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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

Morocco's geology has been subdivided into four structural domains. These are, from the south of the country to the north, the Anti-Atlas domain, the Meseta domain, the High Atlas domain, and the Rif domain. The Anti-Atlas domain contains occurrences of manganese, precious metals (gold and silver), and strategic metals (cobalt, tin, titanium, and tungsten). The High Atlas domain (the Atlas Belt) contains occurrences of barite, copper, iron, lead, manganese, and zinc. The Rif domain contains occurrences of antimony, smectic clays, strategic metals (listed above), and zinc (Ministry of Energy and Mining, 2010).

Morocco is rich in mineral deposits and was the world's leading exporter of phosphates and the third ranked producer of phosphates after China and the United States. Moroccan phosphate production met about 27% of world demand. Primarily because of the value of the phosphate production and exports, the mineral industry continued to play a key role in the national economy (Marokko-Info, 2010).

Minerals in the National Economy

The country's mineral sector continued to grow in 2010. Morocco's mineral resource sector was the leading foreign exchange earning sector for the Government; it accounted for about 35% of foreign trade and contributed about 6% of the gross domestic product. The country was home to about 90 mining companies that produced a variety of minerals. 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 Igoudrane and the Imiter deposits, which host significant deposits of silver. The phosphate deposits, which were owned by the Office Chérifien des Phosphates (OCP), contained about 75% of the world's estimated total phosphate reserves (Report Buyer, 2010).

Government Policies and Programs

The Government agency responsible for oversight of the mineral industry is the Ministère de l'Industrie, du Commerce, de l'Energie et des Mines [Ministry of Industry, Trade, Energy, and Mines]. The Bureau de Recherches et de Participations Minières (BRPM) [Office of Research and Mining Investments] is responsible for the development of most mineral resources. La Centrale d'Achatt et de Développement de la Region Minière de Tafilalet et de Figuig is responsible for promoting and supporting the interests of artisanal miners in the Tafilalet and the Figuig regions. 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 Petrolieres (ONAREP) is responsible for overseeing the energy sector (MBendi Information Services (Pty) Ltd., 2010b).

Production

In terms of the value of production, phosphate rock was Morocco's most important mineral and accounted for about 95% of the value of the country's mining output. In addition to phosphate rock, the country produced a variety of minerals, which included barite, clays, cobalt, copper, fluorspar, gold, iron ore, lead, nickel, petroleum, pyrophylite, salt, silver, and zinc. The level of production was affected significantly by the global recession. Notable changes in 2010 included iron ore and phosphate rock production, which increased, and bentonite, silver, and zinc production, which decreased (table 1).

Morocco produced 14% of the world's production of phosphate rock, 7% of the world's production of barite, 2% of the world's production of cobalt, and 1% of the world's production of fluorspar (Jasinski, 2011; Miller, 2011a, b; Shedd, 2011).

Structure of the Mineral Industry

There was little change in the structure of the mineral industry in 2010. Mineral concentrate production continued to be dominated by the private sector with the exception of phosphate rock, which was a state monopoly. Table 2 is a list of major mineral industry facilities, their capacities, and their locations.

Mineral Trade

Morocco's trade was based on various free trade agreements (FTA) that the country had signed with its principal trading partners. Some of these were the Euro-Mediterranean FTA, which was signed with the European Union (EU); the Agader FTA, which was signed with Egypt, Jordan, and Tunisia; and the U.S.-Morocco FTA. The U.S.-Morocco FTA—a comprehensive agreement that went into effect on January 1, 1996—provided U.S. exporters with increased access to the Moroccan market by eliminating tariffs on 95% of consumer and industrial goods. In turn, the U.S.-Morocco FTA increasd Moroccan trade with the United States. Morocco was the first African country to have an FTA with the United States (Economy Watch, 2010).

U.S. exports to Morocco were valued at about $1.9 billion in 2010. This total included, in order of value, $3.1 million for nonmetallic minerals, $82,000 for petroleum products, and $24,000 for iron and steel products. (U.S. Census Bureau, 2010a).

U.S. imports from Morocco were valued at about $685 million in 2010. This total included, in order of value, about $8.3 million worth of nonferrous materials, about $373,000 worth of gemstones (including precious and semiprecious), and about $182,000 worth of sulfur and nonmetallic materials (not specified) (U.S. Census Bureau, 2010b).

Commodity Review

Metals

Cobalt.—Cobalt in Morocco is associated with arsenic in narrow vein structures found at the contact of serpentines and quartz-rich diorites. The serpentines are the source rock for the 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).

Compagnie de Tifnout Tiranimine Managem SA (CTT Managem) was a subsidiary of Omnium Nord African (ONA), the leading private mining company in Morocco. CTT Managem specialized in the evaluation and mining of cobalt deposits. In 2010, CTT Managem 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 (CorporateInformation.com, 2010)

Copper.—Odyssey Resources Ltd. of Canada was the first foreign-owned company to acquire an exploration license in Morocco. Odyssey had acquired a total of 34 exploration licenses on 392 square kilometers (km^2) in the Anti-Atlas copper-silver district that encompassed six known deposits, one of which had been mined previously. Although the district has a high density of copper-silver deposits, which include some of the region's largest known deposits, Odyssey announced that it would terminate its exploration activities in Morocco, citing disappointing exploration results and insufficient justification to continue. Odyssey commenced the liquidation of its subsidiary in Morocco in 2010 (Odyssey Resources Ltd., 2010).

Gold.—During 2010, Maya Gold and Silver Inc. of Canada conducted exploration activities in two distinct areas at its Amizmiz project. In the TR-AZ area, the main objectives of the exploration programs were to evaluate high-grade gold areas whereas in the Tiglit area, exploration work was aimed at testing geophysical anomalies. The presence of gold mineralization at the Amizmiz project could be genetically related to a reduced intrusive-related gold system (RIRG). The RIRG deposits are characterized by felsic, ilmenite-series (nonmagnetic) plutons. More exploration work and research would be needed to substantiate the RIRG model, which was planned to be a part of Maya's 2011 exploration program (Maya Gold and Silver Inc., 2010).

Maya announced that it had signed an agreement to acquire 100% of the Azegour Mine and its associated mining permit number 183208 from Ouiselsat Mines S.A. The 16-square-kilometer (km^2) Azegour permit lies directly south of the Amizmiz property and covers part of the mineralized corridor being evaluated under Maya's proposed RIRG model. The past-producing Azegour Mine, which was no longer in operation, contained some quantities of copper, molybdenum, and tungsten; however, the property had not been investigated for gold or silver (Mineweb, 2011).

Kasbah Resources Ltd. of Australia was the owner of the Tamlait gold deposit located at the eastern end of the High Atlas Mountains about 300 km south of Oujda. The Tamlait property consisted of eight exploration permits covering a surface area of 128 km^2. Exploration work included 33 diamond drill holes totaling 7,019 m. The drilling showed that Tamlait consisted of a veined quartz stock work developed within a chlorite-sericite altered folded porphyritic intrusive body. Within the 400 m of strike length that had been drill tested, gold mineralization had been intersected to within 12 m of the surface and to a depth of 360 m vertical from the surface (Kasbah Resources Ltd., 2010).

Iron and Steel.—Maghreb Steel Co. announced the construction of its new hot-rolled steel production facility in the Bled Solb industrial complex. Construction would be carried out in three phases. Phase I included completing the hot-rolled-coil (HRC) production line with a capacity of 1 million metric tons per year (Mt/yr). The work in phase 1 started in 2010 with cold tests. Phase II would include the completion of a hot-rolling line for the production of heavy plates with a capacity of 500,000 t/yr. Phase III would consist of building a melt shop and a continuous casting unit for slab production with a capacity of 1 Mt/yr. Costs to complete this project, which would be built on 80 hectares of land, was estimated at $450 million. The Moroccan market was considered to be one of the major markets that had been witnessing a consistant increase in steel consumption, with annual steel consumption increasing from 974,000 metric tons (t) in 2000 to 2.2 million metric tons (Mt) in 2008. Steel consumption in 2013 was projected to reach 3.4 Mt, 70% of which would be long-rolled steel and 30% of which would be flat-rolled steel (Arab Iron and Steel Union, 2010).

Silver.—In terms of value, silver was the country's second ranked mineral after phosphate. The silver mines of Société Metallurgique d'Imiter were located mostly in Imiter in the Anti-Atlas domain and Igoudrane in the Souss Valley region. The Igoudrane mines had a processing capacity of 300,000 t/yr of ore and the Imiter mines had a processing capacity of about 500,000 t/yr of ore (Morocco Bling, 2010).

Tin.—Kasbah Resources acquired the rights to the Achmmach Mine, which was a large hard rock project. The Achmmach tin project was located in the El Hajeb region in the Central Hercynian Massif about 140 km southeast of Rabat. Kasbah Resources's strategy was to increase the size of the deposit's resource, prove the economics, reduce the project risk, and advance Achmmach to a development decision by yearend 2011. The project was composed of two exploitation permits covering 32 km^2. Kasbah Resources had an exclusive right to acquire 100% interest in the Achmmach project by completing a positive feasibility study. Kasbah Resources considered the Achmmach project to represent one of the leading undeveloped tin deposits in the world containing estimated reserves of 7 Mt of ore with 54,000 t of contained tin (Kasbah Resources Ltd., 2010).

Zinc.—Compagnie Minière des Guemassa (CMG) operated the Douar Hajar Mine, which was located in the Guemassa

massif, 35 km south of Marrakesh. Douar Hajar mined a polymetallic sulfide deposit hosted in upper Visean rocks. The deposit was formed by hydrothermal alteration at the boundary of carbonate-sedimentary and volcano-sedimentary sequences. The polymetallic deposit contained chalcopyrite, galena, pyrite, banded pyrrhotite, and sphalerite with total estimated reserves of about 19 Mt averaging 7% zinc, 2% lead, and 0.5% copper. The mining method was cut-and-fill with some sublevel caving. Underground primary crushing was followed by further crushing, grinding, and flotation to yield three separate concentrates of copper, lead, and zinc. The Hajar Mine produced metal concentrates grading 68% lead, 52% zinc, and 28% copper that were delivered to the Port of Safi for shipment mainly to European customers (Mining Technology, 2010).

Industrial Minerals

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

Lafarge Ciments saw cement sales fall in the first half of 2010 owing to flooding and bad weather. Lafarge Ciments projected that the market situation would improve as Morocco was experiencing an increase in construction activity. Lafarge Ciments predicted a cement market growth of between 1% and 2% for 2010 and was considering construction of a new cement plant in the southern Souss region where the company expected growth opportunities (Ghanmi, 2010).

Phosphate Rock.—Phosphate rock is found mainly in the western part of Morocco. Morocco's estimated proven phosphate reserves were 50 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 devised a new strategy aimed at boosting its production capacity in the fields of mining and fertilizers and increasing its raw phosphate extraction to 47 Mt/yr from 28 Mt/yr. OCP announced that it would invest 6.3 billion euros ($9.1 billion[1]) until 2020. OCP was planning to build an underground slurry pipeline to get the phosphate to market. The slurry pipeline would carry phosphates from the central mining region of Khouribga to the Jorf Lasfar industrial and port complex on the Atlantic coast. Khouribga is located 120 km southeast of Casablanca. The French Government was lending OCP €240 million ($345 million) to help finance the project (Global Arab Network, 2010).

Tekfen Contracting Group of Turkey was planning to build a 240-km-long phosphate pipeline and to construct two diammonium phosphate (DAP) plants with a capacity of 850,000 t each at a cost of about $620 million. The DAP facilities were expected to be completed in 2012, and the pipeline to be completed in 2013 (Kaya, 2011).

Mineral Fuels, Related Materials, and Other Sources of Energy

Hydrocarbon occurrences in Morocco included a variety of liquid and gas accumulations, from dry gas in the Rharb Basin and condensate and light oil in the Essaquiera and Preif Basins, to heavy oil in the Tarfaya Basin. The potential for hydrocarbon resources was thought to exist in large yet-to-be-explored sedimentary basins of Morocco. Morocco had a well developed infrastructure to support natural gas and petroleum exploration and production. Exploration activities were conducted year round (Mbendi Information Services (Pty) Ltd., 2010c).

Coal.—In 2010, the state-owned company l'Office National de l'Electricité (ONE) was responsible for the generation, transmission, and distribution of electrical power. The Government relied on coal imported from Colombia, South Africa, and the United States for its energy requirements (Mbendi Information Services (Pty) Ltd., 2010a).

Natural Gas.—Circle Oil plc of Ireland announced that the ADD-1 exploration well had been drilled, logged, and successfully tested at the Sebou Permit as a potential producer. The drilling rig was then moved to commence testing of the DRJ-6 well, which was an untested well from a previous drilling campaign. Following the testing of the DRJ-6 well, the exploration well KSR-11, which would be the permit's fifth and final well, would be drilled. The Sebou Permit lies to the northeast of Rabat in the Rharb Basin, which is a foredeep basin located in the external zone of the Rif Folded Belt (OilVoice, 2010).

Petroleum.—San Leon Energy plc announced that the environmental impact assessment for the Tarfaya pilot plant facility had been approved by the Government. Construction of a new road from the main highway to the pilot plant was completed in August 2010 in preparation for site clearance and construction activity. A drilling program for two wells to be drilled at the pilot plant was under review. Rig availability was also being investigated. San Leon hired Golder Associates Ltd. of Canada to conduct a hydraulic fracturing analysis study to assist San Leon in understanding the natural fracturing possibilities that could be present within the Tarfaya oil shale formation (Mbendi Information Services (Pty) Ltd., 2010d).

Renewable Energy.—The Government's plan for solar energy involved building five power stations, which would account for about 38% of the country's installed power generation by 2020. The Government was hoping to capitalize on the Desertec project, which was a planned €400 billion ($568 billion) project to use solar power from the Sahara desert to supply 15% of Europe's energy by 2050 (Engineering News, 2010).

The Government initiated construction of a €250 million ($355 million) wind farm near Tangiers. The wind farm, which would have 165 turbines and a production capacity of 140 megawatts (MW), was reported to be the largest in Africa. The project was part of an estimated $3 billion solar project that was projected to be completed by 2020. The project would supply about 42% of Morocco's energy production, with hydraulic, solar energy, and wind farm sources each generating 14% of the total. A 54-MW wind farm started operations in northern Morocco in 2000 (Business Maktoob.com, 2010).

[1]Where necessary, values have been converted from euro area euros (€) to U.S. dollars (US$) at an average rate of €1.00=US$1.43.

Uranium.—The Office National des Hydrocarbures et des Mines (ONHYM) was encouraging exploration for uranium. Morocco has several types of uranium occurrences, including paleochannel-type occurrences, granites with vein-type occurrences, and occurrences in sedimentary and metamorphic terrains. The Government of France and the Government of Morocco signed an agreement on civilian nuclear power development. Morocco has limited petroleum reserves but produced phosphate that contains uranium. The Areva Group of France signed an agreement with the ONHYM to investigate the recovery of uranium from phosphoric acid. The amount of uranium in Morocco's phosphates was reported to be very large, although no specific figures were given. The Government was planning to open negotiations in 2011 on building its first nuclear powerplant scheduled to be operational between 2022 and 2024 (MoroccoBoard.com, 2010).

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 investments in the mining sector 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 decrease owing to depletion of reserves. Tin could prove to be an increasingly key commodity for Morocco if Kasbah Resources decides to commission the Achmmach Mine in the foreseeable future. The OCP is expected to encourage foreign investment in phosphate production. The phosphate industry will likely continue to dominate Morocco's mineral sector for the next 6 to 8 years.

References Cited

Arab Iron and Steel Union, 2010, Maghreb Steel celebrates launch [of] new projects in Morocco: Steel Guru. (Accessed May 26, 2010, at http://www.steelguru.com/middle_east_news/Maghreb_Steel_celebrates_launch_new_projects_in_Morocco/136905.html.)

Business.Maktoob.com, 2010, Morocco's King Mohammed VI inaugurates wind farm near Tangiers, biggest in Africa: Business.Maktoob.com. (Accessed July 22, 2010, at http://www.business.maktoob.com/20090000485102/0/PrintPage.htm.)

CorporateInformation.com, 2010, Managem company snapshot: Wright Investors' Service. (Accessed July 22, 2011, at http://www.corporateinformation.com/Company-Snapshot.aspx?cusip=C504BF100.)

Economy Watch, 2010, Morocco trade, export and imports: Economy Watch. (Accessed July 28, 2010, at http://www.economywatch.com/world_economy/morocco/export-import.html.)

Engineering News, 2010, Morocco solar plant draws big investor interest: Creamer Media (Pty) Ltd. (Accessed June 21, 2010, at http://www.engineeringnews.co.za/print-version/morocco-solar-plant-draws-big-investor-interest-2010-06-17.)

Ghanmi, Lamine, 2010, Lafarge sees Morocco cement market growing in 2010: Aggregate Research, April 20. (Accessed July 20, 2010, at http://www.aggregateresearch.com/print.aspx?ID=18985.)

Global Arab Network, 2010, Morocco phosphate company improves productivity: Global Arab Network. (Accessed May 11, 2010, at http://www.globalarabnetwork.com/201005095806/Industry/40-cost-reduction-morocco-phosphates-company-improves-productivity.)

Jasinski, S.M., 2011, Phosphate rock: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 118–119.

Kasbah Resources Ltd., 2010, Achmmach tin project: Kasbah Resources Ltd. (Accessed February 17, 2012, at http://www.kasbahresources.com/cms/index.php/projects/achmmach-tin-project.html.)

Kaya, Çilem, 2011, Turkish company to build phosphate pipeline in Morocco: Daily News, January 20. (Accessed January 24, 2011, at http://www.hurriyetdailynews.com/n.php?n=Turkish-company-to-construct-phosphate-pipeline.)

Leblanc, Marc, and Billaud, Pierre, 1982, Cobalt arsenide ore bodies related to an upper Protozoic ophiolite, Bou-Azzer, Morocco: Economic Geology, v. 77, no. 1, p. 162–175, (Accessed April 21, 2010, at http://econgeol.geoscienceworld.org/egi/content/abstract/776/1/162.) DOI: 102113/gsecongeo 77.1/162

Marokko-Info, 2010, Mineral resources and industry: Marokko-Info. (Accessed July 22, 2011, at http://www.marokko-info.nl/english/floor-treasures-and-industry/.)

Maya Gold and Silver Inc., 2010, Maya to test a new geological model on its Amizmiz property: Maya Gold and Silver Inc. (Accessed December 20, 2010, at http://services.metalseconomics.com/MineSearch/News?news.aspx?type=html&newsID=1008133019.)

MBendi Information Services (Pty) Ltd., 2010a, Electrical power in Morocco—Overview: MBendi Information Services (Pty) Ltd. (Accessed December 21, 2011, at http://www.mbendi.com/indy/powr/af/mo/p0005.htm.)

MBendi Information Services (Pty) Ltd., 2010b, Mining in Morocco—Overview: Mbendi Information Services (Pty) Ltd. (Accessed July 11, 2010, at http://www.mbendi.com/indy/ming/af/mo/p0005.htm.)

MBendi Information Services (Pty) Ltd., 2010c, Oil and gas in Morocco—Overview: MBendi Information Services (Pty) Ltd. (Accessed July 31, 2011, at http://www.mbendi.com/indy/oilg/af/mo/p0005.htm.)

MBendi Information Services (Pty) Ltd., 2010d, San Leon Energy provides update on Tarfaya oil shale pilot plant in Morocco: MBendi Information Services (Pty) Ltd. (Accessed September 27, 2010, at http://www.mbendi.com/a_sndmsg/news_view.asp?PG=23&I=110473&M=0&CTRL=S.)

Miller, M.M., 2011a, Barite: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 24–25.

Miller, M.M., 2011b, Fluorspar: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 56–57.

Mineweb, 2011, Maya acquires the Azegour Mine and consolidates position south of Amizmiz: Mineweb. (Accessed July 30, 2011, at http://www.mineweb.com/mineweb/view/mineweb/en/page674?oid=123988&sn=Detail&pid=102055.)

Mining Technology, 2010, Hajar, Morocco: Mining Technology. (Accessed July 6, 2011, at http://www.mining-technology.com/projects/hajar/.)

Ministry of Energy and Mining, 2010, Portrait of Morocco: Ministry of Energy and Mining (Accessed July 28, 2011 at http://www.maroc.ma/PortailInst/An/MenuGauche/Portrait+of+Morocco/Economy/Mining.htm.)

Morocco Bling, 2010, Moroccan silver: Morocco Bling. (Accessed July 30, 2011, at http://www.moroccanbling.wordpress.com/2011/02/15/Moroccan-silver-the-low-down/.)

MoroccoBoard.com, 2010, Nuclear Morocco: MoroccoBoard News Services. (Accessed July 22, 2010, at http://www.moroccoboard.com/news/334-news-release/1090-morocco-developing-nuclear-reactor.)

Odyssey Resources Ltd., 2010, Odyssey Resources Limited announces an update on projects: Odyssey Resources Ltd., 7 p. (Accessed August 26, 2010, at http://www.odysseyresources.com/i/pdf/nr/2010-08-26_NR.pdf.)

OilVoice, 2010, Circle oil reports gas discovery in Morocco: OilVoice. (Accessed February 2, 2011, at http://www.oilvoice.com/PrinterFriendly/Circle_Oil_Reports_Gas_discovery_in_Morocco/ffb8d35ae.aspx.)

Report Buyer, 2010, Morocco mining report Q1 2010: Report Buyer. (Accessed July 22, 2010, at http://www.reportbuyer.com/industry_manufactering/mining/morocco_mining_report.)

Shedd, K.B., 2010, Cobalt: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 46–47.

U.S. Census Bureau, 2010a, U.S. exports to Morocco from 2002 to 2010 by 5-digit end-use code: U.S. Census Bureau. (Accessed July 28, 2011, at http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c7140.html.)

U.S. Census Bureau, 2010b, U.S. imports from Morocco from 2002 to 2010 by 5-digit end-use code: U.S. Census Bureau. (Accessed July 28, 2011, at http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c7140.html.)

WESTERN SAHARA

The issue of sovereignty for Western Sahara remained unresolved in 2010. 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 fishing, pastoral nomads, and phosphate mining.

The SADR granted two petroleum exploration licenses despite a legal notice from the United Nations questioning the legality of such exploration. SADR also issued exploration licenses to foreign oil companies for future engagement in the territory. Any investments in the resources of Western Sahara were expected to be delayed until the issue of sovereignty is resolved (Afro News, 2010).

Reference Cited

Afro News, 2010, Fortune hunters eye Western Sahara oil riches: Afrol News. (Accessed August 2, 2011, at http://afrol.com/articles/25697.)

TABLE 1
MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2006	2007	2008	2009	2010[e]
METALS						
Antimony, sodium antimonate		500	500 [e]	500	400	400
Cobalt:						
Concentrates, gross weight		30,770 [r, 3]	20,800 [r, 3]	20,200 [r, 3]	26,100 [r, 3]	31,095 [3]
Co content		2,615	1,768 [e]	1,717 [3]	1,600	3,130 [3]
Metal[4]		1,405	1,591	1,791 [3]	1,600	1,545 [3]
Copper:						
Concentrates, gross weight		17,811	19,900	21,100 [r, 3]	42,100 [r, 3]	53,300 [3]
Cu content, concentrates		4,600	5,572	5,055 [3]	12,615 [r, 3]	14,000
Gold	kilograms	1,800	771 [3]	587 [3]	600	650
Iron and steel:						
Iron ore:						
Gross weight		35,500 [r, 3]	48,000 [r, 3]	22,900 [r, 3]	30,500 [r, 3]	44,665 [3]
Fe content (54%)		19,170 [r]	21,600 [r]	12,366 [r]	16,470 [r]	24,119 [3]
Metal:						
Pig iron[e]		15,000	15,000	15,000	15,000	15,000
Steel, crude		314,000	325,000 [e]	478,000	479,000 [3]	455,000
Lead:						
Concentrate:						
Gross weight		59,107 [r, 3]	58,600 [r, 3]	50,000 [r]	47,800 [r, 3]	46,373 [3]
Pb content (68%)		41,370	41,976 [3]	33,477 [3]	27,000 [3]	32,461 [3]
Cupreous matte, Pb content[e]		600	600	600	600	600
Metal:						
Smelter, primary only		55,000	55,000 [e]	50,000	50,000	50,000
Refined:						
Primary		44,700	44,700 [e]	38,000	36,000	38,237 [3]
Secondary[e]		3,000	3,000	3,000	3,000	3,000
Total[e]		47,700	47,700	41,000	39,000	41,237 [3]
Manganese ore, largely chemical-grade		4,815	41,628 [3]	102,285 [3]	51,788 [r]	75,614 [3]
Mercury[e]		10	10	10	10	10
Nickel content of nickle sulfate		80	80 [e]	100 [e]	100	100
Silver, Ag content	kilograms	202,300 [3]	177,712 [3]	201,195 [3]	235,301 [3]	243,000
Zinc concentrate:						
Gross weight		148,690	111,100	161,500 [r, 3]	88,400 [r, 3]	87,360 [3]
Zn content		77,320	54,353	80,747	44,199 [r, 3]	43,680 [3]
INDUSTRIAL MINERALS						
Arsenic trioxide		8,950	8,000 [e]	8,000	8,655 [r, 3]	13,731 [3]
Barite, crude		628,400 [r, 3]	664,700	725,060 [3]	586,937 [r]	572,429 [3]
Cement, hydraulic	thousand metric tons	11,352	12,792	14,047	14,519 [r]	14,000
Clays, crude:						
Bentonite		65,000	137,100	50,125 [3]	84,097 [r]	60,000
Fuller's earth (smectite)		29,400	121,700	140,875 [3]	132,110 [r, 3]	82,570 [3]
Montmorillonite (ghassoul)		1,000	1,000 [e]	1,000	928 [r]	1,186 [3]
Feldspar[e]		28,000	28,000	28,000	28,000	28,000

See footnotes at end of table.

TABLE 1—Continued

MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2006	2007	2008	2009	2010[e]
INDUSTRIAL MINERALS—Continued						
Fertilizers[e]	thousand metric tons	2,400	2,400	2,400	25,210 [r, 3]	3,713 [3]
Fluorspar, acid-grade		94,254	78,817 [3]	56,724 [3]	72,110 [r, 3]	89,680 [3]
Gypsum[e]		600,000	600,000	600,000	600,000	600,000
Phosphate rock:						
Gross weight[5]	thousand metric tons	27,244	27,834 [3]	24,861 [3]	18,307 [r]	26,603 [3]
P_2O_5 content	do.	8,718	8,700 [e]	8,000	6,000 [r]	8,500
Phosphoric acid	do.	3,045	3,000 [e]	2,800	3,077 [r, 3]	3,999 [3]
Pyrophilite		12,900	26,100	25,800	33,400	35,000
Salt:[5]						
Rock		301,061	215,800	225,000	240,000	230,000
Marine		16,234	16,000	16,000	16,500	16,000
Total		317,295	231,800	241,000	256,500	250,000
Strontium minerals, celestite[e]		2,700	2,600	2,600	2,500	2,500
Sulfuric acid[e]		9,500	9,500	9,500	9,500	9,500
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural[e]	million cubic meters	56 [3]	61 [3]	50	60	60
Petroleum:						
Crude	thousand 42-gallon barrels	1,479	1,500 [e]	1,573	1,575	1,575
Refinery products:						
Liquefied petroleum gas	do.	2,500 [e]	2,500 [e]	2,500	2,500	2,500
Gasoline	do.	3,172	3,104	3,434	3,400	3,400
Jet fuel	do.	1,886	2,339	2,096	2,100	2,100
Kerosene	do.	22	--	--	--	--
Distillate fuel oil	do.	16,815	14,890	13,570	14,000	14,000
Residual fuel oil	do.	15,083	15,112	16,000	16,000	16,000
Other	do.	1,000 [e]	1,000 [e]	1,000	1,000	1,000
Total	do.	39,478	37,945	38,600	39,000	39,000

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through June 31, 2011.

[2]In 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.

[3]Reported figure.

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

[5]May include production from Western Sahara.

TABLE 2
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2010

(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 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 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 of Switzerland, 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) (Italcimenti 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 SEFRIOUI SA	Tamdafelt	NA
Do.	Antonio Reyes Mines S.A.	Haddou Ammar, Nador	NA
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

See footnotes at end of table.

TABLE 2—Continued
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2010

(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 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 de Participations Minières (BRPM), 100%]	Tiouit	4,500
Fluorspar, concentrate	Société Anonyme d'Entreprises Minières (SAMINE) (Managem S.A., 58%, and Société Metallurgique d'Imiter, 42%)	El Hammam, Khémisset	120,000
Gold	Akka Gold Mining Co. [Managem S.A., 70%, and Bureau de Recherches et de Participations Minières (BRPM), 16.07%]	Iourim, Tiznit	3
Iron ore million metric tons	Société d'Exploitation des Mines du Rif (SEFERIF) [Bureau de Recherches de Participations Minières (BRPM), 100%]	Bouhoua, Nador	12
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[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 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.	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_2O_5 content	Indio Maroc Phosphore S.A. [Office Chérifien des Phosphates (OCP), 50%, and K.K. Birla Group of India, 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_2O_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

See footnotes at end of table.

TABLE 2—Continued
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2010

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
MOROCCO—Continued			
Salt:			
Rock	Société de Sel de Mohammedia (SSM) [Bureau de Recherches de Participations Minières (BRPM), 100%]	Ain 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 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'Ivestissement 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 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	NA
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.

[1]Under construction.

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

[3]A second purified phosphoric acid plant with a capacity of 120,000 metric tons per year was under construction in 2010.