

2008 Minerals Yearbook

MOROCCO AND WESTERN SAHARA

THE MINERAL INDUSTRIES OF MOROCCO AND WESTERN SAHARA

By Harold R. Newman

MOROCCO

The mineral industry of Morocco was dominated by phosphate production. Morocco was the world's third ranked producer of phosphate after China and the United States. The country produced 6% of the world's production of barite, 2% of the world's production of cobalt, 1.5% of the world's production of fluorspar, 1% of the world's production of lead, and 17% of the world's production of phosphate rock and was a leading exporter of phosphate rock, phosphate derivatives, and phosphoric acid (Mbendi Information Services (Pty) Ltd., 2008; Guberman, 2009; Jasinski, 2009; Miller, 2009a, b; Shedd, 2009).

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. The mineral industry was Morocco's leading foreign exchange earning sector and accounted for about 35% of foreign trade 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 Imiter, which was a world-class silver deposit. The Office Chérifien des Phosphates, (OCP) phosphate deposits contained more than 30% of the world's total phosphate reserves. In 2008, the falling prices of mineral commodities led to reduced output in the Moroccan mining sector. The Government was considering reforming its tax structure and reducing trade bureaucracy to encourage growth in its mineral industry (Market Research, 2009).

Government Policies and Programs

The Government agency responsible for oversight of the mining industry was the Ministère de l'Industrie, du Commerce, de l'Énergie et des Mines (Ministry of Industry, Trade, Energy, and Mines). The Bureau de Recherches et de Participations Minières [Office of Research and Mining Participations] (BRPM) was responsible for the development of most mineral resources. La Centrale d'Achatt et de Dévelopement de la Region Minière de Tafilalet et de Figuig was responsible for promoting and supporting the interests of artisanal miners in the Figuig and the Tafilalet regions. Government policy is to open up the mining sector to investments by both minor and major mining companies; however, phosphate production remained a state monopoly. The OCP was responsible for managing and controlling all aspects of phosphate mining and beneficiation. Mining legislation was 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. All mineral resources are the property of the state, which issues permits and licenses for the exploration and exploitation of the resources (Business Monitor International, 2008).

Production

Morocco was one of the world's leading producers of phosphate rock. In terms of the value of production, phosphate rock was Morocco's most important mineral; phosphate rock also accounted for 95% of mining volume. In addition to phosphate rock, the country produced a wide variety of minerals, which included barite, clays, coal, cobalt, copper, fluorspar, gold, iron ore, lead, nickel, petroleum, salt, silver, talc, and zinc, among others. In 2008, according to reported data, cement, steel, and zinc production increased and lead production decreased (table 1).

Structure of the Mineral Industry

There was little change in the structure of the mineral industry in 2008. 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, including their capacities and 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 was a comprehensive free trade agreement and was expected to provide U.S. exporters with increased access to the Morocco market by eliminating tariffs on 95% of consumer and industrial goods. Morocco was the second Arab country, after Bahrain, and the first African country to have a free trade agreement with the United States (U.S. Department of State, 2008).

Morocco's exports of phosphate derivatives included 14.6 million metric tons (Mt) of phosphates, 2.4 Mt of chemicals and natural fertilizer, and 2.3 Mt of phosphoric acid. To boost exports, the OCP was developing market alliances and joint ventures with foreign downstream processors. Firms from Belgium, Germany, India, and Pakistan were involved in joint-venture projects with the OCP. Also, the OCP announced that it would open its phosphate hub to foreign investors to set up new plants and help expand the chemical and fertilizer industry. The OCP planned to invest \$2.5 billion during the next 5 years to develop the phosphate derivatives export industry, which is a higher value activity than simply exporting the raw material (Economist Intelligence Unit, 2008). The United States was a major trading partner with Morocco. U.S. exports to Morocco were valued at about \$1,436 million in 2008. This total included, in order of value, more than \$146 million for coal and other fuels, \$67 million for petroleum products, \$27 million for iron and steel products, \$20 million for fuel oil, and \$19 million for steelmaking materials (U.S. Census Bureau, 2008a).

U.S. imports from Morocco were valued at about \$879 million in 2008. This total included, in order of value, about \$368 million for sulfur and nonmetallic minerals, \$32 million for miscellaneous nonferrous metals, \$16 million for other petroleum products, and \$2 million in industrial inorganic chemicals and accounted for 21% of Morocco's exports (U.S. Census Bureau, 2008b).

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 S.A. (a subsidiary of Omnium Nord African (ONA), which was the leading private mining company in Morocco) continued to mine cobalt ore at the Bou Azzer underground mine. Bou Azzer, which is literally translated as "where the fig tree stands," is located 35 kilometers (km) south of Ouarzazate in southern Morocco in the central Anti-Atlas Mountain range.

Managem announced that it expected to have a 2008 net loss because of the downturn in the economy and the drop in the prices of cobalt and base metals in the second half of 2008. Rising prices of such materials as sulfuric acid also affected Managem's net results. Efforts were continuing to improve management, streamline costs, and address volatility in output. The price of Managem's shares went down by 59% in 2008 (Mining Journal, 2009).

Copper.—Odyssey Resources Ltd. of Canada was the first foreign company to independently acquire exploration licenses in Morocco. Of its 25 licenses, 6 copper-silver deposits and 2 tailings dumps were 100% owned by Odyssey and 18 were acquired through lease with an option to purchase from the Government's Office National des Hydrocarbures et des Mine (ONHYM). Odyssey's main advanced project was the Alous deposit, which includes both structurally and stratigraphic hosted copper-silver mineralization. The Alous deposit is the largest deposit within the Anti-Atlas property, which covers about 500 square kilometers (km²) and is located in southwestern Morocco. Exploration drilling continued in 2008 (Odyssey Resources Ltd., 2008).

ResidInvest S.A.R.L. is a Moroccan exploration company in the process of becoming a producing mining company.

ResidInvest acquired exploration licenses for the Tazoughert copper deposit in the Province of Er Rachidia in southeastern Morocco. Drilling at Tazoughert resulted in the discovery of a large hydrated copper carbonate deposit with a grade ranging from 7% to 21% copper at a depth of 6 m. ResidInvest estimated possible copper ore resources to be about 40 Mt. The group of licenses is located about 35 km northwest of Boudnib in the southern edge of the High Eastern Atlas (ResidInvest S.A.R.L., 2008).

Gold.—Odyssey also owned the Talouine gold deposit, which is located in the southern Anti-Atlas Mountains west of and on strike with the Taferent gold deposit, which was owned by the ONHYM. Taferent hosted an estimated resource of 5.6 Mt of ore at an average grade of 1.22 grams per metric ton (g/t) gold. The Taferent property consists of three exploration licenses that cover an area of 48 km²; the deposit is hosted in Precambrian volcanic and intrusive rocks. Odyssey was also investigating the Tizintfirst gold property, which hosts a gold-bearing gossan. The 16-km exploration license is located in the eastern Anti-Atlas Mountains (Van der Merwe, 2008).

Kasbah Resources Ltd. of Australia's Tamlalt gold deposit consists of eight exploration permits that cover a surface area of 128 km². Ground magnetic surveying had defined 2,000 m of potential host rocks under shallow cover to the southwest of the Jebel Malek gold prospect and identified two discreet magnetic anomalies. Based on the results of the surveys, new drill targets were defined at Tamlalt and work was scheduled to continue into 2009 (ABN Newswire, 2008b).

Lead.—Emerging Capital Partners of the United States and Truffle Capital of France jointly acquired a 100% stake in Compagnie Minière de Touissit (CMT) for \$53 million. CMT, which was the oldest lead producer in Morocco, specialized in the exploration, extraction, and treatment of lead and zinc. CMT owned mines and an ore treatment plant at Tighza, southeast of Meknes (Paydirt, 2008).

Silver.—Silver in Morocco occurs both as the principal metal in ore deposits at Igoudrane and Imiter and as a byproduct of copper, lead, and zinc mining 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 mountains have a Precambrian basement and a cover of Paleozoic rocks. The volcano-sedimentary bedrock is favorable to polymetallic mineralization, such as that of the Imiter silver deposit and the Bou Azzer cobalt deposit. After phosphates, silver was Morocco's second most significant mineral product (MinVision, 2008).

Tin.—Kasbah Resources acquired the rights to two tin deposits; one (the Achmmach Mine) was an advanced, large, hard rock project, and the other (the El Karit Mine) was a historic, hard rock open pit mine that the company had been evaluating. The Achmmach Mine, which was the larger of the two projects, was considered to be a significant tin deposit. At Achmmach, a total of 17 diamond drill core holes totaling 4,192 m were drilled with the twin objectives of investigating the previous drilling undertaken by BRPM and testing the potential for shallow zones of tin mineralization in the Eastern area. The phase 1 drilling program was completed in 2008 with the testing of 650 m of a 2-km-long mineralized system. Drilling discovered new shallow tin zones in the eastern area. Phase 2 drilling was commenced with the aim of expanding the proven mineralization beyond the existing underground workings in the western area of the Achmmach project. Achmmach was estimated to have a resource of about 1 Mt of ore at a grade of 1% tin (ABN Newswire, 2008a).

Industrial Minerals

Cement.—The Moroccan cement industry comprised the following four companies: Asment de Temara; Holcim (Maroc) S.A.; Lafarge S.A. (Lafarge), through Lafarge Ciments (Maroc), which was a 50% owned subsidiary of the Lafarge Group of France; and Société les Ciments du Maroc S.A.

Diamond.—Metalex Ventures Ltd. of Canada's exploration project covered an area of 24,804 km² of Archaean and Proterozic rocks that have 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 planned to focus on back tracking the positive results to their sources. Also, Metalex planned to conduct a base-metal, diamond, and gold reconnaissance exploration program in an 11,295-km² area underlain by an unexplored Archean craton (Metalex Ventures Ltd., 2008).

Phosphate Rock.—Phosphate rock is found mainly in the western part of Morocco. Morocco's estimated phosphate reserves were 85,000 Mt, which was the largest share of the world's known phosphate reserves. The OCP was the country's sole producer of phosphate rock, most of which was exported. The OCP planned to invest about \$12 billion during the next 7 to 8 years to expand its output and world market share. The OCP stated that it had 49% of the world phosphoric acid market, 45.5% of the world phosphate market, and 12% of the world fertilizer market. In 2008, the OCP was the leading world phosphate exporter (Miningreview.com, 2008).

The Libya-Africa Investment Portfolio of Switzerland and the OCP signed an agreement to jointly develop ammonia, phosphoric acid, and diammonium phosphate (DAP) fertilizer plants in Morocco and Libya. Under the \$1 billion agreement, the two firms would construct a 1-million-metric-ton-per-year (Mt/yr) phosphoric acid plant at Jorf Lasfar in Morocco at a cost of \$350 million; an 800,000-t/yr ammonia plant in Libya at a cost of \$500 million; and a \$150 million DAP facility in either Libya or Morocco. The Government was encouraging investment in the domestic fertilizer section and, in 2008, signed a similar \$600 million agreement with PetroVietnam Fertilizer and Chemicals Co. to build a DAP plant (James, 2008)

Mineral Fuels, Related Materials, and Other Sources of Energy

Morocco imports 96% of its energy requirements and was North Africa's leading importer of petroleum and natural gas. Morocco's economy was affected by the surge in global oil prices. The energy cost was \$1.1 billion in the first quarter of 2008, which was a 69% increase compared with the same period in 2007 (Morocco Newsline, 2008).

The potential for hydrocarbon resources was thought to exist in large, yet-to-be-explored areas of Morocco. The Government reported that it would use a fourfold strategy to explore for petroleum in different parts of the country. The strategy included boosting the promotion of sedimentary basins, developing partnerships, using new technology for exploration, and exploiting data relating to sedimentary basins. Onshore and offshore sedimentary basins were not well explored compared with other countries. In 2008, only four exploration wells in a 10,000-km² area had been drilled in Morocco, whereas the international average was 800 wells for a 10,000-km² area. (Xinhua News Agency, 2008).

Coal.—The power utility l'Office National de l'Électricite (ONE) reported that it would initiate a major independent power project (IPP) at Safi, which is located halfway between Agadir and Casablanca on the west coast. The coal-fired thermal powerplant would have a capacity of about 1,320 megawatts (MW) and would be the second IPP after Jorf Lasfar. In 2008, Morocco had an installed capacity of 5,292 MW. When it comes onstream in 2012, the plant was expected to produce 27% of Morocco's annual energy requirement, which was increasing at a rate of 8.3% per year. The project had an estimated cost of \$2.7 billion and would include clean-coal technology to help reduce the facility's carbon dioxide emissions (Middle East Economic Digest, 2008c).

Natural Gas.—Circle Oil plc of the United Kingdom announced that it had made a third gas discovery after it had drilled and tested the KSR-8 well northeast of Rabat in the Sebou permit of the Rharb Basin. Circle reported that the KSR-8 well had been tested in two zones and that it flowed under test at one of the highest flow rates ever in the Rharb Basin. The lower of the two zones in the Main Hoot formation showed a sustained gas flow rate of 12.5 million cubic feet per day, and the Upper Hoot zone had a reported sustained flow rate of 6.8 million cubic feet per day. Circle Oil held permits in the Oulad N'Zala and the Sebou areas where it had targeted about 100 sites for exploration. Circle Oil held the concession agreement with the ONHYM, which had a 25% interest (Labanyi, 2009).

Petroleum.—International Petroleum Investment Company (Ipic) of Abu Dhabi approved plans to build a refinery at Jorf Lasfar on Morocco's west coast. The refinery was expected to have a capacity of 200,000 barrels per day (bbl/d) and cost about \$5 billion. It would provide refined products for the local market. The source of the crude oil was expected to be Abu Dhabi. The refinery was scheduled for commissioning in 2013. Morocco's refinery at Mohammedia was operated by Société Anonyme Marocain de l'Industrie du Raffinage (Samir). The 126,000-bbl/d refinery was being upgraded after a fire caused damage to the infrastructure (Middle East Economic Digest, 2008a).

Xtract Energy plc of the United Kingdom announced the signing of a joint-venture agreement with Alraed Ltd. Investments Holdings Co. of Saudi Arabia. The joint-venture company, Xtract Energy (Oil Shale) Morocco SA, was established to evaluate and develop oil shale projects in Morocco. Xtract Energy (Oil Shale) Morocco signed a memorandum of understanding with the ONHYM to evaluate the possible development of an oil shale deposit near Tarfaya in southwestern Morocco (London Stock Exchange plc, 2008).

Renewable Energy.—The Government of Spain granted the Government of Morocco a \$5 million loan to fund the construction up of 1,215 photovoltaic solar systems in the central Provinces of Bengurir and Errachdia. The project was part of the solar energy program named "Chourouk," which was aimed at promoting rural electrification. The program provides for installation of 200,000 systems nationwide (Maghreb Arabe Presse, 2008).

Prequalified companies were invited to submit proposals for the 300-MW Tarfaya wind farm. The estimated \$500 million project covers the development, financing, design, engineering, procurement, construction, commissioning, operation, and maintenance of the farm. A total of 16 companies were prequalified. The Government planned to develop 1,000 MW of wind power capacity by 2012 (Middle East Economic Digest, 2008b).

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. More than 100 uranium occurrences have been identified within Morocco. Toro Energy Ltd. of Australia signed a memorandum of understanding with the ONHYM granting it exclusive rights for 6 months to review the potential of selected prospects in three main areas that included Haute Moulouya-Ment, the Sirwa (Zgounder), and the Wafaga. If a strong potential for likely uranium deposits is identified, Toro has exclusive rights to negotiate and enter into joint-venture agreements with the ONHYM (Mining Weekly Online, 2008).

Outlook

The Government is expected to continue to establish joint ventures with international companies, particularly in the energy sector. Also, Government policies could encourage increased 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 launch reform programs within the mining sector to boost its competitiveness. Morocco intends to become a regional investment and trade platform between Europe, the countries of Southern Europe and Sub-Sahara Africa, and the United States and plans to invest heavily in infrastructure in the near future to accomplish this goal. The OCP is expected to start 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 2008. The territory, a desert area bordering the Atlantic Ocean between Mauritania and Morocco, was contested by Morocco and the Popular Front for the Liberation of the Saguia el Hamra 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 increased during 2008. In late 2007, the Saharawi Arab Democratic Republic (SADR) had launched a second natural gas and petroleum round for nine blocks in the Western Sahara region even though the political status of the territory, which was contested by Morocco and SADR, remained unresolved. Most of the blocks lie in the relatively unexplored Mesozoic and Tertiary Aaiun Basin. The following six offshore blocks with water depths ranging up to 3,600 m were on offer beginning in 2008: Tah (20,892 km²); Zug (20,476 km²); Jreifia (17,361 km²); Farsia (17,318 km²); Imlili (16,965 km²); and Amgala (15,417 km²). The onshore blocks on offer were Umdreiga (39,603 km²); Smara (29,895 km²); and Tichla (14,579 km²). During the year, SADR extended the closing date of the second licensing offering to March 31, 2009, owing to the global financial crisis and reduced oil prices. Contracts were not expected to come into force until the political status of the area is resolved (Middle East Economic Digest, 2007; SADR Petroleum Authority, 2008).

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TABLE 1

MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²		2004	2005	2006	2007	2008 ^e
METALS					,	
Antimony sodium antimonate		500	500	500	500 °	500
Cobalt:						
Concentrates, gross weight		18,410	13.030	13.000	13.000 ^e	13.000
Co content		1,600	1,100	1,100	1,100 ^e	1,000
Metal ³		1,594	1,613	1,405	1,591	1,711 4
Copper:		,	,	,	,	,
Concentrates, gross weight		10,308	12,654	17,811	19,900	20,000
Cu content, concentrates		4,400 r	3,800	4,600	5,572 ^r	5,600
Gold	kilograms	1,493	1,786	1,800	1,600 ^e	1,600
Iron and steel:	<u> </u>		,			
Iron ore:						
Gross weight		9,900	8,130	8,818 ^r	9,000 ^r	9,000
Fe content		5,300 e	4,228	4,585 ^r	4,680 ^r	4,680
Metal:						
Pig iron ^e		15,000	15,000	15,000	15,000	15,000
Steel, crude		5,000 e	205,000	314,000	325,000 ^e	478,000 4
Lead:						
Concentrate:						
Gross weight		58,810	59,920	59,107	60,000 ^e	48,000
Pb content		41,400	42,200	41,370	44,800	33,500
Cupreous matte, Pb content ^e		600	600	600	600	600
Metal:						
Smelter, primary only		40,712	54,460	55,000	55,000 ^e	50,000
Refined:						
Primary		35,000	38,600	44,700	44,700 ^e	42,900
Secondary ^e		4,000 4	4,000	3,000	3,000	3,000
Total ^e		39,000	42,600	47,700	47,700	45,900
Manganese ore, largely chemical-grade		9,050	11,267	4,815	4,160	4,000
Mercury ^e		10	10	10	10	10
Nickel content of nickle sulfate		130	99	80	80 ^e	80
Silver:						
Ag content of concentrates	kilograms	25,952	26,000	50,700	51,000	50,000
Ag content of matte and smelter bullion ^e	do.	170,000	170,000	195,000	186,000 ^r	180,000
Total	do.	195,952	196,000	245,700	237,000 ^r	230,000
Zinc concentrate:						
Gross weight		146,200	151,270	148,690	111,100	186,000
Zn content		72,363	78,660	77,320	57,770 ^r	96,900
INDUSTRIAL MINERALS						
Arsenic trioxide		6,866	8,939	8,950	8,000 ^e	8,000
Barite, crude		313,000	325,222	454,738	664,700 ^r	660,000
Cement, hydraulic	thousand metric tons	7,972 ^r	10,284 ^r	11,352 ^r	12,792 ^r	14,047 4
Clays, crude:						
Bentonite		85,400	64,350	65,000	137,100 ^r	135,000
Fuller's earth (smectite)		28,700	29,060	29,400 ^r	121,700 ^r	120,000
Montmorillonite (ghassoul)		1,240	1,010	1,000	1,000 °	1,000
Feldspar		30,270	27,795	28,000	28,000 °	28,000
Fertilizers ^e	thousand metric tons	2,405 4	2,400	2,400	2,400	2,400
Fluorspar, acid-grade		112,100	114,740	94,254	78,900	80,000
Gypsum ^e		600,000	600,000	600,000	600,000	600,000
Phosphate rock:						
Gross weight ⁵	thousand metric tons	25,568	28,119	27,244	27,000 ^e	25,000
P_2O_5 content	do.	8,507	9,195	8,718	8,700 ^e	8,000
Phosphoric acid	do.	3,254	3,392	3,045	3,000 °	2,800

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

2004	2005	2006	2007	• • • • • •
	2005	2006	2007	2008
-				
253,800	283,896	301,061	215,800 r	225,000
36,000	36,000	16,234 4	16,000	16,000
289,800	319,896	317,295 ^r	231,800 ^r	241,000
2,700	2,700	2,700	2,600	2,600
9,500	9,500	9,500	9,500	9,500
255				
-				
_				
40	40	40	42	42
35	35	35	36	36
_				
246	245	240	245 ^e	250
_				
2,500	2,435 4	2,500	2,500	2,500
2,183 ^r	3,172	3,172 ^r	3,104 ^r	3,434 4
1,393 ^r	2,095	1,886 ^r	2,339 ^r	2,096 4
90 ^r	14 ^r	22 ^r	^r	4
16,815 ^r	17,129 ^r	16,815 ^r	14,890 ^r	13,570 ⁴
15,076 ^r	15,345	15,083 ^r	15,112 ^r	16,000
1,000	1,909	1,000 ^e	1,000 ^e	1,000
39,057 ^r	42,099 ^r	40,478 ^r	38,945 ^r	38,600
	253,800 36,000 289,800 2,700 9,500 255 40 35 246 2,500 2,183 r 1,393 r 90 r 16,815 r 15,076 r 1,000 39,057 r	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

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

¹Table includes data available through July 31, 2009.

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

³Cobalt electrowon from cobalt concentrates and tailings from the Bou Azzer Mine.

⁴Reported figure.

⁵May include production from Western Sahara.

TABLE 2

MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2008

(Metric tons unless otherwise specified)

Country and commodity	Maine an antine and an in a mite and an	I	Annual
MOROCCO	Major operating companies and major equity owners	Location of main facilities	capacity
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 de Commerialisation et d'Exploitation Miniere d'Imoulasse (SCEMI)	NA	NA
Do.	Société Commerciale et Miniere du Sahara (SOCOMIS)	Tichka	NA
Do.	Société de Recherches et d'Exploitation Minieres Nadia	Tinitine, Marrakech	NA
Do.	Société Industrie Miniere Marocaine (IMM)	Tichka, Marrakech	NA
Do.	Société Miniere des Barytines d'Asni (SMBA)	NA	NA
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
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 Miniere Bentonite d'Afarha S.A. [Grupo Tolsa of Spain, 80%, and Bureau de Recherches de Participations Minières (BRPM), 20%]	Aferha	9,200
Do.	Société d'Exploitation des Mines du Rif (SEFERIF) [Bureau de Recherches 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 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, 57.4%)	Kiln and mill at Temara	845,000
Do.	Société Lafarge Ciments S.A. (Lafarge Maroc, 69.2%; general public, 12.23%; Caisse de Dépôt et de Gestion, 8.25%; Islamic Development Bank, 5.46%)	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 Ltd. of Switzerland, 51%; general public, 35.2%; Islamic Development Bank, 13.8%)	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.	Société les Ciments du Maroc S.A. (CIMAR) (Ciments Français S.A., 58.3%; general public 8.97%; Caisse Interprofessionnelle Marocaine des Retraites, 7.78%; Banque Nationale pour le Developpement Economique, 5.65%; Fonds d'Abu Dhabi pour le Développement Economique Arabe, 5.38%)	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.	Laâyoune clinker mill	350,000
Clay	Société du Ghassoul et de ses Derives SEFRIOUI SA	Tamdafelt	NA
Do.	Antonio Reyes Mine	Haddou Ammar, Nador	NA

See footnotes at end of table.

TABLE 2—Continued MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2008

(Metric tons unless otherwise specified)

			Annual
Country and commodity	Major operating companies and major equity owners	Location of main facilities	capacity
MOROCCO—Continued			
Coal, anthracite	Charbonnages du Maroc [Bureau de Recherches 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
Copper. concentrate	Société Minière de Bou Gaffer (SOMIFER) [Bureau de	Bleida	50,000
FI F F F	Recherches de Participations Minières (BRPM), 34.2%		,
	Société Metallurgique d'Imiter, 36%: Managem S A., 7.6%]		
Do.	Compagnie Minière de Guemassa (CMG) [Managem S.A., 74%, and Bureau de Recherches de Participations Minières (BRPM). 23.08%]	Douar Hajar Mine, Guemassa, Marrakech	18,000
Do.	Société de Développement du Cuivre de l'Anti-Atlas (SODECAT)	Tiouit	4.500
	[Bureau de Recherches de Participations Minières (BRPM), 100%]		,
Fluorspar, concentrate	Société Anonyme d'Entreprises Minières (SAMINE)	El Hammam, Khémisset	120.000
	(Managem S.A., 58% and Société Metallurgique d'Imiter, 42%)	,	- ,
Gold	Akka Gold Mining Co. [Managem S.A., 70%, and	Iourim, Tiznit	3
	Bureau de Recherches de Participations Minières (BRPM) 16 07%]		-
Liquefied petroleum gas million	Société d'Exploitation des Mines du Rif (SEFERIE)	Bouhoua Nador	12
metric tons	[Bureau de Recherches de Participations Minières (BRPM) 100%]	Boundau, Paulor	12
Lead:			
Concentrate	Compagnie Minière de Guemassa (CMG) [Managem S A 74% and	Douar Hajar Mine, Guemassa	29 900
Contentiate	Bureau de Recherches de Participations Minières (BRPM), 23.08%]	Douai majai mine, Ouemaooa	_>,>00
Do	Compagnie Minière de Touissit (CMT) (Emerging Capital Partners	Touissit, Jerada	73.000
20.	50% and Truffle Canital 50%)	i ouissit, soludu	75,000
Metal ²	Société des Fonderies de Plomb de Zellidia (SFPZ)	Qued El Heimer	70,000
Wictal	(Zellidia S A 50.4%)		70,000
Manganese concentrate	Société Anonyme Chérifienne d'Etudes Minières (SACEM)	Imini Quarzazate	14 000
inanganese, concentrate	[Bureau de Recherches de Participations Minières (BRPM) 43% and	Ininii, Ouurzuzute	11,000
	Compagnie Minière de l'Ogoqué SA (COMILOG) 30%]		
Perlite	Perlite Roche [Roche Investments 70% and Bureau de Recherches	Tidiennit	20,000
1 clinic	de Participations Minières (BRPM) 20%]	Therefinit	20,000
Do	Perlite Inc. (Roche Investments)	Expansion plant at Berrechid	NA
		near Casablanca	
Petroleum refinery thousand	Société Anonyme Marocaine de l'Industrie du Raffinage (SAMIR)	Mohammedia	47.000
products 42-gallon barrels	(Group Corral Petroleum, 64.7% and general public, 35.3%)		,
Do. do.	do.	Sidi Kacem	9.500
Phosphate rock	Office Chérifien des Phosphates (OCP) (Government, 100%)	Sidi Daoui Mine, Khouribga	10.000.000
1		mining center	, ,
Do.	do.	Mera El Arech Mine, Khouribga	6,000,000
		mining center	, ,
Do.	do.	Benguerir open pit mine,	4,000,000
		Gantour mining center	, ,
Do.	do.	Youssoufia underground	3,000,000
		mine, Gantour mining center	, ,
Do.	do.	Sidi Chennane Mine, Khouribga	2.000.000
		mining center	, ,
Phosphoric acid, P_2O_5 content	Indio Maroc Phosphore S.A. [Office Chérifien des Phosphates (OCP).	Jorf Lasfar	330,000
1 , 2 , 5	50% and K.K. Birla Group, 50%]		,
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	1,400.000
		Jorf Lasfar	,,
Phosphoric acid (purified).	Euro-Maroc Phosphore Co. [Office Chérifien des Phosphates (OCP)	Jorf Lasfar ³	120.000
P_2O_5 content	33%: Société Chimique Pravon-Runel. 33%: Chemische Frabrik		- , - , - , - , - , - , - , - , - , - ,
	Budenheim KG, 33%)		

See footnotes at end of table.

TABLE 2—Continued MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2008

(Metric tons unless otherwise specified)

			Annual
Country and commodity	Major operating companies and major equity owners	Location of main facilities	capacity
MOROCCO—Continued			
Salt:			
Rock	Société de Sel de Mohammedia (SSM) [Bureau de Recherches de Participations Minières (BRPM), 100%]	Aîn Tekki, Mohammedia	226,500
Marine	Société Chérifienne des Sels (SCS) [Bureau de Recherches de Participations Minières (BRPM), 50%, and Société Nouvelle des Salins du Sine Saloum (SNSSS), 50%]	Lac Zima, Safi	30,000
Silver, ore	Société Metallurgique d'Imiter (SMI) (Managem S.A., 75.72%, and general public, 24.28%)	Near Quarzazate	525
Steel products:	· · · · · · · · · · · · · · · · · · ·		
Bars and sections	 Société Nationale de Sidérurgie (Sonasid) (general public, 31.14%; Société Nationale d'Ivestissement S.A., 21.07%; Axa Assurances Maroc, 8.53%; Aceralia Redendos, 8.5%) 	Jorf Lasfar	300,000
Rebar and wire rod	do.	Nador	540,000
Do.	do.	Casablanca	80,000
Cold-rolled sheet	Maghreb Steel S.A.	do.	250,000
Talc and pyrophilite:			
Pyrophilite	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 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. WESTERN SAHARA	Société Mineral et Substances	Lalla Mimouna, Taza	NA
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.

 $^2\ensuremath{\mathsf{SFPZ}}$ 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.