THE MINERAL INDUSTRY OF

THE UNITED ARAB EMIRATES

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Hydrocarbons lead the United Arab Emirates[1] (UAE) mineral industry and the economy. Crude petroleum and natural gas accounted for 34.5% of the country's gross domestic product in 1997. The Ministry of Planning reported that oil revenues totaled $13.9 billion[2], down from $14.9 billion in 1996 (Arab Petroleum Research Center, 1998). Abu Dhabi dominates the UAE's hydrocarbon industry, sustaining 84% of crude oil production, 64% of marketed gas production, 94% of crude oil reserves, and 92% of natural gas reserves.

Aluminum and steel from Dubai, ammonia from Abu Dhabi, cement manufactured in six emirates, and chromite from Fujairah were among the minerals produced in the UAE *(See table 1.)* In 1997, Dubai overtook Singapore as the world's leading gold bullion importer and value-added jewelry exporting center. Gold purchases increased by 85% to an estimated 650 metric tons (t) from 350 t in 1996. The surge in consumption was caused by India's easing restrictions on gold imports - (80% of which were obtained from Dubai), the decline in gold prices, and cuts in customs tariffs in other countries (Platt's Metals Week, 1998).

All mineral resources were owned and controlled by the individual emirates and only loosely administered by the Federal Government. The Ministry of Petroleum and Mineral Resources coordinated Federal UAE activities with the international community. The Government continued to encourage the expansion of the country's mineral production capacity. Crude oil production averaged 2.25 million barrels per day (Mbbl/d) in 1997 and was primarily from Abu Dhabi, which produced 2 Mbbl/d. Remaining petroleum and natural gas production was from Dubai and Sharjah. Ras Al-Khaimah realized a portion of the production from the offshore Bukha Field shared with Oman. Umm al-Qaywayn held a 20% share in production from the Mubarak Field in Sharjah. Production exceeded the Organization of Petroleum Exporting Countries (OPEC) quota which limited production from the UAE to 2.16 Mbbl/d. For 1998, the OPEC quota was raised to 2.366 Mbbl/d. In spite of the increased quota Abu Dhabi will have about 400,000 barrels per day (bbl/d) of unused production capacity.

Crude oil, refined petroleum products, natural gas, and aluminum were the principal mineral products exported. Japan, the primary customer for the UAE's mineral exports, absorbed most of Abu Dhabi Gas Liquefaction Co.'s liquefied natural gas (LNG) production and about one-third of the aluminum output and bought more than one-half (1.24 Mbbl/d) of the UAE's more than 2 Mbbl/d crude oil exports in 1997. Chromite ore and gold products fabricated from imported bullion were also exported, primarily to Asia.

The Government was heavily involved in the mineral industry, owning majority shares in the aluminum, fertilizer, natural gas, petroleum production and refining, and sulfur industries. It also had a significant presence in the cement industry. International petroleum companies were heavily involved in crude oil and natural gas development and infrastructure projects in Abu Dhabi. Expatriates accounted for about 75% of the labor force. Ajman granted exploration rights to its entire territory to a Canadian and Norwegian consortium in 1997.

In the metals sector, Dubai Aluminum Co. Ltd. (Dubal) commissioned a 130,000-metric-tons-per-year (t/yr) capacity potline in January 1997, raising total capacity at Dubal to 380,000 t/yr of aluminum. Australia supplied all Dubai's alumina requirements. The smelter's main products are billet, foundry alloy for automotive wheels and component castings, and high-purity ingot for electronics. About two-thirds of the output is shipped to the Far East, and the balance to the Middle East and Europe. The size and infrastructure at the Jebel Ali site could support a 500,000-t/yr-capacity smelter. A sixth 130,000-t/yr-capacity potline is under consideration (Middle East Economic Digest, 1998b).

Chromite mining in Fujairah by Derwent Mining Ltd. of Ireland continued with output exported principally to China and the Netherlands. Other metal operations included the Ahli Steel Co., which is to scrap a 70,000-t/yr steel plant in Ramool, Dubai, to build a new 200,000-t/yr steel plant at Jebel Ali, shifting all manufacturing operations to the industrial center. The new mill is expected to come on-stream in September 1999 and will consist of an electric arc furnace, continuous caster, and rolling mill to produce 200,000 t/yr of 8 to 32-mm rebar, as well as light structural sections and wire rod in coils (Metal Bulletin, 1998). Other metal works included Solo Industries Ltd. in Sharjah, which operated an 800-t/yr lead refinery for scrap recycling, and Lucky Recycling Ltd. in Dubai, which recycled copper scrap.

Ruwais Fertilizer Industries (FERTIL) continued to expand fertilizer exports. FERTIL proposed to increase its ammonia production capacity by 25%, to 500,000 t/yr, and urea production capacity by 15%, to 600,000 t/yr. Smaller fertilizer plants included a 219,000-t/yr plant at Ajman and the 6,000-t/yr Union Kemira plant at Jebel Ali, Dubai. Abu Dhabi National Oil Co.'s (ADNOC) subsidiary, National Chlorine Industries, produced caustic soda, chlorine, and salt at its plant in Umm Al-Nar.

Expansion was underway at Fujairah Cement Industries in Dibba, Fujairah. The Ras Al-Khaimah Cement Co. contracted for the turnkey construction of a 1-million metric tons per year of Portland cement plant at Kywair, Ras Al-Khaimah. The plant completion is expected for 2000. Plant products will be marketed throughout the UAE and abroad (ZKG International, 1997).

The Government encouraged the expansion of hydrocarbon production capacity. The UAE increased sustainable crude petroleum production capacity to 2.6 Mbbl/d in 1997 from 2.3

[1]Comprises the following seven Emirates: Abu Dhabi, Ajman, Dubai, Fujairah, Ras Al-Khaimah, Sharjah, and Umm al-Qaywayn.

[2]Where necessary, values have been converted from Emirian dirhams (Dh) to U.S. dollars at the rate of Dh3.67=US$1.00 in 1997.

Mbbl/d in 1991. Natural gas production capacity was expanded from 3.5 million to 4.8 million cubic meters per day (Mm^3/d). The expansion was achieved by modernizing onshore and offshore gas extraction and distribution systems. Bechtel Corp. of the United States was part of a joint venture that was contracted to upgrade the gas-processing facilities at Habshan. This $1.3-billion onshore gas project for ADNOC will further development of the Thamama B, C, and F sour gas reservoirs. A projected natural gas flow of 42 Mm^3/d was to be treated to recover condensate and sulfur (Financial Times, 1997).

Domestic and international oil companies' investment in increased production capacity has included drilling infill wells, upgrading wellhead equipment, and adding oil and gas gathering facilities, such as new trunklines, flowlines, and remote manifold stations. To comply with OPEC quota restrictions, the onshore fields in Abu Dhabi were required by the Government to cut back on production, and operations in Dubai and high-cost offshore fields were permitted to produce at higher rates.

Exploration continued in the UAE with Dubai Petroleum Co. conducting marine seismic surveys adjacent to its offshore Fateh Field. Ras Al-Khaimah authorities assigned an exploration license to complete a three dimensional seismic survey of Block B to Atlantis Technology Services and Petroleum Geo Services. The Saleh gas and condensate field was the only hydrocarbon structure in production in Sharjah. About 10 Mm^3/d of natural gas was delivered to Dubai. Additional natural gas requirements are to be satisfied by deliveries from Abu Dhabi and Qatar. Natural gas deliveries to Dubai from Abu Dhabi were expected to commence in 2001 at an initial rate of about 15.3 Mm^3/d. Qatar was also expected to supply natural gas to Dubai from the North Field at the rate of 800 Mm^3/d (Middle East Economic Digest, 1998c).

By yearend 1997, refining capacity increased from 211,000 to 326,000 bbl/d. Sharjah had purchased three mothballed Canadian plants, the first of which came on-stream at an 80,000-bbl/d capacity in late 1997. Feedstock will be from Iran, Kuwait, and Saudi Arabia. Fujairah commissioned a 35,000-bbl/d Fujairah refinery. Crude stock for the refinery was the sour heavy crude from the Saudi/Kuwait Partitioned Zone. Abu Dhabi had two refineries with a combined capacity of 211,000. The Ruwais refinery was rated at 126,000 bbbl/d, and the Umm al-Nar, at 85,000 bbl/d. The Ruwais petroleum refinery was undergoing expansion and modernization. The project will include increasing distillation capacity to 540,000 bbl/d in two stages. In the first stage, two 140,000-bbl/d condensate processing trains will be installed by 2000. These units will process the condensate produced as a result of the gas development underway at the Bab and Asab Fields. In the second stage, a 135,000-bbl/d crude distillation unit will be added. Dubai and Sharjah are both developing refineries. Dubai will have a 18,000-bbl/d refinery for liquified petroleum gas and gasoline.

ADNOC and Borealis have formed a 60%-40% joint petrochemicals venture. A $1 billion petrochemical complex, to be built at Ruwais, will be based on a 600,000-t/yr ethane cracker that will supply feedstock for a 450,000-t/yr Borstar process polyethylene complex. About 150,000 t/yr will be delivered to ADNOC's wholly owned 540,000-t/yr ethylene dichloride plant, also planned at Ruwais. Products from Ruwais will be sold in Asia.

The UAE had proven petroleum reserves of 97.8 billion barrels as of January 1, 1998. Proven natural gas reserves were 5.8 trillion cubic meters. Most of the UAE's hydrocarbon reserves were in Abu Dhabi, the venue for 94% of petroleum reserves and 92% of natural gas reserves (Arab Petroleum Research Center, 1998).

Total installed electricity generating capacity was 5,500 megawatts (MW). A number of gas-fired power and desalinization plants were under construction. The 1998 addition of 600-MW capacity through the installation of four new gas turbines and a 30,000-cubic-meter-per-day (m^3/d) desalination plant at Ruwais is vital in meeting the utility requirements of the expanded Ruwais refinery, the ethylene dichloride complex, and the Abu Dhabi Polyethylene company (Middle East Economic Digest, 1998a).

The UAE's crude oil and natural gas distribution network included extensive coastal petroleum terminals at Ruwais, Jebel Dhanna, Port Zayed, and Umm Al-Nar in Abu Dhabi, Jebel Ali and Port Rashid in Dubai, and in Sharjah. Island or mooring buoy loading facilities were at Abu Al-Bukhoosh, Das Island, Delma Island, Mubarraz, and Zirku Island in Abu Dhabi, Fateh in Dubai, and Mubarak in Sharjah.

Revenues from mineral fuels continued to be reinvested in diversification projects and downstream processing. Increasing domestic consumption of electricity and OPEC limitations on oil production forced the UAE to emphasis natural gas output. Developing natural gas resources ultimately increases exports of condensates that are not subject to OPEC quotas. In 1997, the UAE awarded $2.7 billion in natural gas onshore and offshore enhancement and expansion contracts and $3 billion for the petrochemical industry and the Ruwais petroleum refinery upgrade. In the near term, prospects for LNG sales look less than favorable as the economic downturn in Japan and the Republic of South Korea flattens demand and term contracts may be renegotiated.

References Cited

Arab Petroleum Research Center, 1998, United Arab Emirates, in Arab oil and gas directory: Arab Petroleum Research Center, p. 461-518.

Energy Information Administration, February 1998, Year-to-Date Imports of Crude Oil and Petroleum Products into the United States by Country of Origin: Petroleum Supply Monthly, p. 82.

Financial Times, 1997, Abu Dhabi turns up the gas in $10 bn project: [London] Financial Times, March 13, p. 8.

Metal Bulletin, 1998, Ahli Steel moves to industrial zone: Metal Bulletin, no. 8251, February 9, p. 24.

Middle East Economic Digest, 1998a, ABB signs Ruwais Utilities: Middle Economic Digest, April 3, p. 24.

———1998b, Condor project is off to a flying start: Middle East Economic Digest, April 3, p. 34.

———1998c, Dubai continues gas discussions with Qatar: Middle East Economic Digest, April 3, p. 4.

Platt's Metals Week, 1998, Dubai gold trade hits record levels in 1997: Platt's Metals Week, v. 69, no. 3, p. 5.

ZKG International, 1997, Turnkey contract for a new cement project: ZKG International, v. 50, no. 4, p. 42.

Major Sources of Information

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TABLE 1
UNITED ARAB EMIRATES: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/		1993	1994	1995	1996	1997 e/
Aluminum, metal, primary ingot		242,264	246,890	239,900	274,000	398,000 3/
Cement, hydraulic e/ 4/	thousand tons	4,000	5,000	5,918 3/	6,000	6,000
Chromite, gross weight		19,000	55,000	37,000	56,000	61,000 3/
Fertilizer materials:						
Ammonia:						
Gross weight e/		372,000	347,500	441,000	405,000	455,000
N content		305,600	286,500	362,700	331,200	372,500 3/
Urea:						
Gross weight e/		520,000	450,000	575,000	490,000	600,000
N content		259,700	230,000	293,600	258,400	299,600 3/
Gas, natural:						
Gross	million cubic meters	31,630	34,360	40,860	46,530	48,500 3/
Dry	do.	22,930	25,820	31,320	36,250	37,300 3/
Gypsum e/	thousand tons	95	95	90	90	90
Lime e/	do.	45	45	50	50	50
Natural gas plant liquids e/	thousand 42-gallon barrels	58,000	80,000	100,000	110,000	110,000
Petroleum:						
Crude	do.	800,000	792,000	800,500	831,470	845,340 3/
Refinery products:						
Gasoline	do.	11,132	11,970	12,738	12,446	13,000
Kerosene	do.	9,700	10,110	21,243	20,330	21,000
Distillate fuels	do.	19,890	21,681	24,345	24,090	24,500
Residual fuels	do.	19,856	21,863	12,995	16,717	17,000
Other	do.	10,100	10,475	12,665	12,154	12,000
Total	do.	70,678	76,099	83,986	85,737	87500
Steel e/		70,000	70,000	70,000	70,000	70,000
Sulfur, byproduct: e/						
From petroleum refining		24,000	24,500	26,000	26,000	26,000
From natural gas processing		225,000	225,500	230,500	233,000	210,000
Total		249,000 3/	250,000	256,500	259,000	236,000

e/ Estimated. r/ Revised.
1/ Table includes data available through December 1, 1998.
2/ In addition to the commodities listed, crude industrial minerals, such as common clays, diabase, gravel, limestone, marble, sand and shale, presumably are produced, but output is not reported, and general information is inadequate to make reliable estimates of output levels.
3/ Reported figure.
4/ Includes white cement.