

# THE MINERAL INDUSTRY OF

# OMAN

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In 1997, the hydrocarbon mineral sector sustained Oman's developing economy, providing about 40% of the gross domestic product (GDP), 75% of all exports, and more than 77% of Government revenues. Oman's oil revenues alone were \$3.91 billion in 1997. Other commercially viable mineral ventures included the mining of chromite; the smelting and refining of copper, with gold and silver as byproducts; the manufacturing of cement; and the production of crushed and dimension stone and sand and gravel. The mineral industry in total accounted for about one-half of the GDP.

The Petroleum and Mineral Law of Oman, effective since January 1, 1975, governed mineral activities in the country. All minerals are considered Government property until extracted. The royalty tax rate was fixed at 20% of the value of production by a 1976 decree. Although the Government maintained a majority interest in most companies, foreign partnerships were encouraged. The Oman Chromite Co. has limited Government participation with major equities held by private interests.

The Ministry for Oil and Gas superseded the Ministry for Petroleum and Minerals on December 17, 1997. Responsibility for nonhydrocarbon minerals was assigned to the Ministry of Commerce and Industry. In support of the Government's program to increase Omani nationals participation in industry, Shell Oman Marketing Company, distributor of petroleum products, floated 40% of its stock on the Muscat exchange. Private shareholders now hold 51%, and Shell holds 49% while retaining the casting vote.

Crude oil production achieved record levels as development activity and enhanced recovery operations continued. Less than 10% of the domestic output was refined in Oman. Surplus refined products, mostly fuel oil, were exported. Chromite production was entirely destined for export markets. The copper smelter and refinery operated by the Oman Mining Co. imported copper concentrates for toll and custom smelting. (*See table 1.*)

Oman exports the bulk of its crude oil production, about 810,000 bbl/d in 1997. The heavier crudes of the south and the lighter crudes of the north are gathered and blended into the Omani Export Blend (34° American Petroleum Institute (API) gravity). Most of Oman's petroleum exports were destined for Asia.

Shareholders in the Oman India Fertilizers complex in Sur—Oman Oil, Krishak Bharati, and Rashtriya Chemicals and Fertilizers—have contributed 25% of the proposed \$1.1 billion fertilizers complex. International financing is sought for the remaining 75%. The complex will include two 1,750-metric-tons-per-day (t/d)-capacity ammonia units and two 2,200-t/d-capacity urea plants. Completion date is scheduled for 2001 (European Chemical News, 1998).

In August 1997, Japanese interests began mineral exploration in northern Oman under an agreement with the Omani Government committing the Japanese expenditure of \$4 million on surveying and exploring for copper, gold and silver, and other minerals in a 2,900 square kilometer area on the Batina Coast between Rustaq and Sahm.

Construction began in early 1998 on a \$3 billion, 480,000-metric-ton-per-year (t/yr)-capacity aluminum smelter to be constructed in four phases each of 120,000-t/yr capacity. The first 120,000-t/yr unit is scheduled to come on-stream in 2000; the three other units to follow between 2001 and 2002. The project will be funded by foreign and local investors, which includes 40% raised by public subscription through the Muscat exchange in 1998. Shareholders include Charus Enterprises of the United States, the Hong Kong branch of the China National Nonferrous Metals Industry Corporation, Simsen Metals of Hong Kong, and Oman's WJTowell & Co. The smelter is to be constructed in conjunction with a 1,800-megawatt-capacity natural-gas-fueled power station and a 30-million-gallon-per-day desalination plant.

The Oman Chromite Co. exploited the Ghashabi-2 deposit, producing 18,000 metric tons (t) of chromite in 1997. At least 4,000 t were exported to Japan, and unknown quantities were exported to the Refractories Corp. of the Philippines.

Copper cathodes, processed from imported concentrates were exported from the port of Majis, about 17 kilometers (km) northwest of Sohar.

Major developments in the natural gas industry highlighted Oman's mineral industry sector. A \$2-billion financing package for the liquefied natural gas (LNG) plant of the Oman Liquefied Natural Gas LLC. The plant, to be located at Qalhat, 320 kilometers southeast of Muscat, will have dry gas inlet capacity of 34 million cubic meter per day and an LNG capacity of 6.6 million metric tons per year (Mt/yr). Two units of 120,000-cubic-meter storage capacity each are planned. Natural gas will be delivered from 60 to 70 wells in the Saih Rawl, the Saih Nihayda, and the Barik Fields. The gas is 82% to 86.5% methane, 6% to 7.7% ethane, 2.2% to 3.3% propane, and 1.2% to 1.85% butane. It contains 5 parts per million hydrogen sulfide, 1.2% carbon dioxide, 3.4% nitrogen, and 0.05% helium (Oil & Gas Journal, 1997). The Oman Liquefied Natural Gas LLC is a joint venture with the Government, reserving a majority equity position of 51%; Royal Dutch Shell, 34%; Total SA, 6%; Mitsubishi and Mitsui, each 3%; Partex, an Omani private company, 2%; and Itochu, 1%. Oman Liquefied Natural Gas LLC has signed Korea Gas Co is to receive 4.1 Mt/yr of LNG during a 25-year period and Osaka Gas of Japan for an offtake of 1.2 Mt/yr (Petroleum Economist, 1998a).

Petroleum Development Oman (PDO) led in hydrocarbon

exploration in the nation with about 20 drilling rigs in operation through 1997 and in exploration expenses, which were budgeted at \$220 million for the year (Oil & Gas Journal, 1998). In addition to PDO, 14 concession holders were also engaged in exploration, 3 of which entered into agreements with the Government in 1997—Nimir of Saudi Arabia, Gulfstream Resources of Canada, and Occidental Petroleum of the United States. In 1997, Triton Energy, also of the United States, reported completion of a 1,750 km two-dimensional seismic survey on offshore Block 22 in the Gulf of Masirah, a concession it was awarded in 1996. Shell and Amoco were negotiating for exploration rights during the year.

PDO accounted for about 97% of the nation's total petroleum production. The company is owned 34% by Shell, 60% by the Omani Government, 4% by Total SA, and 2% by Partex. Occidental Petroleum is the largest of the country's other equity producers and contributed about 40,000 bbl/d. Other producers in 1997 were Japan Petroleum Exploration Co. Ltd. (Japex) and Elf Aquitaine SA of France. Total petroleum production averaged 887,000 bbl/d. In 1997, Oman extracted about 2 million barrels per day of saline brines associated with its wells. Disposal is a major problem. At present, the water is being reinjected, but only in cases where local salination levels are higher than those in the water sourced from the wells. Total 1997 production costs have been estimated to be \$3.74 per barrel (Petroleum Economist 1998b).

Oman's single refinery, Mina Al-Fahal, has a capacity of 80,000 bbl/d and is dedicated to meeting local demand. A second refinery is being considered for Salalah.

Proven copper ore reserves are 8 million metric tons (Mt), and proven chromite ore reserves are 2 Mt which are made up of over 450 small chromite lenses. Recoverable petroleum reserves are 5.4 billion barrels. At least an additional 1.5 billion barrels could be recovered through secondary recovery methods. Recoverable reserves of natural gas have nearly tripled in the past 5 years to 780 billion cubic meters, most of which is nonassociated natural gas (Arab Petroleum Research Center, 1998).

The Sultanate of Oman had enjoyed a stable economy sustained by petroleum revenues for more than a decade. Improving technology augmented reserves that continued to outpace reservoir withdrawals. The development of the nation's natural gas reserves and increasing overseas investments will place Oman in a secure position when its own petroleum reserves are depleted, at current withdrawal levels, in about 2015. The LNG project will provide greater economic diversification, enhance trade relations, and provide more opportunities for employment for Omani nationals. Buyers for the majority of the plant's output are now guaranteed for at least 25 years. An offshoot of the LNG project will be the construction of a petrochemical complex, a new

aluminum plant, a nitrogenous fertilizer plant, a new power station, a new container port, and a free-trade zone at Salalah. The budget deficit is scheduled to be eliminated by 2000 under the 1996-2000 Development Plan.

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## Major Sources of Information

Ministry of Oil and Gas

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TABLE 1  
OMAN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996 e/	1997 e/
Cement, hydraulic thousand tons	1,000	1,200	1,177 r/	1,260 2/	1,300
Chromite, gross weight	1,236 r/	6,166	5,300 e/	15,252 2/	18,000 2/
Copper:					
Mine output, Cu content	8,800 r/	6,500	--	--	--
Metal:					
Smelter	27,700 3/	31,200 4/	34,200 4/	24,663 2/	22,800 2/
Refinery	20,539 5/	24,194 4/	33,900 4/	24,150 2/	23,600 2/
Gas, natural:					
Gross million cubic meters	5,400	6,000 e/	6,860 r/ e/	9,071 2/	6,700
Dry do.	3,150	3,200 e/	3,015	3,176 2/	4,000
Gold kilograms	90	137	591 r/	576 2/	577 2/
Gypsum	112,882	121,446	104,490	130,900	113,600 2/
Natural gas liquids e/ thousand 42-gallon barrels	2,300	2,300	3,000	3,650	3,800
Petroleum:					
Crude do.	283,240	293,800	311,300	322,300	323,755 2/
Refinery products:					
Liquefied petroleum gas 6/			404	400	400
Gasoline do.	4,500	4,600 e/	4,632 r/	4,888 2/	4,888
Jet fuel do.	2,500	2,500 e/	2,000 e/	2,500	2,500
Kerosene do.	90	90 2/	1,314 r/	90	90
Distillate fuel oil do.	4,600	4,800 e/	5,523 r/	4,800	4,800
Residual fuel oil do.	12,500	12,500 e/	13,606 r/	12,500	12,500
Other do.	900	900 e/	500 r/	500	500
Total do.	25,090	25,390 e/	27,575 r/	25,278	25,278
Sand and gravel thousand tons	7,000 e/	8,000 e/	9,395 r/	9,629 2/	9,800
Silver kilograms	3,300	1,500 e/	100 e/	97 2/	95
Stone:					
Marble thousand tons	76	70	145 e/	117	169 2/
Other do.	1,930	2,000 e/	2,119 e/	2,263	1,992 2/
Sulfur e/	40,000	40,000	35,000	30,000	30,000

e/ Estimated. r/ Revised.

1/ Table includes data available through November 1, 1998.

2/ Reported figure.

3/ Includes 17,800 metric tons of anode as toll/custom output.

4/ Includes toll/custom output.

5/ Includes 12,600 metric tons of cathode as toll/custom output.

6/ Included in other category in 1993 and 1994.