

2007 Minerals Yearbook

SAUDI ARABIA

THE MINERAL INDUSTRY OF SAUDI ARABIA

By Philip M. Mobbs

The Kingdom of Saudi Arabia had diversified its economy and mineral industry, although the nation's economy remained strongly linked to hydrocarbon production, which accounted for more than one-half of the nominal gross domestic product (GDP) in 2007. Saudi Arabia ranked first in the world with 21% of total proven oil reserves. Depending on the source of provisional 2007 crude oil and condensate production data, Saudi Arabia either maintained its position as the leading oil producer in the world or was second, after Russia (BP p.l.c., 2008, p. 6, 9; Saudi Arabian Monetary Agency, 2008, p. 24; U.S. Energy Information Administration, 2008).

All mineral deposits were the exclusive property of the state. The Supreme Council for Petroleum and Mineral Affairs defined and approved national hydrocarbon policies and strategies. The Ministry of Petroleum and Mineral Resources implemented general policy related to minerals, natural gas, and oil. Mining was regulated by Royal Decree No. M/47 (the Mineral Investment Law) of 20 Sha'ban 1425 (October 4, 2004).

Minerals in the National Economy

Saudi Arabian crude oil, along with natural gas and refined petroleum products, provide a source of energy and funding for the establishment of other industries, including energy-intensive heavy industries and petrochemicals. Natural gas and petroleum revenues accounted for 87% of Government income and the hydrocarbon sector overall accounted for 88% of national merchandise exports (Saudi Arabian Monetary Agency, 2008, p. 131, 305).

In conjunction with the decline in crude oil production in 2007, which was attributed to a cut in the Organization of the Petroleum Exporting Countries' crude oil production ceiling allocation for Saudi Arabia, crude oil export volumes declined slightly in 2007 to about 2.54 billion barrels compared with 2.57 billion barrels in 2006. The estimated value of crude oil exports, however, was \$177 billion, which was almost a 10% increase compared with that of 2006. The increase in the value of crude oil exports was attributable to the increase in the average price of crude oil. In 2007, the average price of the Arabian Light standard-type crude oil increased to \$68.74 per barrel compared with \$61.05 per barrel in 2006 (which was almost a 13% increase). Exports of refined petroleum products and gas in 2007 totaled 75.79 million metric tons (Mt); chemical products, 18.9 Mt; and construction materials and steel, 11.7 Mt. Exports of refined petroleum products were valued at about \$29 billion; petrochemicals, \$14 billion; and construction materials and steel, about \$3 billion (Saudi Arabian Monetary Agency, 2008, p. 132, 139, 152, 159).

Production

Significant increases in production volume in 2007 were posted for barite, cement, crude steel, direct-reduced iron (DRI),

feldspar, kaolin, nitrogen (ammonia and urea), and pozzolana and scoria. Notable decreases in output were posted for dolomite, gold, jet fuel and kerosene, liquefied petroleum gases, salt, sand and gravel, and zinc. Slight, but notable, production decreases were posted for crude oil and refined petroleum. Data on mineral production are in table 1.

Structure of the Mineral Industry

In 2007, 1,314 mining and raw materials quarry licenses were held by 670 entities compared with 1,270 licenses held by 650 investors in 2006. The Government maintained ownership interest in most of the large companies that operated in the mineral sector. Petroleum exploration and production in Saudi Arabia was restricted to Saudi Arabian Oil Co. (Saudi Aramco), although international firms had been authorized to explore for natural gas (table 2).

The Ministry of Petroleum and Mineral Resources supervised its affiliate companies in the fields of petroleum and minerals; these included Aramco Gulf Operation Ltd., Saudi Arabian Mining Co. (Ma'aden), and Saudi Aramco. Aramco Gulf Operation and Saudi Arabian Chevron Inc. (which was the subsidiary of Chevron Corp. formerly known as Saudi Arabian Texaco Inc.) worked in the Partitioned Neutral Zone between Kuwait and Saudi Arabia on behalf of the Ministry. The Ministry also supervised the Saudi Geological Survey.

The Government postponed a planned initial public offering to divest 50% of its equity interest in Ma'aden until mid-2008. The Government planned to retain a 50% interest in Ma'aden.

The Government held 70% interest and the private sector held 30% interest in Saudi Basic Industries Corp. (SABIC). Subsidiaries of SABIC included Al-Jubail Fertilizer Co., National Chemical Fertilizer Co., Saudi Arabian Fertilizer Co., Saudi Iron and Steel Co. (Hadeed), and several petrochemical companies.

Commodity Review

Metals

Aluminum.—In 2007, the joint venture of Ma'aden (51% equity interest) and Alcan Inc. of Canada (49%) proposed to develop a \$7 billion 1.6-million-metric-ton-per-year (Mt/yr)-capacity alumina refinery and a two-potline 720,000-metric-ton-per-year (t/yr)-capacity aluminum smelter complex at Ras al-Zour. The facility was expected to be designed to allow the smelter to be expanded to six potlines with a capacity of 2.1 Mt/yr. The first phase of the aluminum smelter construction was scheduled to be completed by 2011. Initially, the smelter was to process imported alumina. The Ras al-Zour alumina refinery, which was scheduled to be completed in 2012, would obtain ore from Ma'aden's proposed bauxite mine at Az Zabirah. In November, Rio Tinto Canada Holding Inc. acquired

Alcan; the aluminum company subsequently was renamed Rio Tinto Alcan Inc. (Metal Bulletin, 2007a; Middle East Economic Digest, 2007b).

Western Way for Industrial Development Co. of Saudi Arabia awarded construction contracts for a 1.6-Mt/yr-capacity alumina refinery and a 700,000-t/yr-capacity aluminum smelter complex at Jizan Economic City to China Nonferrous Metal Industry's Foreign Engineering and Construction Co., Ltd. and China National Machinery Industry Corp. Bauxite feed for the Jizan alumina facility, which was located on the Red Sea, was to be imported from Greece.

Also at Jizan, Aluminium Corp. of China Ltd. (Chalco) agreed to build a 1-Mt/yr-capacity aluminum smelter; initial production was scheduled for 2012. Chalco was to obtain 40% equity interest in the operating company (Sino-Saudi Jizan Aluminum Co.); local investors would secure 40% interest; and MMC International Holdings Ltd. of Malaysia planned to acquire 20% interest. Alumina for the Sino-Saudi smelter would be acquired from Chalco (Middle East Economic Digest, 2007a).

Copper, Gold, Silver, and Zinc.—Ma'aden expected to begin production at Al Amar Mine in early 2008; annual production was anticipated to be about 6,500 metric tons (t) of zinc, 1,100 t of copper, 1,700 kilograms (kg) of gold, and 25 kg of silver (Saudi Arabian Mining Co., 2006).

ADV Group Ltd. of Australia acquired the Vertex Group (Middle East) WLL of Bahrain and subsequently acquired 100% equity interest in Bariq Mining Ltd. ADV and Central Mining Company Investments Ltd. of Saudi Arabia (CMCI) (which was part of the Abdulhadi Abdullah Al Judee Al Qahtani Sons Group of Saudi Arabia) continued exploration of their Jabal Sayid copper project and estimated that the prospect contained resources of 46.2 Mt of ore at a grade of 1.8% copper. At yearend, ADV was renamed Citadel Resources Group Ltd. (ADV Group Ltd., 2007).

Arabian American Development Co. of the United States and local Saudi investors formed Al Masane Al Kobra Mining Co. to develop the Al Masane gold prospect. The company had applied for a commercial license for the project. Arabian American had been working on the development of the project since the early 1990s. The area previously had been mined, but mining activity had ceased about 1,300 years ago (Arabian American Development Co., undated).

Iron and Steel.—In May, the Direct Reduction Iron Co., which was a subsidiary of the Al Tuwairqi Group of Saudi Arabia, began initial production from its DRI plants at Dammam. In November, Hadeed started production from a 1.76-Mt/yr-capacity DRI plant. The facility, which was Hadeed's fifth DRI plant, was reported to be the world's largest DRI plant (Siemens Industrial Solutions and Services Group, 2007).

Al-Atoun Steel Industry Co. of Saudi Arabia continued work on a 910,000-t/yr-capacity crude steel plant and a 500,000-t/yrcapacity rebar rolling mill at Yanbu in western Saudi Arabia. Initial steel production was expected in late 2008. A 1.7-Mt/yrcapacity DRI plant was proposed to be built adjacent to the steel plant by 2009. At Jizan in southwestern Saudi Arabia, Pan Kingdom Investment Co. started the construction of the South Steel Factory, which was planned to include a 1-Mt/yr-capacity crude steel plant and 500,000-t/yr-capacity rolling mill (Gulf Industry, 2007; Metal Bulletin, 2007b).

Niobium (Columbium), Tantalum, Yttrium, and Zircon.— In January, the Government did not renew the exploration license for the Ghurayyah tantalum prospect that was held by Tertiary Minerals plc of the United Kingdom and Saudi partners A.H. Algosaiba & Bros. Co. and Al Nahla Trading and Contracting Co. In addition to tantalum, the prospect contained several other minerals, including niobium (columbium), uranium, yttrium, and zircon. The Government indicated that it would not issue licenses for the exploration for or production of uranium. Tertiary Minerals and partners subsequently reapplied for an exploration license for the prospect that specifically excluded radioactive minerals (Tertiary Minerals plc., 2007).

Industrial Minerals

Phosphate Rock.—In 2007, Ma'aden awarded the contract for the development of the Al-Jalamid phosphate mine to Saudi Comedat Company Ltd., which was a joint venture of CMCI, Jordan Economic Development and Trading Co., and Kier Construction (which was a subsidiary of the Kier Group of the United Kingdom). Saudi Comedat also obtained the contract to operate the Al-Jalamid Mine for 8 years. Ma'aden awarded Guizhou Hongfu Industry and Commerce Company Ltd. the contract to build a 5.1-Mt/yr-capacity phosphate rock beneficiation plant at Al-Jalamid. The resultant dry phosphate concentrate was to be shipped 1,400 kilometers by rail to Ras al-Zour (Corbett, 2007; Saudi Arabian Mining Co., 2007).

In 2007, Ma'aden awarded the contract to build a 3,300metric-ton-per-day (t/d)-capacity ammonia plant for the Ras al-Zour facility to Samsung Engineering Co., Ltd. of the Republic of Korea. In 2006, Ma'aden had awarded three contacts for the construction of a phosphatic fertilizer facility at Ras al-Zour. Dragados International S.A. (which was part of the Actividades de Construcción y Servicios, S.A. of Spain) was awarded the contract for a 3-Mt/yr-capacity diammonium phosphate granulation plant. The contract for the construction of a 1.5-Mt/yr-capacity fertilizer-grade phosphoric acid plant was awarded to Litwin Europe Middle East B.V. of the Netherlands, and the contract for the construction of a 13,500-t/d-capacity chemical-grade sulfuric acid plant was awarded to Outotec Oyj of Finland. The Ras al-Zour facility was expected to begin fertilizer production in 2010 (Actividades de Construcción y Servicios, S.A., 2006; Litwin Europe Middle East B.V., 2006; Outotec Oyj, 2006; Uhde GmbH, 2007).

In September, Saudi Basic Industries Corp. acquired a 30% interest in the Ras al-Zour phosphate project; Ma'aden retained a 70% interest. Costs for the development of the phosphate project had escalated to about \$5.6 billion; in 2004, costs were estimated to be about \$3.5 billion (Middle East Economic Digest, 2007c).

Mineral Fuels

Petroleum.—To meet anticipated domestic and international demand for crude oil (and to offset the natural production decline of older fields), Saudi Aramco had several projects

underway to increase total production capacity. The Khursaniyah project, which was scheduled to come onstream in 2008, was expected to add about 500,000 barrels per day (bbl/d) of Arabian Light crude oil to Saudi Aramco's production capacity. This increase would be made possible through the development of the Abu Hadriyah, the Fadhili, and the Khursaniyah Fields and the commissioning of the Khursaniyah gas plant, which would have the capacity to process up to 28.3 million cubic meters per year of natural gas produced with the oil from the fields and to recover about 290,000 bbl/d of natural gas liquids. By late 2008, the development of the Nuayyim Field was expected to add another 100,000 bbl/d of Arabian Super Light crude oil to Saudi Aramco's production capacity. Significant projects expected to be completed in 2009 included the Khurais project, which was the planned development of the Abu Jifan and Mazalij Fields, which were projected to produce 1.2 million barrels per day of Arabian Light crude oil, and the 250,000-bbl/d expansion of production capacity at the Shaybah Field, which produced Arabian Extra Light crude oil. By 2011, the redevelopment of the Manifa Field (production from which had been suspended in 1985 because of the lack of a market for the field's 'heavy' specific gravity crude oil) was slated to add 900,000-bbl/d of Arabian Heavy crude oil from onshore and offshore wells to Saudi Aramco's production capacity (Brundage, 2007; Blackwell, 2008; Saudi Arabian Oil Co., 2008, p. 17-19).

Outlook

With its crude oil resources, Saudi Arabia is well placed to meet international demand for petroleum but, historically, sustained worldwide economic downturns (and the resultant declines in demand for hydrocarbons) have had significant negative effects on the national economy. Saudi Aramco expects to continue its program to increase its production of premiumpriced light and extra-light grades of crude oil.

In the long term, the Kingdom's privatization program and encouragement of private investment in mineral projects are expected to be attractive to international investors. Significant infrastructure development, which includes the establishment of new cities and the expansion of the highway and railroad network, will likely raise the short-term demand for construction minerals and products, such as cement, glass, sand, steel, and stone. Shortages of steel scrap, a constricted supply of natural gas, and escalating development costs of regional projects could affect the output of the country's expanding steel sector, as could a downturn in the booming regional construction industry. In the event of a downturn in the construction industry, the planned expansion of Saudi Arabian cement and steel production capacities could result in a significant oversupply of cement and steel.

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TABLE 1 SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2003 ^e	2004	2005	2006	2007
METALS	200	(50	((0)	720	727
Copper content of concentrate and bullion	800	652	668	730	737
Ferroalloys ^e Gold content of concentrate and bullion kilograms	8,769 ³	8,268	 7,456	85,000 5,180	85,000 4,438
Iron and steel:	8,709	8,208	7,450	5,180	4,430
Low-grade iron ore, for cement	NA	503,500	582,000	584,000 ³	642,000
Direct-reduced iron thousand metric tons	3,290 ³	3,410	3,630	3,580	4,340
Steel, crude do.	3,944 ³	3,902	4,185	4.000	4,600
Lead content of concentrate ^c	60	30		3	123
Silver content of concentrate and bullion ^e kilograms	13,000	14,494 ³	13,501 ³	9,100 ³	9,028
Zinc content of concentrate ^e	3,000	1,500	15,501	983 ³	716
INDUSTRIAL MINERALS	5,000	1,500		765	/10
Barite	9,000	15,000	15,000	23,308 ^r	30,000
Cement, hydraulic thousand metric tons	23,000	25,370	26,064	27,056 ^r	30,369
Clays	25,000	25,570	20,001	27,000	50,507
Kaolin	3,870	4,000 ^e	1,490	3,957	4,415
Other, for brick and tile thousand metric tons	630	2,000 °	4,300	3,800	3,900
Feldspar	62	80,000	42,300	42,300	73,000
Fertilizer, phosphatic, P_2O_5 content ^e do.	150	295	300	300	300
Gypsum, crude do.	726 ^{r, 3}	641	713	2,101	2,200
Lime ^e	350,000	350,000	360,000	360,000	400,000
Nitrogen:					
N content of ammonia thousand metric tons	1,743 3	1,726	1,780	2,000	2,600
N content of urea do.	1,247 3	1,242	1,250	1,400	1,850
Salt do.	1,300	1,530	1,738	1,752	1,507
Sand and stone:					
Aggregate do.	120,000	156,300	190,000	217,000	234,000
Basalt do.	86 ^{r, 3}	NA	43	53	56
Dolomite do.	NA	530	498	550	81
Granite do.	NA	716	843	962	954
Limestone do.	559 ^{r, 3}	32,000	30,600	30,500	33,447
Marble do.	NA	82	85	85	85
Pozzolana and scoria do.	260 ^{r, 3}	320	372	400	784
Sand and gravel do.	28,000 ^{r, 3}	33,100	28,000	35,000	26,000
Silica sand (glass sand) do.	364 ^{r, 3}	625	518	781 ^r	820
Sulfur, byproduct, hydrocarbon processing	2,180,000	2,249,295	2,716,823	2,906,911	3,089,223
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural:	67.389 ³	75.0(7	91 250	95 001	92 ((5
Gross million cubic meters	60.060 ³	75,967	81,350	85,001	82,665
Dry do. Petroleum:	60,060	68,000	68,547	70,878	72,597
Crude oil million 42-gallon barrels	2,958 ³	3,151	3,309	3,253	3,114
Condensate do.	2,938 44 ⁰	82	3,309 89	5,255 94	3,114 94
Natural gas liquids:	44	82	09	94	74
Propane thousand 42-gallon barrels	144,837 ³	148,225	150,588	149,320	143,681
Butane do.	87,812 ³	91,060	94,148	94,338	92,684
Natural gasoline and other do.	68,422 ³	65,647	66,299	61,456	63,926
Total do.	301,071 3	304,932	311,035	305,114	300,291
Refinery products:	201,071	201,722	211,000	200,111	200,271
Liquefied petroleum gases do.	10,150 ³	13,400	12,740	14,730	11,521
Gasoline and naphtha do.	171,720 ³	198,570	198,870	186,420	188,644
Jet fuel and kerosene do.	65,550 ³	66,980	80,910	77,330	67,282
Distillate fuel oil do.	215,590 ³	234,890	236,370	241,790	238,496
Residual fuel oil do.	169,380 ³	172,790	177,970	181,000	174,385
Unspecified ⁴ do.	10,240 ³	11,490	13,780	14,160	15,041
Ulispecified					

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. NA Not available. -- Zero. ¹Table includes data available through December 22, 2008.

²In addition to commodities listed, carbon black, and methanol were produced, but available information is inadequate to make estimates of output.

³Reported figure.

⁴Includes asphalt.

TABLE 2 SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

		Major operating companies		Annual
Commodi	ty	and major equity owners	Location of facilities	capacity 4,600
Cement ¹		Yanbu Cement Co.	Yanbu	
Do.		Saudi Cement Co.	Ayn Dar, about 120 kilometers southwest of Dammam	
Do.		do.	Al Hofuf, about 120 kilometers southwest of Dammam	4,000
Do.		Southern Province Cement Co. (Government, 40%)	Suq Al Ahad, 10 kilometers northeast of Jizan	2,600
Do.		do.	Bishah, 550 kilometers southeast of Jiddah	2,000
Do.		Arabian Cement Co. Ltd.	Rabigh	3,100
Do.		Eastern Province Cement	Al Khursaniyah	3,500
Do.		Yamama Cement Co.	Riyadh	4,600
Do.		Qasim Cement Co.	Jal al Watah, 18 kilometers north of Buraydah	3,500
Do.		Tabuk Cement Co.	Tabuk	1,500
Do.		Saudi White Cement	About 30 kilometers southwest of Riyadh	200
Copper, Cu conten of ore	t	Saudi Arabian Mining Co. (Ma'aden) (Government, 100%)	Al-Hajar and Mahd Al-Dahab Mines	1,000
	kilograms	do.	Al-Hajar, Bulgah, and Mahd Al-Dahab Mines, and Sukhaybarat plant	8,000
Petroleum:				
Crude milli	on barrels	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	Eastern Province, Najd Region, and offshore; includes the Ghawar, the Hawtah, the Safaniya, and the Shaybah Fields	3,900
Refined products	do.	do.	Ras Tanura	
Do.	do.	Rabigh Petroleum Refining Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	Rabigh	140
Do.	do.	Saudi Aramco Mobil Refinery Co. Ltd. [Saudi Arabian Oil Co. (Saudi Aramco), 50%, and Mobil Yanbu Refining Company Inc., 50%]	Yanbu	140
Do.	do.	Saudi Aramco Shell Refining Co. [Saudi Arabian Oil Co., (Saudi Aramco), 50%, and Shell Saudi Arabia Refining Ltd., 50%]	Al Jubayl	110
Do.	do.	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	Yanbu	69
Do.	do.	Riyadh Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	Riyadh	50
Do.	do.	Jeddah Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	Jeddah	38
Steel, crude		Saudi Iron and Steel Co. (Hadeed) (Saudi Basic Industries Corp. (SABIC), 100%)	Al Jubayl	2,700
Do.		National Steel Co. Ltd. (Al Tuwairqi Group, 100%)	Dammam	800
Titanium dioxide		The National Titanium Dioxide Co. Ltd. (Cristal) (Gulf Investment Corp. of Kuwait; National Industrialization Co. of Saudi Arabia; Shairco Trading Industry and	Yanbu	100
		Contracting of Saudi Arabia) Saudi Arabian Mining Co. (Ma'aden) (Government, 100%)	Al-Hajar and Mahd Al-Dahab Mines	2,000
¹ In 2007, productio	on from mo	st cement plants exceeded nominal capacity.		

¹In 2007, production from most cement plants exceeded nominal capacity.