

## THE MINERAL INDUSTRY OF

# BAHRAIN

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The mineral industry of Bahrain, particularly aluminum and petroleum, supplied about 90% of Government revenues and export earnings in 1994. Crude oil production from Bahrain's Awali Field was supplemented by part of the production from the Abu Saafa offshore field that is co-owned with Saudi Arabia.

The availability of natural gas for electric power generation has fostered the Nation's aluminum smelting and fabrication industries for more than two decades. Expansion programs brought aluminum smelter capacity to 460,000 metric tons per year (mt/a) by late 1992, resulting in Aluminium Bahrain's (Alba) smelter becoming the largest in the Middle East.

Production of the Nation's mineral commodities for the most part has stabilized. Output of crude petroleum has been maintained at nearly 15 million barrels per year (Mbbbl/a) sustained by natural gas injection; it is expected to continue near this level throughout this decade. Unless additional reserves are identified, domestic onshore production is expected to cease by the year 2000. Bahrain's assigned share of production from the offshore Abu Saafa Field also approaches 15 Mbbbl/a.

ALBA was expected to operate at near-capacity levels throughout the decade. However, production targets were temporarily reduced to 445,000 mt/a to reportedly help support world aluminum prices. (*See table 1.*)

Aluminum accounted for more than one-fourth of total exports in 1994. Nearly two-thirds of the exported aluminum was delivered to member countries of the Gulf Cooperation Council (GCC). The European Union's (EU) 6% to 10% tariffs limited exports to that area. Feedstock for the aluminum plant was imported with about 75% of the alumina supply obtained from Alcoa of Australia.

Combined exports of methanol and ammonia were 834,200 metric tons (mt) in 1994. Virtually all production was exported to markets principally in Asia and Western Europe. Urea production is contemplated for the near future, eventually resulting in a decline of ammonia exports in favor of domestic consumers.

Bahrain's oil and natural gas industry was wholly Government owned, and most other mineral commodity ventures were Government controlled. However, private domestic and foreign investment was being encouraged by allowing fully foreign-owned companies to register in Bahrain. The Bahrain Aluminium Extrusion Co. (Balexco),

formerly wholly owned by the Government, has become a closed joint stock company. Offerings were extended to Gulf nationals in 1991 and 1993, which resulted in approximately one-half of Balexco going to private ownership. It was the first state-owned company offered for privatization.

Government approval has reportedly been granted to proceed with a 36,500 mt expansion elevating the Alba aluminum smelter's capacity to nearly 0.5 million metric tons (Mmt). The expansion will reportedly involve extending the third potline by 76 cells and was scheduled for completion in 1997 at a reported cost of \$130 million. Additional production would be absorbed by increasing demand from downstream industries in Bahrain and the GCC. This includes the Bahrain Aluminium Extrusion Company where expansion to 21,000 mt/a is anticipated by the end of 1996 with the commissioning of a third extrusion line. Balexco's second extrusion line was commissioned in November 1994, adding an additional 6,000 mt/a of additional capacity to the existing 7,500 mt/a capacity. The installation of this second line brought Balexco scrap production to about 3,700 mt/a. This scrap was sent to ALBA for reprocessing; however, Balexco will now recycle scrap internally.

A 20,000 mt/a plant, reportedly costing \$2.7 million to manufacture aluminum alloys, was expected to start by 1995. The Bahrain Alloys Manufacturing Co. will use molten aluminum from the Alba smelter to manufacture foundry alloys for the automotive and aerospace industries.

The Gulf Aluminum Rolling Mill Co. (Garmco), Bahrain's aluminum coil and sheet producer for the construction and foil industry, announced plans to increase capacity from its original 40,000 mt/a to 120,000 mt/a by the fourth quarter of 1995. Raytheon Co. of the United States is a consultant for the expansion engineering work. Negotiations were concluded in early 1994 on the purchase of a rolling mill from Alumax Mill Products, also of the United States. Garmco converts ingots from Alba weighing up to 10 mt each into sheets for final use or further downstream processing. After hot and cold rolling, the sheets are between 0.25 and 3 millimeters (mm) thick, with a maximum width of 1.5 meters (m). Bahrain is the largest shareholder in Garmco at 25.5%, followed by Saudi Basic Industries at 20.75%. The company's principal market is in the Gulf area. However, sales to the Pacific region have increased during recent years, prompting Garmco to establish an office in Hong Kong to service the company's end users.

Middle East Aluminum Cables Ltd. has the capacity to produce 40,000 mt/a of rod and 30,000 mt/a of cable. An expansion project is underway to bring production capacity for high-tension cable to 50,000 mt/a. The plant uses molten metal directly delivered from Alba to make products ranging from aluminum alloy rods to steel-reinforced overhead conductors. The company also shares some equity in a consortium with BBS Kraftfahrzeugtechnik of Germany and Al Zayani Investments of Bahrain to produce wheel castings for auto manufacturers and suppliers in Europe.

The bulk of Bahrain's natural gas production is extracted from the Khuff zone. Only one-fifth of the natural gas supply is derived from associated gas in the Awali Field. Nearly one-third of its natural gas production was injected for enhanced recovery operations necessary to maintain petroleum production at the Awali Field. The remaining output was utilized in the production of electric power and as a petrochemical feedstock.

Gulf Petrochemical Industries Co. (GPIC), a joint venture between Bahrain and Kuwait, operated an ammonia and methanol plant at Sitra producing more than 400,000 mt/a of each commodity in recent years. Khuff gas is used as feedstock. The petrochemical use of natural gas was approximately 1.1 billion cubic meters (m<sup>3</sup>) in 1994. GPIC has secured a \$32 million credit advanced by the Arab Investment Co. in support of constructing a 1,700 metric tons per day urea plant, which will consume 80% of GPIC's ammonia output. Total cost of the project is estimated at \$140 million.

The 250,000 barrels per day (bbl/d) capacity refinery at Sitra has consistently operated near or above capacity. About 84% of the refinery's throughput was delivered by pipeline from Saudi Arabia and the remainder from the Awali Field. The refinery has been undergoing an expansion and revamping since 1993, and the project is expected to continue during the next 2 years. The two-stage program will increase the refinery's capacity to 360,000 bbl/d at an overall cost of \$600 million to \$800 million. The domestic demand for petroleum products exceeded 10,000 bbl/d, with the remaining output, eventually reaching 350,000 bbl/d, destined for the export market.

Proven crude oil reserves were estimated at 69.6 million barrels. Natural gas reserves were estimated at about 170 billion m<sup>3</sup>.

The island Nation's basic infrastructure is in place, including a network of petroleum pipelines and storage facilities to accommodate Sitra refinery receipts from the Awali Field and the Abu Saafa Field shared with Saudi Arabia. In addition, 16 product pipelines extend for 5 kilometers (km) from the Sitra refinery storage facilities to a deepwater terminal for export. Natural gas pipelines servicing Bahrain's power generation and industry complexes totaled 32 km in length.

The Directorate of Electricity operates plants at Manama, Sitra, and Riffa. Their combined capacity is 992 megawatts

(MW). An additional 200 MW from Alba's 800-MW powerplant became available after completion of a link-up to the national grid system in 1993. Bahrain Petroleum Co. also produces its own electricity from a 60-MW plant.

The Arab Shipbuilding and Repair Yard (ASRY) was established on a 450-square-kilometer constructed island and reportedly had all installations and support services necessary for a shipyard specializing in the repair of very large crude carriers (VLCC). Owned by Abu Dhabi, Bahrain, Kuwait, Qatar, and Saudi Arabia, each holding 18.84% equity; Iraq, 4.7%; and Libya, 1.1%, the ASRY facility included four repair berths that can accommodate VLCCs up to 500,000 deadweight tons (dwt). In 1992, two floating drydocks purchased from Jacksonville Shipyards of the United States were placed in service accommodating vessels of up to 125,000 dwt.

Petroleum industry revenues enabled the Government to accelerate social and economic development and establish new energy-intensive industries. The Government is focusing on the aluminum, petrochemical, and iron ore pelletizing industries in the hope of expanding Bahrain's existing industrial base and attracting new ventures. The 460,000-mt/a-capacity Alba aluminum smelter has already fostered new downstream industries. The German car industry may blossom into a promising market because car manufacturers are looking for cheaper alternatives to domestic aluminum fabricating sources. The Aluminium Wheel Co., a joint venture of Al-Zayani with other Bahrain partners and BBS Kraftfahrzeugtechnik of Germany, entered production with an initial capacity of 500,000 vehicle wheels as a possible first step to entering a huge market. Aluminum marketing is further promising in view of the rising demand with new building projects in Bahrain, Kuwait, Saudi Arabia, and the United Arab Emirates.

The development of a container port and industrial center at Al Hadd could have a significant impact on the economy. Plans include a power station, desalination plant, and a causeway linking the area to the main island. The Al Hadd project would be another welcome boost to the construction industry.

The question of sovereignty over the Hawar Islands and the reefs of Fasht al-Dibal and Qitaa Jaradah will have to be resolved to permit offshore exploration in these areas of considerable hydrocarbon potential. The International Court of Justice in The Hague conducted preliminary hearings in 1994 into the disputed territories between Bahrain and Qatar.

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<sup>1</sup>Text prepared June 1995.

<sup>2</sup>Where necessary, values have been converted from Bahraini dinars (BD) to U.S. dollars at the rate of BD0.376=US\$1.00.

## Major Sources of Information

Ministry of Industry and Development  
Manama, Bahrain  
Bahrain National Oil Co.

P.O. Box 25504  
Awali, Bahrain  
Telephone: (973) 754 666  
Fax: (973) 753 203  
Bahrain Petroleum Co.  
Awali, Bahrain  
Telephone: (973) 754 444  
Fax: (973) 752 924  
Bahrain National Gas Co.  
P.O. Box 29099  
Rifaa, Bahrain  
Telephone: (973) 756 222  
Fax: (973) 756 991  
Caltex Bahrain  
P.O. Box 25125  
Awali, Bahrain  
Telephone: (973) 753 134  
Fax: (973) 753 122

Harken Bahrain Oil  
P.O. Box 11715  
Manama, Bahrain  
Telephone: (973) 531 735  
Fax: (973) 536 592  
Aluminium Bahrain (Alba)  
P.O. Box 570  
Manama, Bahrain  
Telephone: (973) 661 751  
Arab Shipbuilding and Repair Yard Co.(ASRY)  
P.O. Box 50110  
Al Hadd, Bahrain  
Telephone: (973) 671 111  
Fax: (973) 670 236

TABLE 1  
BAHRAIN: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

Commodity	1990	1991	1992	1993	1994 e/
Aluminum, smelter output, primary metal	213	227	292	448	447
Cement	148	150	220	225	225
Gas, natural:					
Gross	8,110	8,030	9,410	9,800	9,800
Dry	6,000	5,520	4,020	6,930	6,930
Methanol	432	435	414	428	419
Natural gas plant liquids:					
Butane	975	1,100	1,240	1,470	1,190
Propane	1,150	1,470	1,610	1,170	1,500
Naphtha		1,570	1,850	1,800	1,860
Nitrogen, N content of ammonia	325	320	333	348	338
Petroleum:					
Crude	15,900	15,400	15,100	14,900	14,700
Refinery products:					
Gasoline	7,500	7,840	7,900	9,230	7,700
Jet fuel	9,000	7,480	7,500	4,410	7,100
Kerosene	7,500	10,400	10,500	12,300	10,400
Distillate fuel oil	28,500	28,100	28,000	29,400	28,900
Residual fuel oil	22,500	23,600	23,500	22,200	20,900
Other	16,300	16,300	16,300	12,200	13,100
Total	91,300	93,700	93,700	89,700	88,000
Sulfur	5,270	5,270	6,150	6,210	6,300

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/ Table includes data available through June 1, 1995.