounder Millenium Silver Mining started silver production at the Zgounder Mine, following the completion of the rehabilitation of the mine and mill. By December, it had processed 20,665 t of ore grading 278 g/t silver. The mine is located 150 km south of Marrakech, and had an estimated historical (2004) reserve of 582,000 t with an average grade of 361 g/t silver. The mine also had an estimated additional 500,000 t of tailings at an average grade of 125 g/t silver. In 2014, Maya Gold submitted an NI 43–101 preliminary economic assessment report on the Zgounder silver deposit. The mineral reserves estimates for the mine were 152,000 t of proven reserves and 421,000 t of probable reserves. Maya Gold established an annual production target for the Zgounder Mine of 17,715 kilograms per year (kg/yr) of silver through cyanidation and planned to increase silver output to 43,540 kg/yr by using flotation cells (Maya Gold and Silver Inc., 2015d).

**Tin.**—In 2014, Kasbah continued working on the definitive feasibility study of the Achmmach tin project, which was expected to be completed in 2015. The Achmmach tin project was located in the El Hajeb region, in the Central Hercynian Massif, about 140 km southeast of Rabat. The project consisted of two exploitation permits (PE No 2912 and PE No 193172) that cover an area of about 32 km<sup>2</sup>. Kasbah sought to increase the size of the deposit's resource, to prove the economic viability of the project, and to advance Achmmach to a development decision. In 2013, Kasbah signed a shareholder

agreement with Toyota Tsusho Corp. (TTC) and Nittetsu Mining Co. Ltd. (NMC), both of Japan, for the development of the Achmmach tin mine. Under the new agreement, Kasbah reduced its share at the Achmmach project to 75% from 100%, which enabled TTC to hold 20% interest and NMC, 5% interest, in the project. Kasbah updated the total ore reserve at Achmmach to 9.22 Mt at 0.77% tin for about 71,300 t of contained tin, including 1.3 Mt of proven reserves grading 0.97% tin and about 8.0 Mt of probable reserves grading 0.74% tin (Kasbah Resources Ltd., 2014, p. 5–13; 2015a).

The Bou El Jaj tin project (BLJ) was 100% owned by Kasbah; it is located about 15 km from the Achmmach tin project and is the southernmost extension of a mineralized corridor that is from about 2.5 km to 3 km wide and nearly 12 km long in strike. The BLJ deposit had a strong surface geochemical signature for tin with outcropping tin mineralization evident along 2,100 meters (m) of strike length. A 5,000-m core-drilling program was initiated in late 2012. The company did not carry out any significant work at the project during 2014, except for low-level evaluations for possible tin deposits in the areas surrounding the Ment and Zaer granite structures (Kasbah Resources Ltd., 2014; 2015b p. 16–18).

### **Industrial Minerals**

**Barite.**—Morocco’s production of barite has nearly doubled during the past 5 years, and the country has become the world’s leading producer and exporter of barite after China. Barite production decreased to 1.0 Mt in 2014 from about 1.1 Mt in 2013. Broychim S.A.R.L. was the main producer and exporter of barite products in the country, and its share of the market was between 60% and 65%. Broychim exported barite to the United States and to countries in Africa, Europe, and the Middle East. The company expected a 35% reduction in output in 2015 because of decreased worldwide demand by oil companies that use barite as an additive in oilfield drilling mud. The volume of Broychim’s barite exports increased to 460,000 t in 2014 from 400,000 t in 2013. Other barite producers in Morocco included CADETAF, Compagnie Marocaine des Barytes S.A., Société Nord Africaine de Recherches et d’Exploitation des Mines d’Argana, and Société Nouvelle Union des Métaux Maroc (tables 1, 2; Broychim S.A.R.L., 2015).

**Cement.**—In 2014, cement production decreased by 7% to 15.7 Mt from a revised 16.9 Mt in 2013. Morocco and Western Sahara’s cement production capacity increased to more than 24 million metric tons per year (Mt/yr). The capacity included 1.9 Mt/yr of grinding capacity, of which 0.5 Mt was located in Laayoune in Western Sahara. The major producers of cement in Morocco included Lafarge Maroc S.A., which was 50% owned by Lafarge Group of France (and the country’s top producer of cement) and held 38% of the country’s total capacity; Holcim Maroc S.A., which was majority owned (61%) by Holcim Ltd. of Switzerland and held 22% of the country’s total capacity; Ciments du Maroc, which was majority owned (58.3%) by Italcementi Group of Italy and held about 18% of total cement production capacity; and Ciments de L’Atlas, which held 13% of the the country’s total capacity (International Cement Review, 2015, p. 238–239).

**Fluorspar.**—Société Anonyme d’Entreprises Minières (SAMINE) produced acid-grade fluorite ( $\text{CaF}_2$ ) from the El Hammam Mine, which was the only fluorite mine in Morocco and was located 63 km south of Meknes in the Middle Atlas region of Morocco. The company, which had the capacity to produce 100,000 metric tons per year (t/yr) of fluorspar and employed 500 people, produced 74,854 t of acid-grade fluorspar in 2014 compared with 73,900 t in 2013. Fluorite mineralization at the Djebel El Hamman, where the mine is located, occurs in calcium-bearing silicate rocks that include concentrations of copper, lead sulfide, and zinc. The fluorite veins, which include the El Hammam vein, the Bergamou vein, and the Gouaida vein, are hosted in a metamorphosed series of Paleozoic sandy shales, mudstones, and limestones (Mindat.org, 2014; Managem S.A., 2015c, 2016, p. 60).

In 2014, ONHYM, in partnership with Garrot Chaillac S.A. of France, mined 100 t of ore from the fluorspar-lead-barium Zrahina deposit, which is located in the Western High Atlas region. The ore was used in a pilot study to produce a 97% acid-grade  $\text{CaF}_2$  within specific metallurgical parameters and processing design (Office National des Hydrocarbures et des Mines, 2015a, p. 35).

**Phosphate Rock.**—In 2014, OCP produced 27.4 Mt of phosphate rock compared with 26.4 Mt in 2013, about 5 Mt of phosphoric acid (in terms of  $\text{P}_2\text{O}_5$ ), and 7.4 Mt of phosphate-based fertilizers, including diammonium phosphate (DAP) (3.6 Mt), monoammonium phosphate (MAP) (2.8 Mt), and triple superphosphate (TSP) (1 Mt). The company’s capacity in 2014 was 36 Mt/yr of phosphate rock, 7.4 Mt/yr (in terms of  $\text{P}_2\text{O}_5$ ) of phosphate-based fertilizers, and 5.2 Mt/yr of phosphoric acid. The company’s share in the phosphate rock trade market was 47% for phosphoric acid, 33% for phosphate rock, and 17% for phosphate-based fertilizers. OCP planned to increase its phosphate rock capacity to more than 60 Mt/yr by 2025. The company was responsible for the production and sale of phosphate rock and manufactured phosphoric products at the Benguerir, the Khouribga, and the Youssoufia Mines in central Morocco and the Bou Craa Mine in Western Sahara (Arab Fertilizer Association, 2015, p. 53, 57, 65; OCP Group, 2015, p. 10, 52, 55, 58, 41, 81).

Morocco held more than 50 billion metric tons (Gt) of phosphate rock reserves, which was about 75% of global phosphate reserves, including deposits in the disputed Western Sahara region. OCP, which employed 21,000 people, had committed to investing up to \$5 billion during the next decade to develop the infrastructure for new mines and wash plants and to shift the industry more toward beneficiation and fertilizer production (OCP Group, 2015, p. 11).

OCP operated the El Halassa plant, which treated 6.7 Mt of phosphate rock from the El Halassa Mine and 5 Mt extracted from the Sidi Chenane Mine. The El Halassa plant was the world’s largest phosphate washing plant and had the capacity to wash 12 Mt/yr of phosphate rock. In February, OCP launched a fertilizer production unit that was dedicated to Africa, and by December, the company doubled its fertilizer exports to African countries. In April, the group issued initial bond offerings valued at \$1.85 billion in two stages. The first stage included \$1.25 billion of bonds that mature in 10 years, and the second

stage included \$600 million of bonds that mature in 30 years. In May, OCP and Potash Corp. of Canada signed a definitive agreement that would enable Potash Corp. to buy OCP's full range of finished phosphate products to meet the needs of its customers in Canada and the United States. The two companies also signed a memorandum of understanding (MOU) regarding the supply of ammonia to be provided by Potash Corp. to meet OCPs growing ammonia requirements, in particular for its new fertilizer manufacturing complex at Jorf Lasfar (OCP Group, 2015, p. 15, 40, 47).

In June, OCP and Fertilizantes Heringer S.A. of Brazil signed an agreement that would allow OCP to acquire about 10% of Heringer's shares through investment. This transaction would enable Heringer to expand its fertilizer mixing capacity in its main markets. The two companies also signed an agreement for the long-term supply of phosphate products, which would start after the investment was finalized (OCP Group, 2015, p. 14).

In October, OCP inaugurated the phosphate slurry pipeline that would transport phosphate rock from the Khouribga phosphate mine to Jorf Lasfar, where it would be processed and later exported. The 235-kilometer-long pipeline had the capacity to transfer 38 Mt/yr of phosphate ore, thus reducing the cost of delivery and water consumption by maintaining the natural moisture of the rock. A 300-acre site was set aside for phosphate-processing plants, factories, storage warehouses, and new harbor facilities to export phosphate-based products (OCP Group, 2015, p. 15).

In 2014, OCP increased its interest in Bunge Maroc Phosphore, which was a joint venture of Bunge Ltd. of Brazil and OCP, to 50%. The company was expected to increase DAP production capacity at Jarf Lasfar to 7 Mt/yr by building two more fertilizer granulation units. The increase in capacity would supply additional phosphate fertilizer and phosphate-based products for Bunge's agribusinesses and food operations in South America (OCP Group, 2015, p. 105).

### **Mineral Fuels**

By the end of 2014, the Government had awarded 90 offshore exploration permits, 40 onshore exploration permits, 3 offshore prospecting zones, 2 onshore prospecting zones, and 11 exploitation concessions (2 of which were awarded to ONHYM). The Government also signed four MOUs for the development of oil shale in the country. The holders of onshore permits included such companies as Anadarko Petroleum Corp. of the United States, Cabre Maroc Ltd., Circle Oil Maroc Ltd., East West Petroleum of Canada, Genel Energy plc of Turkey and the United Kingdom, Longreach Oil of Australia, Petro Petroleum Inc. of Canada, PetroMaroc Corp. plc of Canada, Repsol Exploration Atlas S.A. of Spain, and San Leon Energy Plc of the United Kingdom. The companies that held offshore permits were Capricorn Exploration and Development Co. Ltd. (a subsidiary of Cairn Energy Plc of the United Kingdom), Chariot Oil & Gas Ltd. of the United Kingdom, Chevron Morocco Exploration Ltd. (a subsidiary of Chevron Corp. of the United States), Galp Energia of Portugal, Genel Energy plc of Turkey and the United Kingdom, Kosmos Energy Ltd. of the United States, and

Total S.A. of France (Office National des Hydrocarbures et des Mines, 2015a, p. 13, 18, 21).

**Natural Gas.**—Morocco produced modest quantities of natural gas, which amounted to 44.34 million cubic meters in 2014 compared with 45.16 million cubic meters in 2013. Additionally, the country received royalties for allowing the transmission of 9.74 billion cubic meters of natural gas from Algeria to Spain across its land in 2014. The Europe-Magherb Pipeline netted Morocco 697 million cubic meters of natural gas in 2014 compared with 708 million cubic meters in 2013. The country's natural gas consumption in 2014, which totaled more than 1 billion cubic meters, was far greater than the country's domestic production of natural gas and the natural gas given to Morocco by Algeria as a royalty for the placement of Algeria's pipelines across Morocco. Morocco imported natural gas from Algeria at a rate of 640 million cubic meters per year under a 10-year contract (Office National des Hydrocarbures et des Mines, 2015a, p. 28; 2015b).

**Petroleum.**—The Government's energy strategy, which sought to reduce dependence on hydrocarbon imports, established financial terms for hydrocarbon exploration agreements that would attract investment in the hydrocarbon sector. These terms capped the Government's share in hydrocarbon projects at 25%, which was less than the 50% share held by other North African countries (Algeria and Libya). More than 40 international oil companies were involved in drilling operations for oil and gas in Morocco, with some licenses extending to 25 years, allowing the companies to acquire 75% of the value of extractions in return for the companies investing part of their revenues in additional exploration operations and paying fees. In 2014, the ONHYM amended 16 existing agreements, awarded 3 new prospecting contracts, and signed 2 new petroleum exploration agreements and 2 MOUs (Office National des Hydrocarbures et des Mines, 2015a, p. 24).

In 2014, Morocco had 10 known oil shale deposits that contained an estimated 3.5% of the world's oil shale resources. According to U.S. Energy Information Administration estimates, the oil shale deposits in Morocco and Western Sahara contained 567 billion cubic meters of technically recoverable shale gas and 200 million barrels of shale oil in place. Projected production from oil shale deposits was estimated to be 50,000 barrels per day. The oil shale deposits included the Tadla basin in Central Morocco; the Tarfaya basin in southwestern Morocco; Timahdit, which is the second largest deposit in Morocco and is located in the Middle Atlas Mountains; and the Tindouf basin, which extends across Morocco and Western Sahara. In 2012, core drilling at the deposit had identified estimated reserves of 42 Gt of oil shale containing an estimated 15 billion barrels of oil in place (Tar Sands World, 2014; U.S. Energy Information Administration, 2013, XIV-1; Office National des Hydrocarbures et des Mines, 2015a, p. 27).

In 2014, ONHYM partnered with four companies to develop oil shale resources in a 382-km<sup>2</sup> area. ONHYM signed a MOU with Global Oil Shale Group Plc of the United Kingdom to evaluate oil shale resources in the Tarfaya south oil shale deposit and in the Permit 1 area, and amended the agreement with ZonaTec S.A. to include permits 13–16 in the Tarfaya West Flank concession area (Office National des Hydrocarbures et des Mines, 2015a, p. 13, 25, 27).

## Outlook

Morocco is expected to continue to receive international investments in the metals, natural gas, petroleum, and phosphate sectors as the Government continues to take additional steps to privatize selected state-owned mining assets and to launch reform programs within the mining industry to boost the industry's competitiveness. In addition to phosphate rock, silver and tin could prove to be significant mineral commodities for Morocco as Maya Gold and Kasbah develop their silver and tin resources, respectively. Broychim is adjusting its production targets for barite according to changes in international demand. The OCP is expected to continue to establish joint ventures with international companies to ensure more effective operations and entry into new markets in Africa, Brazil, and India. Managem is likely to expand its base- and precious-metals operations inside and outside the country by focusing on copper production in Morocco and gold in such African countries as the Democratic Republic of the Congo ([Congo (Kinshasa)], the Republic of the Congo [Congo (Brazzaville)], Gabon, and Sudan. ONYHM is likely to continue supporting the development of the hydrocarbons and mining industries within the country.

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## WESTERN SAHARA

The issue of sovereignty for Western Sahara, which was claimed by the Moroccan Government, the Saharawi Arab Democratic Republic (SADR), and the Popular Front for the Liberation of the Saguia el Hamra and Rio de Oro (Polisario), remained unresolved in 2014. About 85% of the Western Saharan territory was administered by the Government of Morocco and the remaining 15% was under the administration of the Polisario. The territory is a desert area bordering the Atlantic Ocean between Mauritania and Morocco. Western Sahara's economy continued to be dependent on fishing, pastoral nomadism, and phosphate rock mining (Crisp, 2014).

Phosphate de Boucraa S.A. (Phosboucraa), which was a fully owned subsidiary of OCP, was responsible for mining,

beneficiation, transportation, and marketing of phosphate rock at the Bou Craa Mine. The mine had the world's longest conveyor belt, employed 2,200 people (most of them locals), and held 800 Mt of phosphate rock ore, which was 1.6% of Morocco's phosphate rock reserves. Phosphate rock mined in Western Sahara was moved by the conveyor belt for a distance of more than 100 km to the Port of El Aaiun. The phosphate ore was offloaded to cargo vessels for transport to various countries where the phosphate was used in fertilizer production. According to Western Sahara Resource Watch, 2.1 Mt of phosphate rock valued at \$230 million was exported in 2014 compared with 2.2 Mt valued at \$330 million in 2013. Phosphate rock exports went to Canada (37%), Lithuania (19%), New Zealand (12%), the United States (9%), Mexico (8%), Colombia (5%), Australia (4%), and others (4%) (Western Sahara Resource Watch, 2015, p. 10, 11).

Kosmos Energy was exploring for crude oil and natural gas at the Cap Boujour Block, which is located in the Aaiun Basin offshore Western Sahara. The block was the last undrilled Cretaceous basin alongside the North West Africa Atlantic Margin. In September, the Polisario issued a statement opposing the exploration and development of offshore hydrocarbon resources in the territorial waters of Western Sahara (Petroleum Africa, 2014; Kosmos Energy Ltd., 2015).

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TABLE 1  
MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                         | 2010      | 2011                | 2012                | 2013                 | 2014      |
|--|-----------|---------------------|---------------------|----------------------|-----------|
| <b>METALS</b>                                  |           |                     |                     |                      |           |
| Antimony, antimony oxide                       | 1,700     | 15,700              | 7,100               | 7,000                | 7,000     |
| Cobalt:  |           |                     |                     |                      |           |
| Concentrates, gross weight                     | 31,095    | 21,587              | 20,000              | 20,330               | 20,900    |
| Metal <sup>3</sup>                             | 1,582     | 1,718               | 1,314               | 1,353                | 1,391     |
| Copper:  |           |                     |                     |                      |           |
| Concentrates, gross weight                     | 53,300    | 43,000              | 59,000              | 46,320               | 66,480    |
| Cu content, concentrates                       | 12,690    | 12,893              | 17,700              | 10,172 <sup>r</sup>  | 16,579    |
| Gold kilograms                                 | 650       | 520                 | 519                 | 463 <sup>r</sup>     | 337       |
| Iron and steel:                                |           |                     |                     |                      |           |
| Iron ore:                                      |           |                     |                     |                      |           |
| Gross weight                                   | 44,665    | 78,926              | 260,700             | 301,100              | 22,910    |
| Fe content (54%)                               | 24,119    | 42,620              | 140,778             | 162,540 <sup>r</sup> | 12,366    |
| Metal:   |           |                     |                     |                      |           |
| Steel, crude                                   | 485,000   | 654,000             | 539,000             | 558,000              | 500,000   |
| Hot rolled                                     | 1,035,000 | 1,090,000           | 855,000             | 1,035,000            | 970,000   |
| Lead:  |           |                     |                     |                      |           |
| Concentrate:                                   |           |                     |                     |                      |           |
| Gross weight                                   | 46,373    | 43,821              | 39,100              | 43,700               | 39,070    |
| Pb content (40%)                               | 38,200    | 36,500              | 15,600              | 17,435               | 15,628    |
| Cuprous matte, Pb content                      | 890       | 470                 | 600                 | 600                  | 600       |
| Metal, refined:                                |           |                     |                     |                      |           |
| Primary  | 38,237    | 36,469              | 38,000              | 38,000               | 38,000    |
| Secondary <sup>e</sup>                         | 3,000     | 3,000               | 2,500               | 2,500                | 2,500     |
| Total <sup>e</sup>                             | 41,200    | 39,500              | 40,500 <sup>r</sup> | 40,500 <sup>r</sup>  | 40,500    |
| Manganese ore, largely chemical-grade          | 75,614    | 58,000              | 90,200              | 110,970              | 91,271    |
| Mercury <sup>e</sup>                           | 10        | 9                   | 8                   | 8                    | 8         |
| Nickel content of nickel sulfate               | 317       | 217                 | 288                 | 175                  | 220       |
| Silver, Ag content kilograms                   | 243,000   | 186,090             | 173,400             | 254,000 <sup>r</sup> | 276,000   |
| Zinc:  |           |                     |                     |                      |           |
| Concentrate:                                   |           |                     |                     |                      |           |
| Gross weight                                   | 87,360    | 90,129              | 92,000              | 82,500               | 89,570    |
| Zn content                                     | 43,680    | 45,065              | 45,800              | 47,600               | 45,000    |
| Zn oxide                                       | 16,500    | 7,200               | 6,889               | 6,963                | 7,166     |
| <b>INDUSTRIAL MINERALS</b>                     |           |                     |                     |                      |           |
| Arsenic trioxide                               | 13,731    | 8,154               | 8,820               | 8,968                | 8,200     |
| Barite, crude                                  | 572,429   | 769,504             | 1,021,400           | 1,094,470            | 1,006,600 |
| Cement, hydraulic thousand metric tons         | 14,000    | 14,000              | 16,270 <sup>r</sup> | 16,870 <sup>r</sup>  | 15,710    |
| Clays, crude:                                  |           |                     |                     |                      |           |
| Bentonite                                      | 110,700   | 97,071              | 91,200              | 105,240              | 98,757    |
| Fuller's earth (smectite)                      | 82,570    | 103,682             | 81,800              | 59,000               | 73,500    |
| Montmorillonite (ghassoul)                     | 1,186     | 1,419               | 1,900               | 1,990                | 810       |
| Feldspar <sup>e</sup>                          | --        | 43,889 <sup>4</sup> | 45,000              | 45,000               | 45,000    |
| Fertilizers thousand metric tons               | 3,713     | 4,350               | 4,500               | 7,400                | 7,400     |
| Fluorspar, acid-grade                          | 89,700    | 79,207              | 79,300              | 73,900 <sup>r</sup>  | 74,854    |
| Phosphate rock:                                |           |                     |                     |                      |           |
| Gross weight <sup>5</sup> thousand metric tons | 26,603    | 28,052              | 27,060              | 26,400               | 27,390    |
| P <sub>2</sub> O <sub>5</sub> content do.      | 8,500     | 8,977               | 8,659               | 8,448                | 8,640     |
| Phosphoric acid do.                            | 3,999     | 4,888               | 4,158               | 4,700                | 5,000     |
| Pyrophyllite                                   | 27,066    | 4,600               | --                  | --                   | --        |

See footnotes at end of table.

TABLE 1—Continued  
MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                          | 2010                | 2011                | 2012                | 2013                | 2014    |
|---|---------------------|---------------------|---------------------|---------------------|---------|
| INDUSTRIAL MINERALS—Continued                   |                     |                     |                     |                     |         |
| Salt: <sup>5</sup>                              |                     |                     |                     |                     |         |
| Rock  | 503,351             | 720,814             | 730,000             | 488,920             | 439,160 |
| Marine  | 20,000              | 25,000              | 25,000              | 20,000              | 20,000  |
| Total   | 523,351             | 745,814             | 755,000             | 508,920             | 459,160 |
| Sulfur, refineries byproduct                    | 38,000              | 53,000              | 62,000              | 60,000              | 60,000  |
| Sulfuric acid <sup>6</sup> thousand metric tons | 12,000 <sup>r</sup> | 14,500 <sup>r</sup> | 12,500 <sup>r</sup> | 14,000 <sup>r</sup> | 15,000  |
| Talc  | --                  | 500                 | 200                 | --                  | --      |
| MINERAL FUELS AND RELATED MATERIALS             |                     |                     |                     |                     |         |
| Natural gas, dry million cubic meters           | 60                  | 60                  | 43                  | 45                  | 44      |
| Petroleum:                                      |                     |                     |                     |                     |         |
| Crude thousand 42-gallon barrels                | 1,575               | 1,500               | 1,600               | 1,847               | 1,847   |
| Refinery products:                              |                     |                     |                     |                     |         |
| Liquefied petroleum gas do.                     | 336                 | 429                 | 1,322               | 1,114               | 9,915   |
| Gasoline do.                                    | 2,798               | 3,284               | 3,472               | 3,310               | 2,876   |
| Jet fuel do.                                    | 3,391               | 4,219               | 6,955               | 8,406 <sup>r</sup>  | 7,185   |
| Distillate fuel oil do.                         | 14,741              | 17,374              | 19,722              | 16,121              | 16,443  |
| Residual fuel oil do.                           | 12,214              | 17,962              | 14,106              | 13,054 <sup>r</sup> | 10,026  |
| Other do.                                       | 14,520              | 8,732               | 3,423               | 1,995 <sup>r</sup>  | 1,555   |
| Total do.                                       | 48,000              | 52,000              | 49,000              | 44,000              | 48,000  |

<sup>6</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through December 31, 2015.

<sup>2</sup>In addition to the commodities listed, gypsum, lime, perlite, and a variety of crude construction materials were produced, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Cobalt electrowon from cobalt concentrates and tailings from the Bou-Azzer Mine.

<sup>4</sup>Reported figure.

<sup>5</sup>May include production from Western Sahara.

TABLE 2  
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2014

(Metric tons unless otherwise specified)

| Country and commodity  | Major operating companies and major equity owners   | Location of main facilities        | Annual capacity |
|------------------------|---|------------------------------------|-----------------|
| <b>MOROCCO</b>         |   |                                    |                 |
| Arsenic trioxide       | Compagnie de Tifnout Tighanimine Managem S.A. (CTT Managem) (Managem S.A., 55.2%, and Société Metallurgique d'Imiter, 20%)                | Guemassa, Marrakech                | 6,100           |
| Barite                 | Central d'Achat et de Développement de la Région Minière du Tafilalet et de Figuig (CADETAF) (artisanal miners)                           | Errachidia, Figuig, and Ouarzazate | 16,000          |
| Do.                    | Broychim S.A.R.L.   | Casablanca                         | 24,000          |
| Do.                    | do.   | Safi                               | 150,000         |
| Do.                    | Compagnie Marocaine des Barytes S.A. (COMABAR) [Norbar Minerals AS, 55%, and Office National des Hydrocarbures et des Mines (ONHYM), 45%] | Tlet Ighoud, Safi                  | 160,000         |
| Do.                    | do.   | Zelmou, Figuig                     | 110,000         |
| Do.                    | Société Nord Africaine de Recherches et d'Exploitation des Mines d'Argana (SNAREMA)   | Seksaoua, Marakech                 | 120,000         |
| Do.                    | Société Nouvelle Union des Metaux Maroc (SNUMM)   | Jbel Abdellah, Errachidia          | 12,000          |
| Barite, chemical grade | Société Nord Africaine de Recherches et d'Exploitation des Mines d'Argana (SNAREMA)   | Argana                             | 30,000          |
| Bentonite              | Société Minière Bentonite d'Afarha S.A. [Grupo Tolsa, 80%, and Office National des Hydrocarbures et des Mines (ONHYM), 20%]               | Aferha                             | 9,200           |
| Do.                    | Société d'Exploitation des Mines du Rif (SEFERIF) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]                          | Bou Hoed, near Ouxiane             | 15,000          |
| Do.                    | Compagnie Marocaine des Barytes (COMABAR) [Norbar Minerals AS, 55%, and Office National des Hydrocarbures et des Mines (ONHYM), 45%]      | Azzouzet-Tidiennit                 | 5,000           |
| Do.                    | North African Industrial Minerals Exploration S.A.R.L. (S&B Group)  | Trebia Mine                        | NA              |
| Cement, portland       | Asment de Temara (Cimentos Asment EAA, 63%, PROCIMAR, 21%, Cement Francais, 16%)  | Kiln and mill at Temara            | 1,250,000       |
| Do.                    | Ciments de L'Atlas (CIMAT)  | Beni Mellal kiln and mill          | 1,600,000       |
| Do.                    | do.   | Settat kiln and mill               | 1,600,000       |
| Do.                    | Lafarge Maroc S.A. (Lafarge Group, 50%)   | Bouskoura, near Casablanca         | 3,000,000       |
| Do.                    | do.   | Tetouan, south of Casablanca       | 2,500,000       |
| Do.                    | do.   | Cadem clinker mill at Meknes       | 1,750,000       |
| Do.                    | do.   | Tamuda kiln and mill, Tetouan      | 800,000         |
| Do.                    | do.   | Grining unit at Tangier            | 1,000,000       |
| Do.                    | Holcim Maroc S.A. (Holcim AG., 61%)   | Kiln and mill at Oujda             | 1,300,000       |
| Do.                    | do.   | Settat kiln and mill               | 1,700,000       |
| Do.                    | do.   | Fes, Ras El Ma kiln and mill       | 1,300,000       |
| Do.                    | do.   | Fes, Doukkarat clinker mill        | 600,000         |
| Do.                    | do.   | Nador clinker mill                 | 400,000         |
| Do.                    | Ciments du Maroc S.A. (Italcementi Group, 58.3%)  | Kiln and mill at Agadir            | 1,400,000       |
| Do.                    | do.   | Kiln and mill at Marrakech         | 1,300,000       |
| Do.                    | do.   | Kiln and mill at Safi              | 1,000,000       |
| Do.                    | do.   | Laayoune clinker mill              | 500,000         |
| Clay                   | Société du Ghassoul et de ses Derives SEFRIOUI SA   | Tamdafelt                          | NA              |
| Do.                    | Antonio Reyes Mines S.A.  | Haddou Ammar, Nador                | NA              |
| <b>Cobalt:</b>         |   |                                    |                 |
| Ore, gross weight      | Compagnie de Tifnout Tighanimine (Managem Group S.A.)   | Bou-Azzer, Ouarzazate              | 200,000         |
| Metal                  | do.   | Guemassa, Marrakech                | 2,500           |

See footnotes at end of table.

TABLE 2—Continued  
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2014

(Metric tons unless otherwise specified)

| Country and commodity                          |                            | Major operating companies and major equity owners  | Location of main facilities                         | Annual capacity |
|--|----------------------------|--|---|-----------------|
| MOROCCO—Continued                              |                            |  |   |                 |
| Copper, concentrate                            |                            | Société Minière de Bou Gaffer (SOMIFER) (Managem S.A., 100%)   | Bleida, central Anti-Atlas                          | 50,000          |
| Do.  |                            | Compagnie Minière de Guemassa (CMG) [Managem S.A., 70.77%, and Office National des Hydrocarbures et des Mines (ONHYM), 29.23%]   | Douar Hajar Mine, Guemassa, Marrakech               | 18,000          |
| Do.  |                            | Akka Gold Mining Company [Managem S.A., 50.02%, and Office National des Hydrocarbures et des Mines (ONHYM), 16.07%]  | Iourim, Tiznit                                      | 30,000          |
| Fluorspar, concentrate                         |                            | Société Anonyme d'Entreprises Minières (SAMINE) (Managem S.A., 100%)   | El Hammam, Khémisset, 63 kilometers south of Meknes | 100,000         |
| Gold   | kilograms                  | Akka Gold Mining Company [Managem S.A., 50.02%, and Office National des Hydrocarbures et des Mines (ONHYM), 16.07%]  | Iourim, Tiznit                                      | 725             |
| Iron ore                                       |                            | Société d'Exploitation des Mines du Rif (SEFERIF) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]   | Bouhoua, Nador                                      | 120,000         |
| Concentrate                                    |                            | Compagnie Minière de Guemassa (CMG) [Managem S.A., 74%, and Bureau de Recherches de Participations Minières (BRPM), 23.08%]  | Douar Hajar Mine, Guemassa                          | 29,900          |
| Do.  |                            | Compagnie Minière de Touissit (CMT) (Emerging Capital Partners, 50%, and Truffle Capital, 50%)   | Touissit, Jerada                                    | 73,000          |
| Metal <sup>1</sup>                             |                            | Société des Fonderies de Plomb de Zellidja (SFPZ) (Zellidja S.A., 50.4%)   | Oued El Heimer                                      | 70,000          |
| Lime   |                            | Lafarge Calincor Maroc (Lafarge Group)   | Two kilns at Tlad Loulad                            | 180,000         |
| Manganese, concentrate                         |                            | Société Anonyme Chérifienne d'Etudes Minières (SACEM) [Bureau de Recherches de Participations Minières (BRPM), 43%, and Compagnie Minière de l'Ogooué SA (COMILOG), 30%] | Imini, Ouarzazate                                   | 14,000          |
| Natural gas                                    | million cubic meters       | Joint venture of Circle Oil Maroc Ltd. (COML) (75%) and Office National des Hydrocarbures et des Mines (ONHYM), 25%  | Sebou gasfield                                      | 72              |
| Nickel metal                                   |                            | Compagnie de Tifnout Tighanimine (Managem Group S.A.)  | Bou-Azzer, Ouarzazate                               | 250             |
| Petroleum, refinery products                   | thousand 42-gallon barrels | Société Anonyme Marocaine de l'Industrie du Raffinage (SAMIR) (Group Corral Petroleum, 64.7%, and general public, 35.3%)   | Mohammedia  | 75,000          |
| Do.  | do.                        | do.  | Sidi Kacem  | 9,500           |
| Phosphate rock                                 |                            | Office Chérifien des Phosphates (OCP) (Government, 100%)   | Khouribga-Jorf Lasfar Axis,                         | 19,000,000      |
| Do.  |                            | do.  | Mera El Arech Mine, Khouribga mining center         | 6,000,000       |
| Do.  |                            | do.  | Benguerir open pit mine, Gantour mining center      | 6,000,000       |
| Do.  |                            | do.  | Youssoufia underground mine, Gantour mining center  | 3,000,000       |
| Do.  |                            | do.  | Sidi Chennane Mine, Khouribga mining center         | 2,000,000       |
| Phosphoric acid, P <sub>2</sub> O <sub>5</sub> |                            | Office Chérifien des Phosphates (OCP)  | Maroc Chimie I and II, Safi                         | 500,000         |
| Do.  |                            | do.  | Maroc Phosphore I and II, Safi                      | 1,150,000       |
| Do.  |                            | do.  | Maroc Phosphore III, IV, Jorf Lasfar                | 1,500,000       |
| Do.  |                            | Indo Maroc Phosphore S.A. [Office Chérifien des Phosphates (OCP), 33.33%; Chambal Fertilizers and Chemicals Ltd., 33.33%; Tata Chemicals Ltd., 33.33%]                   | Jorf Lasfar   | 430,000         |
| Do.  |                            | Bunge Maroc Phosphore (Office Chérifien des Phosphates (OCP), 50%, and Bung Brasil, 50%)   | do.   | 375,000         |

See footnotes at end of table.

TABLE 2—Continued  
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2014

(Metric tons unless otherwise specified)

| Country and commodity   | Major operating companies and major equity owners   | Location of main facilities  | Annual capacity                                  |         |
|---|---|--|--|---------|
| <b>MOROCCO—Continued</b>  |   |  |  |         |
| Phosphoric acid, P <sub>2</sub> O <sub>5</sub>                    | Jorf Fertilizer Co. V [Office Chérifien des Phosphates (OCP), 100%]   | Jorf Lasfar  | 375,000  |         |
| Do.   | Pakistan Maroc Phosphore [Office Chérifien des Phosphates (OCP), 50%, and Fauji Pakistani Group, 50%]   | do.  | 375,000  |         |
| Phosphoric acid (purified), P <sub>2</sub> O <sub>5</sub> content | Euro-Maroc Phosphore Co. [Office Chérifien des Phosphates (OCP), 33%; Société Chimique Prayon-Rupel, 33%; Chemische Frabrik Budenheim KG, 33%]                            | Jorf Lasfar <sup>2</sup>   | 150,000  |         |
| <b>Salt:</b>  |   |  |  |         |
| Rock  | Société de Sel de Mohammedia (SSM) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]   | Ain Tekki, Mohammedia  | 226,500  |         |
| Marine  | Société Chérifienne des Sels (SCS) [Government, 50%, and Société Nouvelle des Salins du Sine Saloum (SNSSS), 50%]   | Lac Zima, Safi   | 30,000   |         |
| Silver  | kilograms   | Société Metallurgique d'Imiter (SMI) (Managem S.A., 75.72%, and general public, 24.28%)  | Imiter Mine, Imiter                              | 230,140 |
| Do.   | do.   | Zgounder Millenium Silver Mining [Maya Gold and Silver Inc., 85%, and Office National des Hydrocarbures et des Mines (ONHYM), 15%] | Zgounder Mine, 150 kilometers south of Marrakech | 17,727  |
| <b>Steel products:</b>  |   |  |  |         |
| Bars and sections   | Société Nationale de Sidérurgie (Sonasid) (general public, 31.14%; Société Nationale d'Investissement S.A., 21.07%; Axa Assurances Maroc, 8.53%; Aceralia Redendos, 8.5%) | Jorf Lasfar  | 300,000  |         |
| Rebar and wire rod  | Univiers Acier S.A.   | Casablanca   | 1,000,000  |         |
| Do.   | do.   | do.  | 80,000   |         |
| Cold-rolled sheet   | Maghreb Steel S.A.  | do.  | 250,000  |         |
| Sulfuric acid   | Bunge Maroc Phosphore S.A.  | Jorf Lasfar  | 1,250,000  |         |
| Do.   | Indo Maroc Phosphore SA (IMACID)  | do.  | 1,200,000  |         |
| Do.   | Maroc Phosphore III-IV [Office Chérifien des Phosphates (OCP)]  | do.  | 5,800,000  |         |
| Do.   | Pakistan Maroc Phosphore S.A (PMP)  | do.  | 1,300,000  |         |
| Do.   | Office Chérifien des Phosphates Group (OCP)   | do.  | 3,200,000 <sup>2</sup>                           |         |
| Do.   | Maroc Chemei [Office Chérifien des Phosphates (OCP)]  | Safi   | 1,600,000  |         |
| Do.   | Maroc Phosphore I [Office Chérifien des Phosphates (OCP)]   | do.  | 2,500,000  |         |
| Do.   | Maroc Phosphore II [Office Chérifien des Phosphates (OCP)]  | do.  | 1,900,000  |         |
| <b>Talc and pyrophyllite:<sup>2</sup></b>                         |   |  |  |         |
| Pyrophyllite  | Société Industrie Minière Marocaine (IMM)   | Khenifra   | NA   |         |
| Talc  | Société Zenaga  | Tinjdad, Errachidia  | NA   |         |
| Do.   | do.   | Taliouine, Ouarzazate  | NA   |         |
| Zinc, concentrate   | Compagnie Minière de Guemassa (CMG) [Managem S.A., 70.77%, and Office National des Hydrocarbures et des Mines (ONHYM), 29.23%]  | Douar Hajar Mine, Guemassa   | 170,000  |         |
| Do.   | do.   | Draa Sfar  | NA   |         |
| Do.   | Société des Mines de Tenuous (SOMITE)   | Aguerd N'Tazoult, Azilal   | NA   |         |
| Do.   | Société Mineral et Substances   | Lalla Mimouna, Taza  | NA   |         |
| <b>WESTERN SAHARA</b>   |   |  |  |         |
| Cement  | Ciments du Maroc S.A. (CIMAR) (Italcementi Group, 58.3%)  | Laayoune, grinding   | 500,000  |         |
| Phosphate rock  | Phosphates de Bou Craa S.A. [Office Chérifien des Phosphates (OCP), 65%]  | Open pit mine, Bou Craa mining center  | 2,000,000  |         |

Do., do. Ditto. NA Not available.

<sup>1</sup>Société des Fonderies de Plomb de Zellidja also refines silver and produces copper matte and sodium antimonate.

<sup>2</sup>Under construction.