



2008 Minerals Yearbook

SAUDI ARABIA

THE MINERAL INDUSTRY OF SAUDI ARABIA

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The Kingdom of Saudi Arabia ranked first in the world with about 21% of the total proved oil reserves and maintained its position as the leading producer of petroleum (which included condensate, crude oil, and natural gas liquids) in the world. The country ranked ninth in the world in terms of petroleum refining capacity and was the 32d ranked steel producer. A variety of industrial minerals and metals also were produced in Saudi Arabia (table 1; BP p.l.c., 2009, p. 6, 9; U.S. Energy Information Administration, 2009; World Steel Association, 2009).

All mineral deposits are the exclusive property of the state. The Supreme Council for Petroleum and Mineral Affairs defines and approves national hydrocarbon policies and strategies. The Ministry of Petroleum and Mineral Resources implements general policy related to minerals, natural gas, and oil. Mining is 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 Arabia's economy remained strongly linked to hydrocarbon production, which accounted for more than 60% of the nominal gross domestic product in 2008. The hydrocarbon sector overall accounted for nearly 90% of national merchandise exports; any notable change in Saudi Arabian crude oil production or the international oil price significantly affects the country's economy. Petroleum revenues (which increased by nearly 75% in 2008 compared with those in 2007 in terms of riyals¹) accounted for 89% of Government income. Development projects funded from the Government's budget surplus from previous years included education projects (32.3% of total appropriations), water and sewage projects (20.7%), municipal services (13.2%), road projects (6.3%), water desalination projects (3.9%), and 2,164 projects in the industrial sector that included energy-intensive mineral-related heavy industries and petrochemicals (3.2%) (Saudi Arabian Monetary Agency, 2009, p. 135, 137, 144, 318).

In 2008, crude oil export volumes increased by 5.2% to 2.67 billion barrels compared with 2.54 billion barrels in 2007. The preliminary value of crude oil exports was \$247 billion, which was a 38.5% increase compared with that of 2007. The increase in the value of crude oil exports was attributable to increases in the production volume and the average price of crude oil. Saudi Arabian oil prices fluctuated significantly in 2008, rising to an average of \$131.22 per barrel in July before dropping to \$36.50 per barrel in December. In 2008, the average price of the Arabian Light standard-type crude oil increased to \$94.77 per barrel compared with \$68.74 per barrel in 2007 (which was almost a 40% increase). Arabian Medium increased to an average of \$91.77 per barrel compared with \$65.03 per barrel in 2007, and Arabian Heavy increased to an average of \$87.75 per barrel compared with \$64.19 per barrel

in 2007. Exports of refined petroleum products were valued at \$33.9 billion; petrochemicals, \$16.7 billion; and construction materials and steel, about \$3.4 billion (Saudi Arabian Monetary Agency, 2009, p. 144, 170, 388).

Production

Significant increases in production volume in 2008 were posted for copper, lead, and zinc, which were coproducts of the new Al Amar gold mine, which is located in Ar Riyadh Province about 195 kilometers (km) southwest of Riyadh. Clays, direct-reduced iron (DRI), feldspar, granite, and natural gas also posted significant increases in production volume. Smaller but notable (about 4% to 5%) production increases were posted for crude oil and refined petroleum. Notable decreases in output were posted for limestone blocks and sand and gravel. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Deputy Ministry for Mineral Resources (2009, p. 3, 54, 75, 103, 111) reported that in 2008 there were 1,263 active mining and quarrying licenses and 145 active exploration and reconnaissance licenses. The Government maintained ownership interest in most of the large companies that operated in the mineral sector. 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. In July, the Government divested 50% of its equity interest in Saudi Arabian Mining Co. (Ma'aden) through an initial public offering and retained a 50% interest in Ma'aden (table 2).

Exploration for and production of crude oil in Saudi Arabia were restricted to Saudi Arabian Oil Co. (Saudi Aramco), which formed joint ventures with international firms to explore for natural gas and to refine petroleum. The Ministry of Petroleum and Mineral Resources supervised its affiliate companies in the fields of minerals and petroleum; these included Aramco Gulf Operation Ltd., Ma'aden, and Saudi Aramco. Aramco Gulf Operation and Saudi Arabian Chevron Inc. (which was a subsidiary of Chevron Corp. of the United States) worked in the Partitioned Neutral Zone between Kuwait and Saudi Arabia on behalf of the Ministry. The Ministry also supervised the Saudi Geological Survey.

Commodity Review

Metals

Aluminum.—By October 2008, the estimated cost of construction of the aluminum project that the joint venture of

¹Where necessary, values have been converted from Saudi Arabian riyal (SAR) to U.S. dollars (US\$) at the fixed rate of SAR3.75=US\$1.00.

Ma'aden (51% equity interest) and Rio Tinto Alcan of Canada (49%) proposed to build increased to \$10.6 billion from \$7 billion in 2007 owing to significantly escalated construction costs and slight increases in refinery and smelter capacities. Rio Tinto Alcan withdrew from the project in December. Ma'aden remained committed to the development of the 3.5-million-metric-ton-per-year (Mt/yr)-capacity bauxite mine at Az Zabirah and the 1.8-Mt/yr-capacity alumina refinery and 2-potline 740,000-metric-ton-per-year (t/yr)-capacity smelter facility that was to be built at Ras al-Zawr, which is located about 90 km north of Jubail on the Persian Gulf. In 2008, Ma'aden began mining low-grade bauxite and kaolin at Az Zabirah. The low-grade bauxite was expected to be sold to cement companies (Karam, 2008).

Development work continued on Western Way for Industrial Development Co. of Saudi Arabia's 1.6-Mt/yr-capacity alumina refinery and 700,000-t/yr-capacity aluminum smelter complex and Sino-Saudi Jizan Aluminum Co.'s 1-Mt/yr-capacity aluminum smelter. Both facilities were expected to be built at the proposed Jizan Economic City (also known as Jazan Economic City), which was to be located about 60 km north of Jizan on the Red Sea. Emirates Aluminium Company Ltd. PSJC of the United Arab Emirates also proposed to build a 700,000-t/yr-capacity aluminum smelter in the planned King Abdullah Economic City, which was to be located north of Jeddah on the Red Sea (Shaheen, Tammar, and Al Ghalib, 2008, p. 9).

Copper, Gold, Silver, and Zinc.—Ma'aden began operations at Al Amar Mine in early 2008. The mine's annual production was anticipated to be about 200,000 t/yr of ore, from which about 6,500 metric tons (t) of zinc, 1,100 t of copper, 1,700 kilograms (kg) of gold, and 25 kg of silver were expected to be recovered. Ma'aden's mining operations at the Bulghah Mine were expected to cease in 2010; at the Al-Hajar Mine, in 2011; at the Mahd Adh-Dahab Mine, in 2013; and at the Al Amar Mine, in 2014. The Sukhaybarat ore processing plant was expected to close in 2014. Ma'aden and its subsidiaries (Ma'aden Gold and Base Metals Co. and Saudi Company for Precious Metals) explored for precious metals and associated minerals at Al Hajar, Garzaieh, Misca, Ourook, Shaktalieh, Sheba, Siham, Tawan, Umm ash Shalahib, and Warsha (Saudi Arabian Mining Co., 2006; 2009, p. 18; undated).

In 2008, Consolidated Mining Company Investments Ltd. of Saudi Arabia transferred the Jabal Sayid copper and gold project to Bariq Mining Ltd., which was a joint venture of Citadel Resources Group of Australia and Consolidated Mining. Bariq continued a resource-definition drilling program at Jabal Sayid, and a feasibility study of the project was expected to be completed in 2009. Citadel explored the Jabal Shayban copper and gold deposit in 2008 and planned to begin exploration of the Jabal Baydan zinc and Wadi Kamal nickel deposits in 2009.

Al Masane Al Kobra Mining Co. (AMAK), which was a venture of local investors and the Arabian American Development Co. of the United States, acquired the Al Masane mining license from Arabian American Development. AMAK began construction of facilities for the underground Al Masane Mine, which is located in southwestern Saudi Arabia; initial production was scheduled to begin in late 2009. At full capacity, annual mine output was expected to include 58,000 t of zinc

concentrates (that contained 53% zinc); 34,900 t of copper concentrate (that contained 25% copper) and about 12 t of doré (that contained 98% silver and 2% gold) (Al Masane Al Kobra Mining Co., 2009, p. 14).

Iron Ore.—In January, National Mining Co. of Saudi Arabia (50% equity interest) and London Mining Plc (50%) formed Saudi London Iron Ltd. (SLI) to develop the Wadi Sawawin iron ore project. SLI began a preliminary feasibility study of a proposed 11.6-Mt/yr-capacity mine, which was to be located in northwestern Saudi Arabia about 52 km from the Red Sea, and a 5-Mt/yr-capacity seaside pelletizing plant that was expected to be completed in 2009 (London Mining Plc, 2009, p. 6-7).

Niobium (Columbium), Tantalum, Yttrium, and Zircon.—In 2008, no work was performed on the Ghurayyah tantalum prospect by the joint venture of Tertiary Minerals plc of the United Kingdom (50% equity interest) and Saudi partners A.H. Algoisaiba & Bros. Co. and Al Nahla Trading and Contracting Co. (25% each). In early 2007, the Government did not renew the prospect's license; the joint venture subsequently applied for a new exploration license.

Industrial Minerals

Aluminum Fluoride, Clay and Shale, and Magnesite.—In 2006, Al Zamil Holding Co. of Saudi Arabia and Industries Chimiques du Fluor of Tunisia had formed a joint venture to build a 50,000-t/yr-capacity aluminum fluoride manufacturing plant near Jubail. Initial production, which tentatively had been scheduled for 2008, was pushed back to 2010 (Shaheen, Tammar, and Al Ghalib, 2008, p. 9).

In 2008, Ma'aden started mining at its 50,000-t/yr-capacity kaolin mine at Az Zabirah. Development work on the Zarghat magnesite deposit continued; a 150,000-t/yr-capacity mine at Zarghat was expected to be commissioned in 2010 (Dabbagh, 2009, p. 16).

Phosphate Rock.—In January, Ma'aden, which held 70% equity interest in the Al-Jalamid phosphate project, and SABIC, which held 30% interest, incorporated Ma'aden Phosphate Co. (MPC). MPC continued the development of the Al-Jalamid phosphate mine and the Ras Az Zawr fertilizer complex; initial production of diammonium phosphate fertilizer was expected in 2011.

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. In August, production tests from the Khursaniyah project started; the project was expected to add about 500,000 barrels per day (bbl/d) of Arabian Light crude oil and natural gas liquids from the Abu Hadriyah, the Fadhili, and the Khursaniyah fields to Saudi Aramco's production capacity.

Other ongoing projects included the Khurais project, which was the planned development of the Abu Jifan and the Mazalij fields, which were projected to produce 1.2 million barrels per day of Arabian Light crude oil; the 250,000-bbl/d expansion of

the Arabian Light crude oil production capacity at the Shaybah field; and the redevelopment of the Manifa field, which was expected to add 900,000 bbl/d of Arabian Heavy crude oil from onshore and offshore wells to Saudi Aramco's production capacity (Saudi Arabian Oil Co., 2009, p. 17-18).

Outlook

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

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TABLE 1
SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity ²	2004	2005	2006	2007	2008	
METALS						
Copper content of concentrate and bullion	metric tons	652	668	730	737	1,465
Ferroalloys ^c	do.	--	--	85,000	85,000	90,000
Gold content of concentrate and bullion	kilograms	8,268	7,456	5,180	4,440 ^r	4,527
Iron and steel:						
Low-grade iron ore, for cement	metric tons	503,500	582,000	584,000	642,000	581,000
Direct-reduced iron		3,410	3,630	3,580	4,340	4,970
Steel, crude		3,902	4,185	4,000	4,600	4,670
Lead content of concentrate ^c	metric tons	30	--	-- ³	123 ³	600
Silver content of concentrate and bullion	kilograms	14,494	13,501	9,100	9,028	8,232
Zinc content of concentrate	metric tons	1,500 ^e	--	983	716	3,663
INDUSTRIAL MINERALS						
Barite ^c	metric tons	15,000	15,000	23,308 ³	30,000 ³	30,000 ³
Cement, hydraulic		25,370	26,064	27,056	30,369	31,823
Clays:						
Kaolin	metric tons	4,000 ^e	1,490	3,957	4,415	4,400
Other, for brick and tile		2,000 ^e	4,300	3,800	3,900	5,000
Feldspar	metric tons	80,000	42,300	42,300	73,000	550,000
Fertilizer, phosphatic, P ₂ O ₅ content ^e		295	300	300	300	300
Gypsum, crude		641	713	2,101	2,100 ^r	2,300
Lime ^e		350	360	360	400	400
Nitrogen:						
N content of ammonia		1,726	1,780	2,000	2,600	2,600 ^e
N content of urea		1,242	1,250	1,400	1,850	1,850 ^e
Salt		1,530	1,738	1,752	1,507	1,600
Sand and stone:						
Aggregate		156,300	190,000	217,000	234,000	248,000
Basalt		NA	43	53	-- ^r	--
Dolomite		530	498	550	465 ^r	465
Granite		716	843	962	954	1,100
Limestone:						
Blocks		775	462	308	308	242
For cement		32,000	30,600	30,500	33,447	36,100
Marble	metric tons	82,000	84,700	84,700	85,000	85,000
Pozzolana and scoria		320	372	400	784	810
Sand and gravel		33,100	28,000	35,000	26,000	22,000
Silica sand (glass sand)		625	518	781	820	799
Sulfur, byproduct, hydrocarbon processing	metric tons	2,249,295	2,716,823	2,906,911	3,089,223	3,163,346
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	75,967	81,350	85,001	82,665	86,158
Dry (methane)	do.	52,100 ^r	57,400 ^r	60,300 ^r	61,900 ^r	68,100
Petroleum:						
Crude oil	million 42-gallon barrels	3,151	3,309	3,253	3,114	3,266
Condensate	do.	82	89	94	94	93
Natural gas liquids:						
Ethane	million cubic meters	10,100	11,200	10,600	10,700	10,600
Propane	thousand 42-gallon barrels	148,225	150,588	149,320	143,681	146,048
Butane	do.	91,060	94,148	94,338	92,684	94,483
Natural gasoline and other	do.	65,647	66,299	61,456	63,926	68,195
Refinery products:						
Liquefied petroleum gases	do.	13,400	12,740	14,730	11,521	11,300
Gasoline and naphtha	do.	198,570	198,870	186,420	188,644	200,610
Jet fuel and kerosene	do.	66,980	80,910	77,330	67,282	69,680
Distillate fuel oil	do.	234,890	236,370	241,790	238,496	247,440
Residual fuel oil	do.	172,790	177,970	181,000	174,385	174,380
Unspecified ⁴	do.	11,490	13,780	14,160	15,041	17,960
Total	do.	698,120	720,640	715,430	695,369	721,370

See footnotes at end of table.

TABLE 1—Continued
SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES¹

⁰Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ¹Revised. do. Ditto. NA Not available. -- Zero.

¹Table includes data available through November 20, 2009.

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

³Reported figure.

⁴Includes asphalt.

TABLE 2
SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Bauxite, low-grade for cement	Saudi Arabian Mining Co. (Ma'aden) (Government, 50%)	Central zone, Az Zabirah area	250,000
Cement:			
Grey portland	Yamama Cement Co. Ltd.	Riyadh	4,600
Do.	Yanbu Cement Co.	Yanbu	4,600
Do.	Saudi Cement Co.	Al Hofuf, about 120 kilometers southwest of Dammam	4,000
Do.	do.	Ayn Dar, about 120 kilometers southwest of Dammam	1,450
Do.	Najran Cement Co.	About 160 kilometers northwest of Najran	4,000
Do.	Eastern Province Cement Co.	Al Khursaniyah	3,500
Do.	Qassim Cement Co.	Jal al Watah, 18 kilometers north of Buraydah	3,500
Do.	Arabian Cement Co. Ltd.	Rabigh	3,100
Do.	Southern Province Cement Co. (Government, 52%)	Suq Al Ahad, 10 kilometers northeast of Jizan	2,600
Do.	do.	Bishah, 550 kilometers southeast of Jiddah	2,000
Do.	do.	Tihama	1,800
Do.	Northern Region Cement Co.	About 190 kilometers west-northwest of Arar	2,000
Do.	Riyadh Cement Co.	About 30 kilometers southwest of Riyadh	1,700
Do.	Tabuk Cement Co.	Tabuk	1,500
Do.	Al Safwa Cement Co. (Khayyat Group, 50%, and Lafarge Cement S.A., 50%)	Jabal Farasan	1,400 ¹
Do.	Al Jouf Cement Co.	South of Turaif	1,500 ¹
White	Al-Gharbiah Cement Factory	Jeddah	250
Do.	Saudi White Cement Co.	About 30 kilometers southwest of Riyadh	200
Copper, Cu content of ore	Saudi Arabian Mining Co. (Ma'aden) (Government, 50%)	Al Amar Mine, Ar Riyadh Province and Mahd Adh-Dahab Mine, Al Madinah Province	1,000
Gold kilograms	do.	Al Amar Mine, Ar Riyadh Province; Al-Hajar Mine, Asir Province; Bulgah Mine, ² Al Madinah Province; Mahd Adh-Dahab Mine, Al Madinah Province; and Sukhaybarat plant, ² Al Madinah Province	8,000
Kaolin	do.	Central zone, Az Zabirah	50,000
Petroleum:			
Crude million 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.	Ras Tanura	193
Do.	do.	Rabigh Refining & Petrochemical Co. (PetroRabigh) [Saudi Arabian Oil Co. (Saudi Aramco), 50%, and Sumitomo Chemical Co., 50%]	140 ³
Do.	do.	Saudi Aramco Mobil Refinery Co. Ltd. [Saudi Arabian Oil Co. (Saudi Aramco), 50%, and Mobil Yanbu Refining Company Inc., 50%]	140
Do.	do.	Saudi Aramco Shell Refining Co. [Saudi Arabian Oil Co., (Saudi Aramco), 50%, and Shell Saudi Arabia Refining Ltd., 50%]	110
Do.	do.	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	82
Do.	do.	Riyadh Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	50
Do.	do.	Jeddah Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	38

See footnotes at end of table.

TABLE 2—Continued
SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
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 Contracting of Saudi Arabia)	Yanbu	100
Zinc, Zn content of ore	Saudi Arabian Mining Co. (Ma'aden) (Government, 50%)	Al Amar Mine, Ar Riyadh Province and Mahd Adh-Dahab Mine, Al Madinah Province	2,000

Do., do. Ditto.

¹Under construction.

²The Bulgah Mine and the Sukhaybarat plant are operated by the Saudi Company for Precious Metals, which is a subsidiary of Saudi Arabian Mining Co. (Ma'aden).

³Rabigh Refining & Petrochemical Co. (PetroRabigh) was formed in late 2008 as a joint venture of Saudi Aramco and Sumitomo Chemical Co. PetroRabigh will operate the Rabigh refinery formerly managed by Saudi Aramco subsidiary Rabigh Petroleum Refining Co.