



2009 Minerals Yearbook

MOROCCO AND WESTERN SAHARA

THE MINERAL INDUSTRIES OF MOROCCO AND WESTERN SAHARA

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MOROCCO

Morocco possessed about three-quarters of the world's estimated reserves of phosphates. It was the world's third ranked producer of phosphates after China and the United States and controlled one-third of the international trade in phosphates and their derivatives. Morocco was continuing to develop its phosphate derivatives sector. These mineral commodities and products were Morocco's leading foreign exchange earning sector and accounted for about 35% of foreign trade. As a result, the mining industry continued to play a key role in the national economy (Arab-Greek Chamber, 2009).

Morocco produced 17% of the world's output of phosphate rock, 6% of the world's output of barite, 2% of the world's output of cobalt, 2% of the world's output of fluor spar, and 1% of the world's output of lead (Guberman, 2010; Jasinski, 2010; Miller, 2010a, b; Shedd, 2010).

Minerals in the National Economy

Mining was significant to the Moroccan economy. The country was home to more than 90 mining companies that produced 20 different minerals and accounted for about 35% of foreign trade, including about 75% of Morocco's exports (in terms of tonnage) and 6% of the gross domestic product. Morocco hosts several world-class deposits, including Bou-Azzer, which was the world's only deposit where cobalt was mined as a primary product, and the Imiter silver deposit. The Office Chérifien des Phosphates' (OCP's) phosphate deposits contained more than 30% of the world's total phosphate reserves (MarketResearch.com, 2009).

Government Policies and Programs

The Ministère de l'Industrie, du Commerce, de l'Energy et des Mines [Ministry of Industry, Trade, Energy, and Mines] is the Government agency responsible for oversight of the mining industry. The Bureau de Recherches et de Participations Minières [Office of Research and Mining Investments] (BRPM) is responsible for the development of most mineral resources. La Centrale d'Achat et de Développement de la Région Minière de Tafilalet et de Figuig is responsible for promoting and supporting the interests of artisanal miners in the Tafilalet and the Figuig regions. The OCP is responsible for managing and controlling all aspects of phosphate mining and beneficiation and the processing of phosphate derivatives. Mining legislation is based on the Mining Code Bill No. 1-73-412 of August 13, 1973, and is enforced through Executive Orders and the Directorate of Mines. The Office National de Recherches et d'Exploitations Pétrolières (ONAREP) is responsible for overseeing the energy sector (MBendi Information Services (Pty) Ltd., 2009c).

Production

In terms of the value of production, phosphate rock was Morocco's most important mineral and accounted for about 95% of the country's volume of mining output. In addition to phosphate rock, the country produced a variety of minerals, which included barite, clays, coal, cobalt, copper, fluor spar, gold, iron ore, lead, nickel, petroleum, salt, silver, talc, and zinc, among others. The level of production of most mineral commodities in 2009 remained about the same as in 2008 and was affected only marginally by the global recession. Notable changes in 2009 included lead production, which decreased, and silver production, which increased (table 1).

Structure of the Mineral Industry

There was little change in the structure of the mineral industry in 2009. Mineral concentrate production continued to be dominated by the private sector with the exception of phosphates, which was a state monopoly. Table 2 is a list of major mineral industry facilities, their capacities, and their locations.

Mineral Trade

Morocco signed a free trade agreement with the United States on June 15, 2004, which went into effect on January 1, 2006. The U.S.-Morocco Free Trade Agreement (FTA) was a comprehensive free trade agreement and was expected to provide U.S. exporters with increased access to the Moroccan market by eliminating tariffs on 95% of consumer and industrial goods. Since its entry into force, bilateral trade between the two countries had increased significantly. Morocco was the first African country to have an FTA with the United States (U.S. Department of State, 2009).

Morocco also had an FTA with the European Free Trade Association and with Turkey and was a member of the Arab Maghreb Union, which was made up of Algeria, Morocco, and Tunisia, and the Pan-Arab Free Trade Area. The Arab-Mediterranean Free Trade Agreement between Egypt, Jordan, Morocco, and Tunisia entered into force in 2007. Most of Morocco's trade was with the European Union (EU) (International Trade Center, 2009).

U.S. exports to Morocco were valued at about \$1,630 million in 2009. This total included, in order of value, \$183 million for fuel oil, \$54 million for coal and other fuels, \$22 million for iron and steel products, and \$6 million for specialized mining equipment (U.S. Census Bureau, 2009a).

U.S. imports from Morocco were valued at about \$468 million in 2009. This total included, in order of value, about \$158 million for gemstones, including precious and semiprecious; \$68 million

for iron and steel manufactures; and \$50 million for bauxite and aluminum (U.S. Census Bureau, 2009b).

Commodity Review

Metals

Cobalt.—Cobalt in Morocco is associated with arsenic in narrow vein structures found at the contact of a serpentine and quartz-rich diorite. The serpentines are the most obvious source rock for cobalt. The mineralized veins are vertically continuous for an estimated 200 meters (m). The ore has undergone several phases of brecciation and recrystallization related to late Pan-African and Hercynian deformations, which produced the various shapes of the ore bodies: flat lenses, lodes, stock works, and veins (Leblanc and Billaud, 1982).

Managem SA, which was a subsidiary of Omnium Nord African (ONA) (the largest private mining company in Morocco), continued to mine cobalt ore at the Bou-Azzer underground mine located 35 kilometers (km) south of Ouarzazate in southern Morocco in the central Anti-Atlas Mountain range. Managem announced that it would have a net loss in 2008 because of the downturn of the economy and because the prices of base metals and cobalt dropped in the second half of 2008. Increases in the prices of materials, such as sulfuric acid, also affected Managem's net results. Efforts were continuing in 2009 to improve management, streamline costs, and address volatility in output to alleviate constraints that had been in place for the past 5 years (Mining Journal, 2009).

Copper.—Odyssey Resources Ltd. of Canada was the first foreign company to acquire exploration licenses independently in Morocco. Odyssey had acquired a total of 34 exploration licenses on 392 square kilometers (km²) in the Anti-Atlas copper-silver district that encompassed six known deposits, one of which had been previously mined. The area has a high density of deposits in the copper-silver district, which included some of the largest known deposits. All the deposits are found within a narrow stratigraphic interval from the top of the Precambrian intrusive-volcanic-sedimentary sequence into the base of the unconformable overlying Infracambrian sedimentary sequence. Copper and silver grades and ratios vary from deposit to deposit. Estimated copper grades ranged from less than 1% to more than 3%, and estimated grades of silver ranged from less than 10 grams per metric ton (g/t) to more than 150 g/t (Odyssey Resources Ltd., 2009a).

Odyssey continued to have an interest in the Alous copper-silver deposit. The Alous deposit was the largest deposit located within Odyssey's Anti-Atlas properties. The deposit was composed of 2 licenses held directly by Odyssey and 24 licenses that were leased from the Government. The state-owned licenses were extended to July 2010, and Odyssey was considering exploration options for the deposit (Odyssey Resources Ltd., 2019b).

Gold.—Maya Gold and Silver Inc. of Canada announced that it had received high-grade results from its surface channel sampling program on its Amizmiz project. The designated AZS-1, AZS-2, and AZN zones were partially stripped and channel sampled. The mineralized zones appeared to be long stratabound

layers. On the AZS-1 zone, eight channel samples were collected for a length of 16 meters (m) and a width of 1.7 m and returned an average grade of 11.9 g/t gold and 21.9 g/t silver. On the AZS-2 zone, five channel samples were collected for a length of 9 m and a width of 0.87 m and returned an average grade of 25.1 g/t gold. On the AZN zone, 11 channel samples were collected for a length of 16 m and a width of 0.64 m and returned an average grade of 12.3 g/t gold and 33.7 g/t silver. These zones were situated about 1.1 km east of the designated TRNA zone, which returned an average value of 26.16 g/t gold across 0.98 m (MBendi Information Services (Pty) Ltd., 2009b).

The TRNA zone at Amizmiz's mineralized area appeared to be long stratabound layers that could be the result of the deposition of black smoker ashes on a carbonated sea floor. Further exploration was to include channel sampling and a 7,500-m drill program that was scheduled to begin in late 2009 (Maya Gold & Silver Inc., 2009).

In 2009, Agricola Resources plc of the United Kingdom was granted two gold exploration licenses in Tan Tan Province in southern Morocco. Agricola entered into a joint-venture agreement with the Minerals Exploration Branch of the Office National des Hydrocarbures et des Mines [National Office for Mines and Hydrocarbons] (ONHYM). Agricola was entitled to earn up to a 100% interest in the projects by funding all exploration costs. If an exploitable deposit is located, Agricola would pay ONHYM a 2% net smelter return thereafter. The Ain Kerma project is located 30 km east-northeast of Tan Tan in the Anti-Atlas Mountains about 50 km from the Atlantic coast. ONHYM spent about \$1 million during a 3-year period and identified several gold-bearing quartz veins. Of these veins, the 400-m-long AK-1 vein has identifiable gold values that range from 0.1 g/t to 6.5 g/t. The AK-4 structure extends for 800 m with a 300-m section of gold values that range from 4.7 g/t to 56 g/t across 0.3 m to 1.2 m. At the Toufrite project, gold occurs in a quartz vein developed within a granitic stock that intrudes a sequence of sandstones and volcanic breccias. The quartz vein extends for 230 m and ranges in width from 1 m to 6 m and grades from 0.2 g/t to 14 g/t gold (Agricola Resources plc, 2009).

Silver.—Silver was Morocco's secondmost important mineral commodity after phosphates. Silver in Morocco occurred both as the principal metal in ore deposits at Igoudrane and Imiter and as a byproduct from base-metals operations. Most of the country's silver production came from the Imiter Mine, which was owned and operated by Société Metallurgique d'Imiter (SMI) (a subsidiary of Managem S.A.). The Imiter Mine is located about 25 km from Boumaine du Dades in the Oriental Anti-Atlas Mountains in central Morocco. The Imiter Mine had a capacity of 300,000 metric tons per year (t/yr) of ore. The Igoudrane Mine had a capacity of 500,000 t/yr of ore (Maps of World, 2009).

Tin.—Kasbah Resources Ltd. of Australia acquired the rights to two tin deposits; one, the Achmmach Mine, was a large advanced hard rock project, and the other, the El Karit Mine, was a historic hard rock open pit mine that the company was evaluating. The Achmmach tin project was located in the El Hajeb region in the Central Hercynian Massif about 140 km southeast of Rabat. Kasbah announced that results from surface exploration at the western part of the permit had located an

outcrop of tin mineralization with assays of up to 9.9% tin. The addition of the Western zone increased the outcropping mineralization to three zones. Drilling and sampling were continuing. The Achmmach Mine, which was the larger of the two projects, was considered to be a significant tin deposit. Achmmach was reported to have an estimated resource of about 1 Mt of ore at an average grade of 1% tin. The mine development concept included a bulk underground mine and gravity/flotation plant that would produce about 5,700 t/yr tin during a 6-year mine life (Kasbah Resources Ltd., 2009).

Zinc.—Compagnie Minière des Guemassa (CMG) operated the Douar Hajar Mine, which is located in the Guemassa massif 35 km south of Marrakesh. Douar Hajar mined a polymetallic sulfide deposit hosted in upper Visean rocks. Hydrothermal mineralization occurred 120 m below the surface in the contact zone between a lower volcano-sedimentary series and an upper sedimentary formation. The operation was built with a design capacity of 6,000 metric tons per day processing run-of-mine ore averaging 10.5% zinc, 3% lead, 0.3% copper, and 60 g/t silver. Douar Hajar ore was blended with ore trucked from CMG's Drâa Lasfar Mine, which was located 15 km west of Marrakech (Mining Technology, 2009).

Industrial Minerals

Cement.—The Moroccan cement industry was largely dominated by four companies that were backed by four international cement producers—Asment de Temara (Cimentos de Portugal S.A. of Portugal), Ciments du Maroc S.A. (Italcementi Group of Italy), Société Holcim (Maroc) S.A. (Holcim AG of Switzerland), and Société Lafarge Ciments S.A. (Lafarge Maroc).

Ciments du Maroc announced that it had awarded a contract to Siemens Industry Solutions Division of Germany to supply electrical equipment for its new cement works under construction at Ait Baha. The order was valued at about \$12 million and included installation services. Commissioning was scheduled for yearend 2009 (Global Cement Magazine, 2009).

Diamond.—Metalex Ventures Ltd. of Canada's exploration project covered an area of 24,804 km² of Archaean and Proterozoic rocks that had never been systematically explored for diamond. Following an agreement with ONHYM, 904 drainage and loam samples were collected across an area of 13,509 km² and diamond indicator minerals were found in 16 of the samples. Metalex would focus next on following the positive results back to their sources. Also, Metalex planned to conduct a base-metal, diamond, and gold reconnaissance exploration program across an 11,295-km² area underlain by the unexplored Achaean craton (Metalex Ventures Ltd., 2009).

Phosphate Rock.—Phosphate rock is found mainly in the western part of Morocco. Morocco's estimated proven phosphate reserves were 85,000 Mt, which was the largest share of the world's known phosphate reserves. OCP was the country's sole producer of phosphate rock, most of which was exported. OCP was planning to double production by 2015. This was in keeping with its \$12 billion expansion plan started in 2008. In 2009, OCP was developing three new mines in the

same area at an expected cost of \$100 million to achieve its output goals (Bakr, 2009).

OCP was planning to build underground slurry pipelines to get the phosphate to market. The slurry pipeline would extend from Khouribga to the chemical processing site and Port at Jorf Lasfar. The 50-million-metric-ton-per-year (Mt/yr) twin slurry pipeline was expected to reduce transport costs from \$8 per metric ton to \$2 per metric ton. OCP was focusing on the major part of its growth at Khouribga, which has the highest grade reserves, 40 years of accessibility, and the lowest cost mining potential. Reserves there have been estimated to be 35 billion cubic meters. Khouribga is located 120 km southeast of Casablanca (Mining Review Africa, 2009).

Bunge Ltd. of Brazil and OCP announced the formation of a 50-50 joint-venture company to produce fertilizers in Morocco. The company, Bunge Maroc Phosphore S.A., would increase overall production in Morocco and serve as an additional source of phosphate-based materials and intermediate products for Bunge's fertilizer businesses in Argentina and Brazil. The companies would finance the venture with an estimated \$350 million in debt and equity over 3 years (Highbeam Research, 2009).

Mineral Fuels, Related Materials, and Other Sources of Energy

Hydrocarbon occurrences in Morocco were represented by a variety of liquid and gas accumulations, from dry gas in the Rhab Basin, and condensate and light oil in the Essaquiara and the Preif Basins, to heavy oil in the Tarfaya Basin. The potential for hydrocarbon resources was thought to exist in large yet-to-be-explored areas of Morocco. Morocco has a substantial infrastructure to support an active natural gas and petroleum industry. Seaports, pipelines, and refineries were located near large cities. Exploration activities can be conducted year round (Mbendi Information Services (Pty) Ltd., 2009d).

Coal.—In 2009, the state-owned company l'Office National de l'Electricité (ONE) was responsible for the generation, transmission, and distribution of electrical power. Morocco relied on imported sources of energy. The Government imported coal from Colombia, South Africa, and the United States. ONE used the coal to power the electrical power stations at Jorf Lasar and Mohammedia (Mbendi Information Services (Pty) Ltd., 2009a).

Natural Gas.—Dana Petroleum plc of the United Kingdom announced that it had made a significant natural gas discovery at Anchois in the Tanger-Larache license with the drilling of its first offshore well. The Anchois-1 well is located about 40 km from the coast and was drilled to a total depth of 2,435 m. Two intervals of high-quality gas-bearing sand were encountered. The combined gas column was about 90 m with about 40 m of net pay. It was the first well drilled in the area. The preliminary estimates of the amount of reserves were about 2.8 billion cubic meters. Three other companies involved in exploration efforts in the area were Gas Natural S.A. of Spain, ONHYM, and Repsol YPF, S.A. of Spain (Gulf Oil and Gas, 2009a).

Caithness Petroleum Ltd. of the United Kingdom announced that it had interests in three exploration permits, an exclusive reconnaissance license, and three exploitation licenses onshore

through its subsidiary Cabre Maroc Ltd. The Rharb Center exploration permit and the Rharb Sud exploration permit are in an area that contains shallow Miocene natural gas fields; the Fès exploration permit is in an overthrust area with the potential for large discoveries of natural gas and petroleum. The Taounata reconnaissance license is believed to cover an area that is similar to the Fès permit area. An airborne/gradiometry survey was to be acquired for the Taounata license area. Zhana 1, Zhana 2, and Zhana 3 are exploitation concessions. Cabre Maroc has a 65% interest in the Zhana 1 concession and a 75% interest in the Zhana 2 and Zhana 3 concessions (Caithness Petroleum Ltd., 2009).

Petroleum.—ONHYM signed agreements for two offshore exploration permits and was to participate in both cases as part of a consortium led by Island International Morocco, a subsidiary of Island Oil and Gas plc of Ireland, and Serica plc of the United Kingdom. The contiguous Fom Draa and Sidi Moussa offshore concessions cover a total area of about 12,700 km² in the Agadir Basin, which is a little-explored region located 100 km southwest of Agadir. Both agreements were valid for a period of 8 years. ONHYM's initial commitments were to reprocess geologic and seismic data, with a drill-or-drop decision to be made at the end of the early phases. The geologic setting, on the Atlantic Margin, was said to be analogous to and on trend with oil-producing basins in West Africa (Offshore, 2009).

San Leon Energy plc announced that it had signed an agreement with ONHYM to employ proprietary in situ vapor extraction (IVE) technology at the 6,000-km² (1,482,626-acre) Tarfaya oil shale project. IVE is an in situ oil shale extraction technology that forces heated gas through a central injector well into oil-bearing fractured oil shale. The oil is produced from several extraction wells that are located equidistant to the central injector well. The in situ process is environmentally cleaner than the alternate open pit mining. San Leon signed a 3-year memorandum of understanding with ONHYM, which granted San Leon the exclusive right to convert the area to a license. The feasibility study, which included a work program, was approved by ONHYM (Gulf Oil and Gas, 2009b).

Solar Energy.—A large-scale solar energy project estimated to cost \$9 billion was announced by the Government. The project seeks to achieve 2,000 megawatts of capacity by 2020. Five sites had been identified and were located in the southern region of Ouarzazate. The first power station was expected to be operational by 2015. The project was to be under the auspices of the Moroccan Agency for Solar Energy which would be in charge of all economic, financial, and technical studies (Morocco Business News, 2009).

Uranium.—The ONHYM was encouraging exploration for uranium. Morocco's several uranium mineralization settings included paleochannel-type occurrences, granites with vein-type occurrences, and occurrences in sedimentary and metamorphic terrains. Three main areas under investigation included Haute Moulouya, Sirwa (Zgounder) and Wafaga. Haute Moulouya and Wafaga have paleochannel deposits. Toro Ltd. of Australia had tenements in the Haute Moulouya area and had the right to negotiate and enter into a joint-venture agreement with ONHYM (World Nuclear Association, 2009, p. 5).

Outlook

The Government is expected to continue to establish joint ventures with international companies, particularly in the natural gas and petroleum sectors. Also, Government policy is to increase the mining sector investments by both minor and major mining companies. The Government is expected to take steps to privatize selected state-owned mining assets and to launch reform programs within the mining sector to boost its competitiveness. Lead, silver, and zinc output is expected to decline. There is expected to be a strong opportunity to increase the output of Moroccan tin because of the expected increase in demand coming from the electronics sector. Tin might prove to be an increasingly key commodity for Morocco if Kasbah Resources decides to commission its mine in the years ahead.

The tin sector would be helped by the ban on lead solder by the EU and the United States. Also, global production levels of tin were declining. The OCP is expected to encourage foreign investment in the phosphate sector, and the phosphate industry will likely continue to dominate Morocco's mineral sector for the next 6 to 8 years.

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WESTERN SAHARA

The issue of sovereignty for Western Sahara remained unresolved in 2009. The territory, a desert area bordering the Atlantic Ocean between Mauritania and Morocco, was contested by Morocco and the Saharawi Arab Democratic Republic (SADR) and Rio de Oro (Polisario), an independence movement based in Tindouf, Algeria. Western Sahara's economy was dependent on pastoral nomadism, fishing, and phosphate mining.

Interest in oil exploration contracts in areas offshore Western Sahara continued in 2009. SADR extended the closing date of the Second Licensing Offering to March 31, 2009, owing to the global financial crisis and reduced oil prices. SADR also declared an offshore exclusive economic zone (EEZ) in January 2009. The declaration of a 200-nautical mile EEZ stated the SADR's jurisdiction over its offshore fisheries and mineral resources. The EEZ also provided the legal framework for the SADR offshore leasing regime, which was receiving international attention for offshore natural gas and petroleum exploration activities. The SADR EEZ borders those of the Canary Islands, Mauritania, and Morocco (Western Sahara Oil & Gas Ltd., 2009).

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TABLE 1
MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2005	2006	2007	2008	2009 ^c
METALS					
Antimony, sodium antimonate	500	500	500 ^e	500	400
Cobalt:					
Concentrates, gross weight	13,030	13,000	13,000 ^e	14,000	13,000
Co content	1,100	1,100	1,100 ^e	1,257 ^{r,3}	1,200
Metal ^d	1,613	1,405	1,591	1,791 ^{r,3}	1,600
Copper:					
Concentrates, gross weight	12,654	17,811	19,900	18,500 ^r	18,000
Cu content, concentrates	3,800	4,600	5,572	5,055 ^{r,3}	5,000
Gold kilograms	1,786	1,800	771 ^{r,3}	587 ^{r,3}	600
Iron and steel:					
Iron ore:					
Gross weight	8,130	8,818	9,000	9,000	10,000
Fe content	4,228	4,585	4,680	4,680	4,800
Metal:					
Pig iron ^e	15,000	15,000	15,000	15,000	15,000
Steel, crude	205,000	314,000	325,000 ^e	478,000	479,000 ³
Lead:					
Concentrate:					
Gross weight	59,920	59,107	60,000 ^e	48,000	36,000
Pb content	42,200	41,370	41,976 ^{r,3}	33,477 ^{r,3}	27,000 ³
Cupreous matte, Pb content ^e	600	600	600	600	600
Metal:					
Smelter, primary only	54,460	55,000	55,000 ^e	50,000	50,000
Refined:					
Primary	38,600	44,700	44,700 ^e	38,000 ^r	36,000
Secondary ^e	4,000	3,000	3,000	3,000	3,000
Total ^c	39,000	47,700	47,700	41,000	39,000
Manganese ore, largely chemical-grade	11,267	4,815	41,628 ^{r,3}	102,285 ^{r,3}	100,000
Mercury ^e	10	10	10	10	10
Nickel content of nickle sulfate	99	80	80 ^e	100 ^e	100
Silver, Ag content kilograms	185,700 ^{r,3}	202,300 ^{r,3}	177,712 ^{r,3}	201,195 ^{r,3}	235,301 ³
Zinc concentrate:					
Gross weight	151,270	148,690	111,100	186,000	187,000
Zn content	78,660	77,320	54,353	80,747	81,000
INDUSTRIAL MINERALS					
Arsenic trioxide	8,939	8,950	8,000 ^e	8,000	8,000
Barite, crude	325,222	454,738	664,700	725,060 ^{r,3}	700,000
Cement, hydraulic thousand metric tons	10,284	11,352	12,792	14,047	14,000
Clays, crude:					
Bentonite	64,350	65,000	137,100	50,125 ^{r,3}	60,000
Fuller's earth (smectite)	29,060	29,400	121,700	140,875 ^{r,3}	120,000
Montmorillonite (ghassoul)	1,010	1,000	1,000 ^e	1,000	1,000
Feldspar	27,795	28,000	28,000 ^e	28,000	28,000
Fertilizers ^e thousand metric tons	2,400	2,400	2,400	2,400	2,400
Fluorspar, acid-grade	114,740	94,254	78,817 ^{r,3}	56,724 ^{r,3}	60,000
Gypsum ^e	600,000	600,000	600,000	600,000	600,000
Phosphate rock:					
Gross weight ⁵ thousand metric tons	28,119	27,244	27,834 ^{r,3}	24,861 ^{r,3}	25,000
P ₂ O ₅ content do.	9,195	8,718	8,700 ^e	8,000	8,000
Phosphoric acid do.	3,392	3,045	3,000 ^e	2,800	2,800
Salt: ⁵					
Rock	283,896	301,061	215,800	225,000	240,000
Marine	36,000	16,234	16,000	16,000	16,500
Total	319,896	317,295	231,800	241,000	256,500
Strontium minerals, celestite ^e	2,700	2,700	2,600	2,600	2,500
Sulphuric acid ^e	9,500	9,500	9,500	9,500	9,500

See footnotes at end of table.

TABLE 1—Continued
MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2005	2006	2007	2008	2009 ^e
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural ^e million cubic meters	40	56 ³	61 ³	50	60
Petroleum:					
Crude thousand 42-gallon barrels	1,573	1,479	1,500 ^e	1,573	1,575
Refinery products:					
Liquefied petroleum gas do.	2,435	2,500 ^e	2,500 ^e	2,500	2,500
Gasoline do.	3,172	3,172	3,104	3,434	3,400
Jet fuel do.	2,095	1,886	2,339	2,096	2,100
Kerosene do.	14	22	--	--	--
Distillate fuel oil do.	17,129	16,815	14,890	13,570	14,000
Residual fuel oil do.	15,345	15,083	15,112	16,000	16,000
Other do.	1,909	1,000 ^e	1,000 ^e	1,000	1,000
Total do.	42,099	39,478	37,945	37,600	39,000

^eEstimated; estimated data are rounded to no more than three significant digits. ^fRevised. do. Ditto. -- Zero.

¹Table includes data available through May 31, 2010.

²In addition to the commodities listed, perlite and a variety of crude construction materials are produced, but information is inadequate to make reliable estimates of output.

³Reported figure.

⁴Cobalt electrowon from cobalt concentrates and tailings from the Bou-Azzer Mine.

⁵May include production from Western Sahara.

TABLE 2
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2009

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
MOROCCO			
Arsenic trioxide	Compagnie de Tifnout Tiranimine (CTT) (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.	Compagnie Marocaine des Barytes (COMABAR) [Norbar Minerals AS, 55%, and Bureau de Recherches et de Participations Minières (BRPM), 45%]	Tlet Ighoud, Safi	160,000
Do.	do.	Zelmou, Figuig	110,000
Do.	Morocco Minerals Co.	Chemaia, Safi	NA
Do.	Ouiselsat Mines S.A.	Tazzarine, Ouarzazate	NA
Do.	Société Commerciale et Minière du Sahara (SOCOMIS)	Tichka	NA
Do.	Société de Recherches et d'Exploitation Minières Nadia	Tinitine, Marrakech	NA
Do.	Société Industrie Minière Marocaine (IMM)	Tichka, Marrakech	NA
Do.	Société Minière des Barytines d'Asni (SMBA)	NA	NA
Do.	Société Nord Africaine de Recherches et d'Exploitation des Mines d'Argana (SNAREMA)	Seksaoua, Marrakech	120,000
Do.	Société Nouvelle Union des Metaux Maroc (SNUMM)	Jbel Abdellah, Errachidia	12,000
Do.	Société Zenaga	Tinjdad, Errachidia	NA
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 of Spain, 80%, and Bureau de Recherches et de Participations Minières (BRPM), 20%]	Aferha	9,200
Do.	Société d'Exploitation des Mines du Rif (SEFERIF) [Bureau de Recherches et de Participations Minières (BRPM), 100%]	Bou Hoed, near Ouixane	15,000
Do.	Compagnie Marocaine des Barytes (COMABAR) [Norbar Minerals AS, 55%, and Bureau de Recherches et de Participations Minières (BRPM), 45%]	Azzouzet-Tidiennit	5,000
Do.	North African Industrial Minerals Exploration S.A.R.L. (S&B Group)	Trebia Mine	NA
Celestite	Société Karia Mines	Jbel Kifane, Taounate	NA
Cement, portland	Asment de Temara (Cimentos de Portugal S. A., 57.4%)	Kiln and mill at Temara	845,000
Do.	Société Lafarge Ciments S.A. (Lafarge Maroc, 69.2%)	Douar Laaouameur kiln and mill south of Casablanca	2,000,000
Do.	do.	Cadem clinker mill at Meknes	1,000,000
Do.	do.	Tamuda kiln and mill, Tetouan	800,000
Do.	do.	Kiln and mill at Tangier	250,000
Do.	do.	Tetouan II kiln and mill	(1)
Do.	Société Holcim (Maroc) S.A. (Holcim AG, 51%)	Kiln and mill at Oujda	1,000,000
Do.	do.	Settat kiln and mill	1,700,000
Do.	do.	Fes, Ras El Ma kiln and mill	1,200,000
Do.	do.	Fes, Doukkarat clinker mill	600,000
Do.	do.	Nador clinker mill	400,000
Do.	Ciments du Maroc S.A. (CIMAR) (Italcementi Group, 58.3%)	Kiln and mill at Agadir	1,220,000
Do.	do.	Kiln and mill at Marrakech	1,300,000
Do.	do.	Kiln and mill at Safi	850,000
Do.	do.	Laayoune clinker mill	350,000
Clay	Société du Ghassoul et de ses Derives SEFRIQUI SA	Tamadafelt	NA
Do.	Antonio Reyes Mines S.A.	Haddou Ammar, Nador	NA
Coal, anthracite	Charbonnages du Maroc [Bureau de Recherches et de Participations Minières (BRPM), 98.89%]	Jerada	650,000
Cobalt:			
Ore, gross weight	Compagnie de Tifnout Tiranimine (CTT) (Managem S.A., 55.2%, and Société Metallurgique d'Imiter, 20%)	Bou-Azzer, Ouarzazate	17,000
Metal	do.	Guemassa, Marrakech	1,400

See footnotes at end of table.

TABLE 2—Continued
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2009

(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) [Bureau de Recherches et de Participations Minières (BRPM), 34.2%; Société Metallurgique d'Imiter, 36%; Managem S.A., 7.6%]	Bleida	50,000
Do.	Compagnie Minière de Guemassa (CMG) [Managem S.A., 74%, and Bureau de Recherches et de Participations Minières (BRPM), 23.08%]	Douar Hajar Mine, Guemassa, Marrakech	18,000
Do.	Société de Développement du Cuivre de l'Anti-Atlas (SODECAT) [Bureau de Recherches et de Participations Minières (BRPM), 100%]	Tiout	4,500
Fluorspar, concentrate	Société Anonyme d'Entreprises Minières (SAMINE) (Managem S.A., 58%, and Société Metallurgique d'Imiter, 42%)	El Hammam, Khemisset	120,000
Gold	Akka Gold Mining Company [Managem S.A., 70%, and Bureau de Recherches et de Participations Minières (BRPM), 16.07%]	Iourim, Tiznit	3
Liquefied petroleum gas	million metric tons Société d'Exploitation des Mines du Rif (SEFERIF) [Bureau de Recherches et de Participations Minières (BRPM), 100%]	Bouhoua, Nador	12
Lead:			
Concentrate	Compagnie Minière de Guemassa (CMG) [Managem S.A., 74%, and Bureau de Recherches et 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 ²	Société des Fonderies de Plomb de Zellidja (SFPZ) (Zellidja S.A., 50.4%)	Oued El Heimer	70,000
Manganese, concentrate	Société Anonyme Chérifienne d'Etudes Minières (SACEM) [Bureau de Recherches et de Participations Minières (BRPM), 43%, and Compagnie Minière de l'Ogooué SA (COMILOG), 30%]	Imini, Ouarzazate	14,000
Perlite	Perlite Roche [Roche Investments, 70%, and Bureau de Recherches et de Participations Minières (BRPM), 20%]	Tidiennit	20,000
Do.	Perlite Inc. (Roche Investments)	Expansion plant at Berrechid, near Casablanca	NA
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	47,000
Do.	do.	Sidi Kacem	9,500
Phosphate rock	Office Chérifien des Phosphates (OCP) (Government, 100%)	Sidi Daoui Mine, Khouribga mining center	10,000,000
Do.	do.	Mera El Arech Mine, Khouribga mining center	6,000,000
Do.	do.	Benguerir open pit mine, Gantour mining center	4,000,000
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 ₂ O ₅ content	Indio Maroc Phosphore S.A. [Office Chérifien des Phosphates (OCP), 50%, and K.K. Birla Group, 50%]	Jorf Lasfar	330,000
Do.	Office Chérifien des Phosphates (OCP)	Maroc Chimie I and II, Safi	270,000
Do.	do.	Maroc Phosphore I and II, Safi	1,100,000
Do.	do.	Maroc Phosphore III and IV, Jorf Lasfar	1,400,000
Phosphoric acid (purified), P ₂ O ₅ content	Euro-Maroc Phosphore Co. [Office Chérifien des Phosphates (OCP), 33%; Société Chimique Prayon-Rupel of Belgium, 33%; Chemische Frabrik Budenheim KG of Germany, 33%]	Jorf Lasfar ³	120,000
Salt:			
Rock	Société de Sel de Mohammedia (SSM) [Bureau de Recherches et de Participations Minières (BRPM), 100%]	Ain Tekki, Mohammedia	226,500
Marine	Société Chérifienne des Sels (SCS) [Bureau de Recherches et de Participations Minières (BRPM), 50%, and Société Nouvelle des Salins du Sine Saloum (SNSSS), 50%]	Lac Zima, Safi	30,000

See footnotes at end of table.

TABLE 2—Continued
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2009

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
MOROCCO—Continued				
Silver, ore	thousand kilograms	Société Metallurgique d'Imiter (SMI) (Managem S.A., 75.72%, and general public, 24.28%)	Imiter and Igoudrane Mines, Imiter	800
Steel products:				
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		Univers Acier S.A.	Casablanca	1,000,000
Do.		do.	do.	80,000
Cold-rolled sheet		Maghreb Steel S.A.	do.	250,000
Talc and pyrophyllite:				
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., 74%, and Bureau de Recherches et de Participations Minières (BRPM), 23.08%]	Douar Hajar Mine, Guemassa	170,000
Do.		do.	Draa Sfar	(1)
Do.		Société des Mines de Tennous (SOMITE)	Aguerd N'Tazoult, Azilal	NA
Do.		Société Mineral et Substances	Lalla Mimouna, Taza	NA
WESTERN SAHARA				
Phosphate rock		Phosphates de Boucraa S.A. [Office Chérifien des Phosphates (OCP), 65%]	Open pit mine, Boucraa mining center	2,000,000

Do, do. Ditto. NA Not available.

¹Under construction.

²Société des Fonderies de Plomb de Zellidja also refines silver and produces copper matte and sodium antimonate.

³A second purified phosphoric acid plant with a capacity of 120,000 metric tons per year was under construction.