

THE MINERAL INDUSTRY OF

TUNISIA

By Thomas P. Dolley

Phosphate rock and crude petroleum production remained the most important segments of the Tunisian mining industry in 1994. According to the Government, mining industry activity accounted for about \$300 million² in foreign exchange during the year. The estimated gross domestic product (GDP) for Tunisia in 1993 was \$34.3 billion, the last year for which data were available.

The Tunisian legal system is based on French civil law and Islamic law. Basic investment codes covering mining legislation in Tunisia were based on law No. 72-38 of 1972, concerning industries producing for the export market, and law No. 74-74 of 1974, concerning domestic industries. A unified investment code was introduced in November 1993 to help facilitate foreign investment in the mineral industry. Further legislation is planned by the Government to improve incentives for foreign investment in mining.

The most recent amendment to laws governing hydrocarbon exploration and production was passed on June 12, 1990, by the Tunisian Parliament. This amendment, law No. 90-55, was designed to encourage foreign companies to operate in Tunisia. Additionally, further changes were planned for 1994 in the hydrocarbons law to simplify investment procedures. Currently, hydrocarbon exploration agreements take three primary forms: an exploration license that allows the operator to undertake geological investigations before making a full commitment; an exploration permit allowing the operator the right to conduct seismic geophysical investigation with options for full prospecting; and a prospecting permit that allows the operator to carry out geological exploration and drilling for up to 5 years. If a hydrocarbon resource is to be developed, a joint-venture agreement is signed with the Tunisian parastatal (a company wholly or partly owned by the Government) Enterprise Tunisienne d'Activites Petrolieres (ETAP). The law obligates ETAP to cover its share of expenses if it chooses to participate.

For the past several years, the Government determined that it was important for Tunisian industry to take a leadership role on the environment among north African nations. In Tunisia, the task of environmental management resides with the Ministry of Environment and Land Planning through its subsidiaries, Agence Nationale de la Protection de l'Environnement and Office National de l'Assainissement. The Tunisian phosphate industry was actively addressing environmental problems. For example, Compagnie des

Phosphates de Gafsa (CPG) has installed double absorption technology at its sulfuric acid plants at Gabes. Another serious environmental concern for Tunisia is the pollution of the Mediterranean Sea from a variety of sources. Pollution from industrial effluent, urban sewage, discharges of oily ballast from ships, and accidental oil spills are seriously affecting the southwestern Mediterranean Sea and coastline. World oil traffic using the major routes of Bizerte-Cap Bon in Tunisia and the Gibraltar Strait place additional stress on the area. The Government was formulating an institutional and legal template to allow for responsible environmental management. According to the World Bank, the Government's plan includes a 10-year action plan for water and soil conservation; a forestry program; a national strategy to combat desertification; and a national action program for environmental protection that aims to combat pollution, preserve the quality of life of urban and rural populations, protect the marine environment and beaches, and preserve the country's archeological heritage.

Tunisia is an important producer of industrial minerals and mineral fuels in the north African region. However, production of crude oil continued a slow decline in 1994, with phosphate rock having a modest increase in production during the year. Tunisia remained a small-scale metals producer in support of the steel industry and also continued production of nonferrous metals. Fluorspar production ceased in 1992. (*See table 1.*)

The European Union (EU) dominates Tunisian trade, accounting for more than 75% of imports and exports. France is Tunisia's main trading partner, with more than 30% of total trade; however, India remained a customer accounting for about 50% of Tunisia's phosphoric acid exports. Total Tunisian phosphate rock exports increased from 1.1 million metric tons (Mmt) contained P₂O₅ in 1993 to 1.3 Mmt in 1994. Hydrocarbon exports typically account for about 15% of total Tunisian export revenues.

Approximately 12,000 people were directly employed in mining in Tunisia, of which 80% were in the phosphate industry. Phosphate rock production in Tunisia was entirely controlled and operated by the Government parastatal CPG, founded in 1896. CPG is the largest company in Tunisia in both number of employees and capital investment, directly employing 9,000 people and indirectly employing more than 200,000 people. Le Groupe Chimique Tunisien (GCT) controls phosphate processing through its Tunisian-owned

Societe Industrielle d'Acide Phosphorique et d'Engrais (SIAPE) and Societe Arabe des Engrais Phosphates et Azotes (SAEPA). In 1989, GCT absorbed Industries Chimiques Maghrebines and Societe Engrais de Gabes, both of which were producers of phosphoric acid. Societe Miniere du Nord-Ouest (COMINO) operates three mines; a lead-zinc-barite operation at Boujabeur, zinc at Hassine, and lead-zinc at Lakhouat Boukhil. The parastatal Societe du Djebel Djerissa (SDD) produced iron ore from the underground mine at Djerissa and the open pit operation at Tamera Douaria. Additionally, SDD had stated during the year that the underground mining operation at Djerissa would probably close in 1997, but could have an extended life with the utilization of more modern mining equipment.

Hydrocarbon exploration and production was overseen by a series of production-sharing agreements between foreign operators and the Tunisian Government-controlled ETAP, usually with ETAP holding a 45% to 50% equity partnership.

The zinc-lead mine at Bougrine commenced production in 1994. Bougrine is approximately 170 kilometers (km) southwest of Tunis. It employed about 300 people, including many Tunisian professionals. The operation is an underground mine utilizing drift and fill and sublevel mining. The mine was operated by Societe Miniere de Bougrine (SMB), a subsidiary of Canada's Metall Mining Corp. The remaining equity ownership is held by a group of Tunisian banks. Bougrine is the only private-sector mining project in Tunisia. Construction of the mine took approximately 18 months, including two mine entrances and twin declines, underground drifts and raises, as well as installation of fixed mining equipment, an underground explosives magazine, and electrical facilities. It was essentially completed by yearend 1993. Completion of the 350,000-metric-ton-per-year (mt/a) ball and rod mill was completed in 1994. According to the operator, the lead and zinc ore is disseminated in the micron-size range within metasomatized galena and sphalerite. A multi-stage computer-controlled chemical flotation process is employed and ore processing is monitored by X-ray fluorescence. Metall Mining Corp. estimated ore recovery at about 20% to 30% zinc and 5% lead. Owing to the lack of an operational lead smelter in Tunisia, the concentrates are shipped to Europe to the primary customer, Germany's Metallgesellschaft AG. SMG estimated the productive life of the mine to be 15 years. Additionally, Metall Mining Corp. continued exploration for other carbonate or sediment-hosted zinc-lead deposits similar to Bougrine in a joint venture with the Government.

A noteworthy event in Tunisia's industrial minerals sector in 1994 was the African Development Bank's awarding of a \$154 million loan to rehabilitate the phosphate sector. According to *Africa Energy & Mining* of September 14, 1994, the loan represents a percentage of the rehabilitation's total cost of \$198.5 million. About 13.2% of the full amount will be contributed by CPG and 8.5% by Groupe Chimique.

The rehabilitation project was to be completed by December 1997.

Tunisian phosphate rock production and export improved in 1994. The phosphate mining is primarily in the Gafsa region from a variety of open pit and underground sources. CPG's newest open pit operation was at Kef Eddour. CPG processed about 80% of its phosphate output in Tunisia at plants in Gabes, M'Dilla, Sfax, Skhira, and Tunis using technology developed in-country. Marketable phosphate comes in three main grades: material used in the manufacture of phosphoric acid and fertilizers containing 65% to 68% bone phosphate of lime (BPL), 60% to 62% BPL that can be directly applied agriculturally, and a third metallurgical grade of phosphate. Additionally, CPG proposed the development of another open pit mine at Moulares by 1996 at an estimated cost of \$22 million.

Increased domestic consumption and declining output from larger oilfields has put stress on the Tunisian hydrocarbon sector in recent years. Despite these apparent shortfalls, new exploration and development continued unabated in Tunisia and has slowed the petroleum production decline.

Though declining in production, the El-Borma Field remained Tunisia's largest crude oil producer and is operated by Italy's Azienda Generali Italiana Petroli (Agip). The offshore Ashtart Field accounted for more than 20% of Tunisia's total crude oil production and was expected to increase production in 1995 after secondary recovery procedures are initiated by the operator, France's Societe Nationale Elf Aquitaine. The Miskar natural gasfield is scheduled to go on-stream in late 1995, according to the operator, the United Kingdom's British Gas Tunisia, with initial production of 1.5 billion cubic meters per year (m³/a) of natural gas.

The African Development Bank estimated Tunisian phosphate rock reserves at 3.5 to 4 billion metric tons (mt), or about 5% of global reserves. Tunisian crude petroleum reserves have been estimated at 1.7 billion barrels (bbl) by the *Oil and Gas Journal* of Dec. 23, 1994. Total estimated reserves of natural gas are 85 billion m³. Recoverable natural gas reserves at the offshore Miskar Field alone are estimated at 22.7 billion m³ to 28 billion m³. The Metall Mining Corp. estimated minable reserves at Bougrine at 5.3 million metric tons (Mmt) grading 11.7% zinc and 2.6% lead.

A total of 2,115 km of railway was the primary mode of transportation of phosphate rock to chemical plants and seaports. Highways within Tunisia total 17,700 km. Crude oil pipelines are 797 km long, and natural gas pipelines total 742 km. Tunisia has an electrical generation capacity of about 1.5 megawatts. Combined cycle power stations, which generate electricity from natural gas, remained a construction priority in Tunisia.

The mineral industry is an integral part of the country's economic future, as evidenced by the phosphate and hydrocarbon sectors. Additionally, the Government expressed concern that the closing of underground phosphate mines

could lead to unemployment in the mining sector and possibly contribute to the Islamic fundamentalism movement. Despite this, improvement in the global markets of these mineral commodities, continued commitment to economic structural adjustment and environmental concerns, and proposed free trade relations with Europe bode well for Tunisia.

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²Where necessary, values have been converted from Tunisian dinars (D) to U.S. dollars at a rate of D0.96=US\$1.00.

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Major Sources of Information

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TABLE 1
TUNISIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/ METALS	1990	1991	1992	1993	1994 e/	
Iron and steel:						
Iron ore and concentrate, gross weight	thousand tons	291	295	291	299	240
Fe content	do.	154	156	151	153	129
Metal:						
Pig iron e/	do.	140	140	140	140	140
Steel, crude	do.	177	193	181	190	190
Lead:						
Mine output, Pb content		2,970	1,290	1,360	863	4,610
Metal: e/						
Primary 3/		2,200	750	913	900	2,200
Secondary		500	250	250	250	656
Total		2,700	1,000	1,160	1,150	2,860
Silver metal, primary	kilograms	930	900	900	900	900
Zinc, ore						
Zn content		7,000	5,000	4,090	2,390	26,500
		3,960	2,830	2,310	1,350	15,000
INDUSTRIAL MINERALS						
Barite						
Barite		885	22,400	30,200	15,300	15,700
Cement, hydraulic e/						
Cement, hydraulic e/	thousand tons	300	3,300	3,300	3,300	3,300
Clays, construction e/						
Clays, construction e/	do.	50	350	350	350	350
Fluorspar, acid grade						
Fluorspar, acid grade		974	37,600	13,800	-- 4/	-- 4/
Gypsum e/						
Gypsum e/		100,000	100,000	100,000	100,000	100,000
Lime e/						
Lime e/	thousand tons	650	650	600	600	600
Phosphate rock:						
Gross weight	do.	6,260	6,350	6,400	5,500	5,660
P ₂ O ₅ content	do.	1,860	1,880	1,890	1,630	1,700
Salt, marine						
Salt, marine	do.	402	441	460	435	414
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross e/	million cubic meters	374	236	200	200	200
Dry	do.	200	200	150	150	150
Petroleum:						
Crude	thousand 42-gallon barrels	36,500	38,700	40,300	35,800	33,200
Refinery products:						
Distillate fuel oil e/	do.	4,040	3,900	3,800	3,800	3,800
Gasoline e/	do.	2,200	2,290	2,200	2,200	2,200
Kerosene e/	do.	2,400	1,160	1,100	1,100	1,100
Other e/	do.	400	400	400	400	400
Refinery fuel and losses e/	do.	111	232	200	200	200
Residual fuel oil e/	do.	3,860	3,510	3,500	3,500	3,500
Total e/	do.	13,000	11,500	11,200	11,200	11,200

e/ Estimated.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ In addition to the commodities listed, a variety of crude construction materials (common clays, sand and gravel, and stone) is produced, but output is not reported, and available information is inadequate to make reliable estimates of output levels. Limestone quarried for cement manufacture is substantial; however, information is inadequate to make accurate estimates of output.

3/ From domestic and imported ores.

4/ Mine closed in 1992.