

SAUDI ARABIA

By Philip M. Mobbs

In 2000, Saudi Arabia accounted for about 12.3% of the total world output of crude oil. To meet the increased international demand for petroleum, Saudi Arabia, which was the swing producer for the Organization of the Petroleum Exporting Countries (OPEC), increased output by 7.3% in 2000 compared with that of 1999. Despite the increased crude oil flows in 2000, national output still was less than 90% of sustainable crude production capacity. Petroleum accounted for about 90% of Saudi Arabia's export earnings and about 70% of Government revenues.

In 2000, the gross domestic product (GDP) at current prices was estimated by the Saudi Arabian Monetary Agency to be \$173 billion¹ (Middle East Economic Digest, 2001a). Crude oil and natural gas production was valued at \$71 billion. In 2000, crude oil and natural gas production accounted for about 42% of the GDP, petroleum refining accounted for about 3% of the GDP, and about 0.4% of the GDP was attributed to other mineral production (Saudi Arabian Monetary Agency, [undated], Gross domestic product by type of economic activity [at producers' values at current prices], accessed August 1, 2001, via URL <http://www.sama.gov.sa/reports/annual/reports/tab5-1w.htm>).

Government Policies and Programs

A new Foreign Investment Act was ratified in 2000. Under the new law, international investors acquired the same rights and privileges as Saudi Arabian investors. The Government continued working on the proposed opening of the energy sector to international oil companies that originally had been broached in 1998 and assessed foreign oil companies' suggested investment opportunities that could be included under the program. The Government announced that international oil companies would be considered for the development of three initial gas initiative projects—the Haradh (South Ghawar area), the Kidan/Shaybah, and the Rabigh/Midyan (Red Sea area) (Alexander's Gas & Oil Connections, August 7, 2000, Saudi Arabia presents oil companies with three core projects, accessed September 7, 2000, at URL <http://www.gasandoil.com/goc/news/ntm03262.htm>).

In January, the Government established the Supreme Council for Petroleum and Mineral Affairs.

Work on the Saudi Strategic Storage project (SSSP) continued. The SSSP had been envisioned in 1994 to assure refined petroleum products supply and distribution in the kingdom. Government-owned Saudi Aramco assumed control of the initial underground storage facility in 2000. The project's construction phase was scheduled to be completed by 2009.

¹Where necessary, values have been converted from Saudi riyals (SRIs) to U.S. dollars at the rate of SRIs3.75=US\$1.00.

Production

Mineral and mineral-based commodity production in Saudi Arabia included barite, cement and other industrial and construction materials, copper, nitrogenous and phosphatic fertilizers, natural gas, gold, oil, petrochemicals, refined petroleum products, salt, silver, sulfur, and zinc. Steel was produced from scrap and imported iron ore pellets.

In 2000, the average production of crude oil and condensate, which included the Saudi Arabian share of production from the partitioned neutral zone shared with Kuwait, was 9.2 million 42-gallon barrels per day (Mbb/d) (U.S. Energy Information Administration, June 2001, Saudi Arabia—Oil, accessed July 31, 2001, at URL <http://www.eia.doe.gov/emeu/cabs/saudi.html>). Although actual sustainable production capacity was reported to be about 10.5 Mbb/d, Saudi Arabian output has been restricted to about 9 Mbb/d in recent years in accordance with the quota assigned by OPEC (U.S. Energy Information Administration, 2001). In 2000, Saudi Arabia's unused production capacity of 1.3 Mbb/d was equivalent to about half of Iraq's 2.6-Mbb/d production and exceeded the output from Brazil, which was the 18th largest crude oil producer in the world (BP p.l.c., June 2001, Oil production, accessed August 1, 2001, at URL http://www.bp.com/centres/energy/world_stat_rev/oil/production.asp).

Trade

Total exports from Saudi Arabia in 2000 were valued at \$79 billion (Middle East Economic Digest, 2001a). In 1999 (the last year for which sector data were available), mineral products, primarily crude oil and petroleum products, accounted for 89% of total exports, which were valued at \$51 billion (Saudi Arabian Monetary Agency, [undated], Composition of exports, accessed August 1, 2001, at URL <http://www.sama.gov.sa/reports/annual/reports/tab6-2.htm>).

About 41% of Saudi Arabian crude oil was shipped to Asia, and 23%, to the United States. Asia also received 63% of Saudi Arabian natural gas liquids exports and 61% of refined petroleum products exports. Imports into the United States of crude oil and products from Saudi Arabia were reported to be about 1.57 Mbb/d in 2000, which accounted for about 17% of total U.S. crude oil imports (U.S. Energy Information Administration, June 2001, Saudi Arabia—Oil, accessed July 31, 2001, at URL <http://www.eia.doe.gov/emeu/cabs/saudi.html>).

Saudi Arabia's total imports were valued at about \$27 billion in 2000 (Middle East Economic Digest, 2001a). The United States remained the largest supplier to the kingdom and accounted for about 19% of the country's imports. In 1998 (the last year for which there were discrete data), total imports were

valued at \$30 billion, of which aluminum accounted for \$278 million; iron ore, \$126 million; ornamental stone, \$71 million; refractory brick, \$30 million; titanium ore, \$22 million; zinc and zinc alloy, \$22 million; and cement, \$16 million (United Nations, 2000).

Structure of the Mineral Industry

All minerals, which included natural gas and petroleum, were owned by the Government. The state-owned Saudi Arabian Mining Co. (Ma'aden), which was created in 1997, actively participated in and promoted mineral exploration and mining activities throughout the kingdom. In 2000, Saudi Aramco was the only company authorized to engage in oil and gas exploration and field development within Saudi Arabia, although many industrial projects in the petrochemical and petroleum-refining sectors were joint ventures between Saudi firms and international companies.

The concession of the Arabian Oil Co., Ltd., of Japan (AOC) to operate in the Saudi Arabian-administered section of the partitioned neutral zone expired early in the year. AOC continued to work in the Kuwaiti-administered section of the partitioned neutral zone with Kuwait Oil Co. and Saudi Arabian Texaco Inc. Saudi Aramco created a subsidiary, Aramco Gulf Operations Co. Ltd., to replace AOC in the Saudi Arabian-administered zone.

Affiliated companies of Saudi Basic Industries Corp., which included the Saudi Arabian Fertilizer Co. (SAFCO), the Saudi Iron and Steel Co. (Hadeed), and the Saudi Petrochemical Co., were involved in the manufacture of chemicals, fertilizers, and steel.

Commodity Review

Metals

Bauxite.—Ma'aden indicated that development of the remote Az Zabirah bauxite deposit would depend on the building of a regional transportation network (Abdullah Al-Dabbagh, Saudi Arabian Mining Co. [Ma'aden], Ma'aden—A new Saudi Arabian thrust into gold and minerals, accessed August 2, 2001, at URL <http://www.us-saudi-business.org/dabbagh.htm>). Az Zabirah had minable resources of 102 million metric tons (Mt) at a grade of 58.05% Al₂O₃ and 5.46% SiO₂ (Collenete and Grainger, 1994a).

Gold.—About 2,200 kilograms (kg) of gold was produced at the Mahd Adh Dhahab underground mine and 1,500 kg at the Sukhaybirat open pit mine. The open pit Al-Amar Mine, which was 220 kilometers (km) southwest of Riyadh, began operations in late 2000 and was expected to produce 1,500 kg of gold and 7,300 kg of silver in 2001. Ma'aden estimated that Al-Amar had reserves of 3.2 Mt at a grade of 3.28 grams per metric ton (g/t) gold. In 2000, feasibility studies were undertaken for the Al-Hajar underground and the Balghah open pit projects. Al-Hajar's North Vein zone had estimated resources of 1.07 Mt at a grade of 33.1 g/t gold, and resources at the Southwest Stockwork area were estimated to be 1.145 Mt of ore at a grade of 9.4 g/t gold. Balghah's resources were estimated to be 40 Mt

at a grade of about 1 g/t gold (Collenete and Grainger, 1994b, p. 99; Abdullah Al-Dabbagh, President and CEO, Saudi Arabian Mining Co. [Ma'aden], February 29, 2000, Ma'aden—A new Saudi Arabian thrust into gold and minerals, accessed August 2, 2001, at URL <http://www.us-saudi-business.org/dabbagh.htm>).

Iron and Steel.—Hadeed successfully completed the installation of an 850,000-metric-ton-per-year (t/yr)-capacity flat steel facility at its Al Jubayl steel plant (Middle East Economic Digest, 2001b). The Al Jubayl plant included a direct-reduction iron plant built in 1999, an 850,000-t/yr steel plant, the 850,000-t/yr hot strip rolling mill, a 496,000-t/yr cold rolling mill, and a 200,000-t/yr hot dip galvanizing line (Saudi Basic Industries Corp., 2001, Products—Metals, accessed August 2, 2001, at URL <http://www.sabic.com/en/products/metals/flat.html>). The plant was engineered to allow for expansion to 4.3 million metric tons per year of rolled products. After the flat steel facility opened, Hadeed announced that it would close the 140,000-t/yr-capacity Jeddah rolling mill (Metal Bulletin, 2000a).

In July, United Gulf Steel Mills Co. Ltd. opened a 500,000-t/yr-capacity medium-section rolling mill in Al Jubayl (Metal Bulletin, 2000b).

Industrial Minerals

Fertilizer.—Three companies produced fertilizer in Saudi Arabia, the Al Jubayl Fertilizer Co., the National Chemical Fertilizer Co. (Ibn Al-Baytar), and SAFCO. In January 2000, SAFCO began production at its third ammonia and urea facility, the new 500,000-t/yr-capacity ammonia, and 600,000-t/yr-capacity urea plant at Al Jubayl. In August, a proposed expansion of the Ibn Al-Baytar ammonia plant in Al Jubayl to 583,000 t/yr from 500,000 t/yr was announced (Saudi Basic Industries Corp., 2000a).

In 2000, National Industrial Gases Co. (GAS) initiated krypton-xenon gas production at its Al Jubayl air separation plant which was configured to allow for production of 600,000 t/yr of nitrogen for the fertilizer plants in Al Jubayl (Saudi Basic Industries Corp., 2000b). GAS also produced argon for Hadeed's Al Jubayl steel plant.

Magnesite and Phosphate.—In 2000, the magnesite deposit at Zaghat was being evaluated and Ma'aden completed a feasibility study of the Al Jalamid phosphate deposit.

Mineral Fuels

Natural Gas.—The successful 2000 exploration program added 167 million cubic meters per day to nonassociated natural gas reserves with the discovery of two new gasfields (the Ghazal, about 100 km west of Haradh, and the Manjurah, about 30 km west of Haradh) and three new gas reservoir discoveries in the existing Hawiyah, Mazalij, and Niban Fields. When the Ghazal and the Manjurah discoveries are developed, Saudi Arabia would have 87 oil and gasfields.

The expansion of the kingdom's master gas system continued in 2000. Saudi Aramco increased the processing capacity of the Berri, the Shedgum, and the 'Uthmaniyah gas plants to 167

million cubic meters per day. The 40-million-cubic-meters-per-day Hawiyah gas-processing plant was under construction. Scheduled to open in late 2001, the Hawiyah plant also was designed to handle 170,000 42-gallon barrels per day (bbl/d) of condensate and 1,000 metric tons per day of sulfur (Saudi Aramco, 2001, p. 26-27). A feasibility study of the 45-million-cubic-meter-per-day Haradh gas plant was completed in 2000. The plant's construction schedule proposed a December 2003 startup.

Petroleum.—Saudi Aramco began a long-term field study of the Ghawar Field, which was the world's largest onshore field, to improve predictions of reservoir characteristics and recovery and redevelopment models.

The company's refineries completed the Government-mandated switch to unleaded gasoline before year's end. Lead additives were replaced with the oxygenate methyl tertiary butyl ether. The Rabigh refinery increased its maximum sustained capacity to 425,000 bbl/d from 400,000 bbl/d (Saudi Aramco, 2001, p. 33).

Reserves

Saudi Arabia's crude oil reserves represent more than 25% of the total proven world reserves (U.S. Energy Information Administration, 2001, p. 111-113). Saudi Aramco (2001, p. 23) reported that proven oil reserves were 259.25 billion barrels. The bulk of the kingdom's reserves were contained in a few fields in the northeast. These included the Ghawar Field and the Safaniya Field, which was the world's largest offshore oilfield.

Natural gas reserves were reported to be 6.2 trillion cubic meters (Saudi Aramco, 2001, p. 23). Most of Saudi Arabian natural gas reserves were associated with the country's oilfields; the Ghawar Field accounted for about 35% of the total gas reserves.

Outlook

Because most of the national income is dependent upon markets outside the kingdom, the economy remains vulnerable to sudden changes in volume and pattern of worldwide trade in crude, petrochemicals, and refined petroleum. The proposed gasfield development and new transmission facilities associated with the ongoing expansion of Saudi Arabia's natural gas capacity should be developed within the next 5 years, assuming no hitch in financing associated with a major unforeseen decline in world oil prices. Saudi Aramco intends to maintain sustainable crude oil production capacity of approximately 10.5 Mbbbl/d to abide with OPEC production constraints. The company was expected to shut in less-profitable heavy-crude fields as new fields, which contain lighter premium crudes, are brought on line.

The Government also was considering a revised mineral policy to attract additional investment in the mining sector.

Several metal and industrial mineral mining projects were expected to come on-stream within the next 10 years.

References Cited

- Collenette, Peter, and Grainger, D.J., 1994a, Bauxite, *in* Mineral resources of Saudi Arabia: Ministry of Petroleum and Mineral Resources, Directorate General of Mineral Resources Special Publication SP-2, p. 22-26.
- 1994b, Gold, *in* Mineral resources of Saudi Arabia: Ministry of Petroleum and Mineral Resources, Directorate General of Mineral Resources Special Publication SP-2, p. 87-117.
- Metal Bulletin, 2000a, In brief: Metal Bulletin, no. 8483, June 12, p. 20.
- 2000b, New section mill claims to win Saudi market share: Metal Bulletin, no. 8528, November 23, p. 18.
- Middle East Economic Digest, 2001a, Databank: Middle East Economic Digest, v. 45, no. 29, July 20, p. 40-41.
- 2001b, Hadeed looks to optimise capacity: Middle East Economic Digest, v. 45, no. 24, June 15, p. 17.
- Saudi Aramco, 2001, Annual review—2000: Dhahran, Saudi Arabia, Saudi Aramco, 56 p.
- Saudi Basic Industries Corp., 2000a, SABIC affiliate to debottleneck ammonia plant: Riyadh, Saudi Arabia, Saudi Basic Industries Corp. press release, August 12, 1 p.
- 2000b, SABIC to export rare-gas mixture produced at GAS—Expansion project marks the beginning of krypton-xenon production in Saudi Arabia: Riyadh, Saudi Arabia, Saudi Basic Industries Corp. press release, September 11, 1 p.
- United Nations, 2000, Trade analysis system: United Nations CD-ROM.
- U.S. Energy Information Administration, 2001, Table 2.2—World crude oil production—1990-1999 (continued), *in* International energy annual—1999: Washington, DC, U.S. Department of Energy, p. 28.

Major Sources of Information

- Ministry of Petroleum and Mineral Resources
P.O. Box 247
Riyadh, 11191, Saudi Arabia
Telephone: +(966) 1-478-1661
Fax: +(966) 1-478-0552
- Deputy Ministry for Mineral Resources
P.O. Box 345
Jeddah, 21191, Saudi Arabia
Telephone: +(966) 2-669-1216
Fax: +(966) 2-667-2265
- Saudi Geological Survey
P.O. Box 54141
Jeddah, 21514, Saudi Arabia
Telephone: +(966) 2-619-5000
Fax: +(966) 2-619-6000
E-mail: SGS@SGS.ORG.SA

Major Publications

- Arab Oil & Gas Directory, Arab Petroleum Research Center, annual.
- Saudi Arabia Directorate General of Mineral Resources:
Atlas of Industrial Minerals, 1993.
Mineral Resources of Saudi Arabia, 1994.

TABLE 1
SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/	1996	1997	1998	1999	2000 e/
METALS					
Ore, mine output:					
Gross weight e/	1,569,205 4/	1,600,000	1,700,000	1,680,000	1,700,000
Copper content of concentrate and bullion 5/	834 e/	703	782	821	900
Gold content of concentrate and bullion 5/ kilograms	7,530	7,260	5,100	4,570	3,800
Lead content of concentrate e/ 5/	50	50	60	50	50
Silver content of concentrate and bullion 5/ kilograms	16,608	17,200	13,840	10,470	9,300
Zinc content of concentrate e/ 5/	500	619	3,550 4/	3,161 4/	3,000
Iron and steel:					
Direct-reduced iron thousand tons	2,296 4/	2,110	2,268	2,343	3,090 4/
Steel, crude do.	2,683	2,539	2,356	2,610	2,973 4/
Ferroalloys e/	20,000	83,000	83,000	83,000	83,000
INDUSTRIAL MINERALS					
Barite e/	8,000	8,000	8,000	7,000	8,000
Cement, hydraulic thousand tons	16,437	15,400	14,000 e/	16,313 r/ 4/	18,107 4/
Fertilizer, phosphatic, P ₂ O ₅ content do.	122	112	130	145	147
Gypsum, crude	362,589	365,000 e/	330,000 e/	380,000 r/ 4/	400,000
Lime e/	180,000	180,000	200,000	340,000 r/ 4/	350,000
Nitrogen:					
N content of ammonia thousand tons	1,386	1,405	1,418	1,402	1,743 4/
N content of urea do.	1,010	930	1,024	1,002	1,214 4/
Pozzolan e/	144,000	145,000	145,000	140,000	150,000
Salt e/	140,000	140,000	140,000 r/	200,000 r/ 4/	200,000
Sand and gravel e/ thousand tons	110,000	110,000	100,000	120,000 r/	120,000
Scoria e/ do.	2,000	2,000	2,000	2,000 4/	2,000
Sulfur, byproduct, hydrocarbon processing	1,741,900 r/	1,700,543 r/	1,880,105 r/	1,939,758 r/	2,101,391 4/
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural: 6/					
Gross million cubic meters	77,700	81,900	83,000	89,000 e/	96,000
Dry do.	41,340	45,300	46,700	46,200 r/ e/	58,870
Natural gas liquids: e/					
Propane thousand 42-gallon barrels	160,000 r/	159,000 r/	159,000 r/	153,000 r/	163,000
Butane do.	65,400 r/	69,000 r/	69,000 r/	66,200 r/	69,000
Natural gasoline and other do.	51,600 r/	52,000 r/	51,000 r/	50,000 r/	53,000
Total do.	276,750 r/ 4/	280,119 r/ 4/	279,163 r/ 4/	269,134 r/ 4/	285,008 4/
Petroleum:					
Crude 7/ million 42-gallon barrels	2,999	3,050 r/	3,170 r/	2,860 r/	3,360
Refinery products:					
Liquefied petroleum gases thousand 42-gallon barrels	15,424 r/	14,447 r/	11,929 r/	12,533 r/	9,634 4/
Gasoline and naphtha do.	142,164 r/	138,740 r/	142,606 r/	148,853 r/	155,556 4/
Jet fuel and kerosene do.	64,058 r/	60,844 r/	53,243 r/	60,638 r/	66,920 4/
Distillate fuel oil do.	192,509 r/	191,948 r/	193,328 r/	188,848 r/	198,176 4/
Residual fuel oil do.	181,059 r/	165,375 r/	176,460 r/	164,032 r/	163,941 4/
Unspecified 8/ do.	5,387 r/	6,934 r/	6,533 r/	6,625 r/	8,083 4/
Total do.	600,601 r/	578,288 r/	584,099 r/	581,529 r/	602,310 4/

e/ Estimated. r/ Revised.

1/ Table includes data available through August 2, 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ In addition to commodities listed, the following were produced: basalt, clays, granite, limestone, marble, methanol, nitrogenous fertilizers, silica sand, and sodium hydroxide (caustic soda); but available information is inadequate to estimate output.

4/ Reported figure.

5/ Mahd Adh Dhahab Mine produced a bulk flotation concentrate that contains copper, gold, lead, silver, and zinc and a crude bullion that contains copper, gold, and silver.

6/ Includes Saudi Arabian share (50%) of production from the Saudi Arabian-Kuwaiti partitioned neutral zone.

7/ Includes condensate. Series is a calculation based on 365 days of the reported daily average production; however, reported daily averages vary widely by source.

Actual reported Saudi Aramco crude oil production, in million barrels: 2,878 in 1996; 2,829 in 1997; 2,922 in 1998; 2,655 in 1999; and 2,847 in 2000. Saudi Aramco data do not include lease condensate nor the Saudi Arabian share of production from the partitioned neutral zone.

8/ Includes asphalt.