



2007 Minerals Yearbook

LIBYA

THE MINERAL INDUSTRY OF LIBYA

By Mowafa Taib

Hydrocarbons were the main contribution to the world mineral supply by Libya, which is also known by its official name the Great Socialist People's Libyan Arab Jamahiriya. With 3.6% of the world's proven oil reserves, this north African country contains Africa's largest oil reserves. In 2007, Libya produced 1.9% of the world's oil output and ranked 3d among African oil-producing countries after Nigeria and Algeria and 15th globally in terms of the volume of oil produced (BP p.l.c., 2008, p. 6, 8; Central Bank of Libya, 2008, p. 44; Organization of Arab Petroleum Exporting Countries, 2008, p. 11, 21).

Minerals in the National Economy

Despite the Government's efforts to diversify the economy, the Libyan economy remained heavily dependent on the hydrocarbon sector. Petroleum operations made up 53% of Libya's real sector activities, and hydrocarbon exports accounted for 96% of the total value of Libyan exports. The Government revenue from the petroleum sector in 2007 was \$19.6 billion,¹ which represented 82.7% of the total budgetary revenue and 55% of the country's gross domestic product. The growth in the volume of crude oil and natural gas production was 1.7% and 8.0%, respectively. However, the volume of crude oil exports rose by 3.7% and that of gas exports, by 10.4% in 2007 compared with 2006 production levels. Hydrocarbon exports averaged 6% higher in 2007 than in the previous year (Central Bank of Libya, 2008, p. 40, 42).

Petroleum Law No. 25 of 1955, the Petroleum Regulations No. 8 and 9, and the provisions of Exploration and Production-Sharing Agreement IV govern the hydrocarbon sector. Mining and quarrying operations are covered under law No. 2 of 1971 and its amendments, whereas law No. 5 of 1997 regulates foreign investment in the non-oil sectors. Additionally, law No. 443 of 2006 also applies to international companies, including hydrocarbons and minerals companies that intend to operate in Libya. This legislation requires foreign companies to have a local partner that holds a minimum of a 35% share in any joint venture (Middle East Economic Digest, 2008b).

Structure of the Mineral Industry

Libya's concessions map contained exploration license codes for 46 companies that operated in the hydrocarbon sector under several legal framework arrangements with state-owned petroleum company, National Oil Corp. (NOC). NOC fully owned nine companies, had joint ventures with seven companies, and had entered into exploration and production-sharing agreements with the remaining companies. NOC's equity interest in oil companies working in Libya ranged from 50% to 100%. These interests were as follows: 100% of Arabian

Gulf Oil Co. and Sirte Oil Co.; 80% of a joint venture with Total E&P Libya; 75% of a joint venture with Repsol Oil Operations Co.; 66% of a joint venture with OMV Aktiengesellschaft of Austria; 51% of a joint venture with Wintershall AG of Germany; 51% of a joint venture with Petro-Canada; 51% of a joint venture with U.S. companies Amerada Hess Corp., ConocoPhillips Co., and Marathon Oil Corp.; and 50% of a joint venture with Eni S.p.A. of Italy (General Authority for Information, 2008, p. 200).

Twenty-eight oil companies had exploration and production-sharing agreements with NOC, including BP p.l.c., Chevron Texaco Libya Ltd., Exxon Mobil Corp., Oil India Ltd., Petro-Canada, and Sonatrach S.p.A. (National Oil Corp., 2008).

Privatization plans for state-owned establishments progressed in 2007. The Government invited international investors to hold shares in several Libyan companies, including Arab Cement Co. at Al-Marqab, Libyan Cement Co. in Benghazi, and Libyan Iron and Steel Co. (LISCO) in Misuratah. Investors were also invited to participate as joint-venture partners in other smaller state-owned enterprises (General Authority for Ownership, 2007).

The National Company of Mining of Libya, which is the Government agency that oversees the country's mining operations, invited international mineral exploration companies to explore for metals in the East Oweinat region, which is located in southeastern Libya. It also invited companies to mine iron ore deposits at Tarout in the Wadi Ash-Shatti region of west-central Libya (National Company of Mining, 2008).

The Industrial Research Center conducted geologic surveys as well as exploration and mining studies in 2007. The center produced geologic and geophysical maps for the Al-Kufrah, the East Oweinat, and the Jabal Iqui regions. It also commissioned economic feasibility studies for producing minerals, including bentonite in the central region, dolomite in the Al-Aziziah District, gold in the East Oweinat region and Arkno Mountain, gypsum in the eastern region, and phosphate in the western region (Industrial Research Center, 2008).

Production

The soaring oil prices in international markets during 2007 did not result in a substantial increase in the volume of crude oil produced in Libya. Moreover, the growth curve of refinery products, such as gasoline and liquefied petroleum gas (LPG), was almost flat (0.4%) whereas production of petrochemical commodities, such as urea and ammonia, was 6.1% lower than in 2006 (Central Bank of Libya, 2008, p. 43, 44).

The local market demand for cement and other building materials increased substantially in recent years owing the construction boom in the residential and industrial sectors. Therefore, cement production increased by more than 10% in 2007 compared with 2006 and by 65% compared with 2005 output. Additionally, Libya produced cement, clay, gypsum, lime, methanol, salt, sand, stone, and sulfur (table 1).

¹Where necessary, 2007 values have been converted from Libyan dinar (LD) to U.S. dollars (US\$) at the rate of LD1.22422 = US\$1.00.

Commodity Review

Metals

Iron and Steel.—The steel industry was a leading non-oil industry; it met most of the local market demand and contributed to the country's exports. In 2006 (which was the latest full year for which data were available), exports of iron and steel products totaled 918,000 metric tons (t). Data for the first 9 months of 2007 indicate that exports of iron products declined because of increasing domestic demand (Arab Steel, 2008b).

Libya's steel production in 2007 was estimated by the World Steel Association (WSA) to be 1.2 million metric tons (Mt) compared with 1.15 Mt in 2006. WSA also reported that Libya's production of direct-reduced iron, including hot-briquetted iron, was 1.66 Mt in 2007 compared with 1.63 Mt in 2006 (World Steel Association, 2008).

The demand for iron and steel products was expected to increase further as a result of the construction of several railway lines, which included a 450-kilometer (km)-long high-speed line between Benghazi and Tubruq, a north-south freight railway between Misuratah and Sabha, and another 900-km line along the Mediterranean coast (Middle East Economist Digest, 2008c, p. 12). In 2007, LISCO continued its expansion plan to increase its liquid steel production capacity to 4 million metric tons per year (Mt/yr) from 1.3 Mt/yr by securing a \$640 million loan from Libyan banks in addition to \$193 million allocated by the Government (Arab Steel, 2007). LISCO moved forward with its plans to add three electric-arc furnaces (EAFs) and a ladle furnace to its plant at Misuratah. The installation of the EAFs in Steel Melt Shop No. 1 was expected to increase the facility's capacity to 1.1 Mt/yr from 630,000 metric tons per year (t/yr). The expansion work was expected to take 30 months (Libyan Iron and Steel Co, 2006; Arab Steel, 2008a).

Both the central Government and the local governments were interested in the development of iron ore mining at the Wadi Ash-Shatti deposit, which was regarded as the most promising iron ore mining site in Libya. The site has three iron ore horizons that can be as thick as 12 meters (m) and an estimated 795 Mt of magnetic and nonmagnetic ore at a grade of 51.7% iron (Scott, 2000). The National Company of Mining envisaged mining iron ore deposits in the Wadi Ash-Shatti and transporting iron ore more than 600 km north by rail to LISCO's steel complex in Misuratah on the Mediterranean coast. If this vision were to materialize, it could significantly reduce the quantities of iron ore pellets and ferroalloys imported from abroad (National Company of Mining, 2008).

Industrial Minerals

Cement.—The continuing work in the Great Man Made River (GMMR) project consumed more than 800,000 t of sulfate-resistant cement (as of 2004) and required 5,200 km of pipeline made of sulfate-resistant cement (World Report, undated). The sulfate-resistant cement was produced at the Howari plant following the modification of its production lines. Cement consumption in Libya was projected to reach 9 Mt/yr by

2010 compared with the 6 Mt/yr consumed in 2007 (Economist Intelligence Unit, 2008).

Italcementi Group of Italy entered into a 50-50 joint-venture agreement with the Economic and Social Development Fund of Libya to build a cement plant in Al-Ghazala, which is located 53 km west of the city of Tubruq in northeastern Libya. The plant was expected to produce 4 Mt of portland cement and 500,000 t of white cement annually. The agreement was approved by the National Company of Mining (Italcementi Group, 2008).

The African Cement Co., which was owned jointly by the Government and the private sector, awarded China Building Material Co. of Hong Kong a contract to build a new cement plant at Fezzan in the Wadi Ash-Shatti district. The plant was expected to begin producing portland cement and sulfate-resistant cement at a rate of 3,000 metric tons per day (t/d).

The National Company of Mining identified seven locations for future cement production. They were located in the districts of Ajdabia, Al-bayda, Benghazi, Darnah, Sirte, Slouq, and Tubruq. The company invited interested investors to use the industrial mineral resources and to build cement plants.

Mineral Fuels

Natural Gas.—The Government and international companies intensified their efforts to increase Libyan natural gas exploration, production, and transport. Thus, NOC, which intended to double its gas exports to 16 billion cubic meters per year and to increase production to 31 billion cubic meters per year by 2010, launched a fourth round of public bids for exploration and production-sharing agreements that would be focused on gas exploration. The areas offered in these bids covered blocks in the offshore, the Cyrenaica, the Ghadames, the Murzuq, and the Sirte basins. The results of the licensing round gave two blocks in the Sirte basin to Royal Dutch Shell plc of the Netherlands, two blocks in the Murzuq basin to Polskie Górnictwo Naftowe i Gazownictwo S.A. of Poland, three blocks in the Ghadames basin to Gazprom Libya B.V. of Russia, and three blocks in the Ghadames basin to Sonatrach S.p.A. of Algeria (Global Insight, 2007).

In May 2007, Eni Gas Co., which was one of the Eni Petroleum Co. group of companies, along with NOC launched the Western Libyan gas project, which was expected to produce 10 billion cubic meters per year of natural gas when it becomes fully operational. The plan was to export 80% of the gas produced to Europe and to use the remaining 20% to supply the domestic and Tunisian markets. This project was designed to transport natural gas produced in Libya from an onshore and offshore field to Europe through the Greenstream pipeline. The offshore field (Bahr Essalam) is situated 112 km off the western coast of Libya; the onshore field (the Wafa) is located in the northwest near the Libyan border with Algeria. The gas from the Bahr Essalam offshore field was to be treated onshore at the liquefied natural gas plant in Mellitah and transmitted along with the gas and condensates coming from the Wafa field to the Gela reception terminal on the Italian island of Sicily (Eni Petroleum Co., 2007).

BP secured an agreement in 2007 with NOC to explore for gas in two large onshore blocks in the Ghadames basin (North

Ghadames and South Ghadames) in western Libya near its borders with Algeria and Tunisia and one deepwater offshore location about 290 km into the Gulf of Sirte (BP p.l.c., 2007).

Petroleum.—Libya's crude oil production had remained at about 1.75 million barrels per day (Mbbbl/d) for the past 3 years, which was only about one-half of the country's production rate in the 1970s. Therefore, the Government adopted a master plan to pursue a long-term (2005-15) exploration program to achieve its goal of increasing reserves to 20 billion barrels of oil and of producing 3.0 Mbbbl/d by 2012 and 3.5 Mbbbl/d by 2020. Consequently, NOC expanded its onshore and offshore exploration activities by using advanced technologies to drill at least 50 wildcat wells and capture 4,000 square kilometers (km²) of three-dimensional (3-D) seismic data and 10,000 km of two-dimensional (2-D) seismic data annually (BP p.l.c., 2007).

NOC announced the results of the third round of gas and oil licensing bids, which started in late 2006. The winners included the Russian OAO Tatneft Group, which was awarded two onshore contracts in the Ghadames basin and one in the Sirte basin; Taiwan-based Chinese Petroleum Corp., which was awarded one block in the Murzuq basin; Petro-Canada (with Repsol YPF S.A. of Spain); Wintershall AG of Germany and Mitsui & Co. of Japan; and Gazprom Libya B.V., which was awarded an offshore area (Middle East Economic Digest, 2006).

BP returned to work in Libya in May 2007 after 30 years by signing a 7-year contract with NOC to search for oil and gas in the offshore Gulf of Sirte and in the Ghadames basin, which were two of the five main basins in Libya. BP would acquire 5,500 km of 2-D seismic data and 3,000 km² of 3-D seismic data and would drill 17 exploration wells (BP p.l.c., 2007; Middle East Economist Digest, 2008a).

Additionally, NOC entered into a joint-venture agreement with Star Consortium, which was a United Arab Emirates-based group that included TransAsia Gas International and Star Petro Energy to rehabilitate and operate the Ras Lanuf refinery. The refinery had a capacity of 220,000 barrels per day.

A number of oil and gas discoveries in Libya were reported by NOC. Five oil and two gas discoveries were made in 2007 compared with seven oil and three gas discoveries in 2006 (Organization of Arab Petroleum Exporting Countries, 2008, p. 16).

Outlook

Libya is expected to continue its economic growth, which had significantly accelerated as a result of the lifting of sanctions by the United Nations and the United States in 2003 and 2004, respectively. The influx of oil and gas companies and international investors to Libya is expected to continue despite the fluctuations in the price of crude oil because the Government investment laws remain competitive with those of the neighboring countries. Along with expansion of oil and gas operations, the growth of construction projects in other sectors of the economy has made it crucial for Libya to increase its output of cement, iron ore, and steel. Thus, Libyan petroleum and mineral industries are set for vertical and horizontal growth in the short and medium terms.

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TABLE 1
LIBYA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity ²	2003	2004	2005	2006	2007 ^c
Cement, hydraulic ^c	3,500	3,600	3,621 ³	5,300 ^r	6,000
Gas, natural:					
Gross million cubic meters	14,000	14,900	15,000	27,000 ^r	29,000 ³
Dry do.	10,300	10,700	11,700	14,800	14,300 ³
Gypsum ^c	150	175	175	200 ^r	240
Iron and steel, metal:					
Direct-reduced iron ⁴	1,336 ^r	1,586 ^r	1,669 ^r	1,663 ^r	1,660 ³
Crude steel	1,007	1,026	1,255 ^r	1,151 ^r	1,250 ³
Lime ^c	250	250	250	250	250
Methanol	727	670	607	657 ^r	608 ³
Nitrogen:					
N content of ammonia	577	577	507 ^r	512 ^r	517 ³
N content of urea	425	425	385 ^r	380 ^r	360 ³
Petroleum:					
Crude ^c thousand 42-gallon barrels	560,000 ^r	591,000 ^r	618,000 ^r	643,000 ^r	654,000
Refinery products:					
Liquefied petroleum gas do.	2,300	2,200	2,000 ^r	2,300	2,300
Gasoline do.	7,300	5,600	8,000 ^r	7,800 ^r	8,200
Naphtha do.	21,200	11,200	14,700 ^r	22,600 ^r	22,200
Kerosene and jet fuel do.	12,400	20,300	11,900 ^r	11,100 ^r	11,700
Distillate fuel oil do.	28,100	28,700	30,600 ^r	30,600 ^r	30,900
Residual fuel oil do.	41,600	42,800	47,200 ^r	47,000 ^r	46,700
Total do.	112,900	110,800	114,400 ^r	121,400 ^r	122,000
Salt ^c	40	40	40	40	40
Sulfur, byproduct of petroleum and natural gas ^c	15	15	16	16	20

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

¹Table includes data available through February 28, 2009.

²In addition to the commodities listed, a variety of clay, dolomite, limestone, sand, and crushed construction stone was produced, and natron (soda ash) may have been produced, but available information is inadequate to make estimates of output. Natural gas liquids also were produced but were blended with crude petroleum and reported as part of that total.

³Reported figure.

⁴Includes hot-briquetted iron.

TABLE 2
LIBYA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Cement:	Libyan Cement Co.	Benghazi	800	
Do.	Arab Union Contracting Co.	Burj Cement plant, Zliten	1,400	
Do.	Ahlia Cement Co.	Homs 2, Lebda	1,000	
Do.	do.	Souk el Khamis, Tripoli	1,000	
Do.	do.	Zliten	1,000	
Do.	Libyan Cement Co.	El Fataih, Derna	1,000	
Do.	do.	El Hawari	1,000	
Do.	Ahlia Cement Co.	Homs 1, El Margueb	300	
Iron and steel:				
Iron:				
Hot-briquetted iron	Libyan Iron and Steel Co. (Government, 100%)	Misuratah	650	
Sponge iron	do.	do.	1,100	
Steel:				
Crude	do.	do.	1,250	
Rolled:				
Bar and rod	do.	do.	800	
Cold-rolled strip	do.	do.	140	
Hot-rolled strip	do.	do.	580	
Methanol	Sirte Oil Co. [National Oil Corp. (NOC), 100%]	Marsa el Brega	365	
Natural gas, liquefied	do.	do.	700	
Nitrogen:				
Ammonia	do.	do.	803	
Urea	do.	do.	1,041	
Petroleum:				
Crude	thousand 42-gallon barrels per day	Joint venture [Eni S.p.A., 50% and National Oil Corp. (NOC), 50%]	Oilfields included the Bhar Essalam, Bouri, Bu Attifel, El Feel, KK, NC-125, NC-169, NC-174, OO-82, Rimal, UU-82, XX-82, and Wafa	400
Do.	do.	National Oil Corp. (NOC) (Government, 100%) and various subsidiaries and joint ventures, including:	65 oilfields spread across the country, of which:	1,240
		Arabian Gulf Oil Co. [National Oil Corp. (NOC), 100%]	The Sarir and the Nagoora Augila oilfields	NA
		Sirte Oil Co. ([National Oil Corp. (NOC), 100%]	The Assumud, the Attahadi, and the Raguba oilfields	NA
		ESPA [National Oil Corp. (NOC), 51%, Petro-Canada, 49%]	The En Naga North and the En Naga West oilfields	NA
		ESPA [National Oil Corp. (NOC), 80%, Total E&P Libye, 20%]	Al Jurf oilfield	NA
		ESPA [National Oil Corp. (NOC), 51%, Wintershall AG, 49%]	The As-Sarah, the Hamid, the Jakhir, the Nakhla, and the Tauma oilfields	NA
		Waha Oil Co. [National Oil Corp. (NOC), 51%, (ConocoPhillips Co., Marathon Oil Corp. and Amerada Hess Corp.), 49%]	The Bahi, the Defa, the Gialo, and the Waha oilfields	NA
		Zuweitina Oil Co., [National Oil Corp. (NOC), 66%, OMV Aktiengesellschaft, 34%]	Intisar oilfield	NA
Do.	thousand 42-gallon barrels per day	Joint venture of National Oil Corp. (NOC), 75%, Repsol Oil Operations Co., 25%	NR186 oilfield in Murzuq Basin	74
Refined	do.	Ras Lanuf Oil and Gas Processing Co. [National Oil Corp. (NOC)]	Ras Lanuf	220
Do.	do.	Az Zawiya Oil Refining Co. [National Oil Corp. (NOC)]	Az Zawiya	120
Do.	do.	Arabian Gulf Oil Co. [National Oil Corp. (NOC)]	Tobruk	20
Do.	do.	do.	Sarir	10
Do.	do.	National Oil Corp. (NOC)	Marsa el Brega	8

Do., do. Ditto. NA Not available.

