



2017–2018 Minerals Yearbook

SAUDI ARABIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF SAUDI ARABIA

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Note: In this chapter, information for 2017 is followed by information for 2018.

Saudi Arabia supplied the world with aluminum, ammonia, ammonium phosphate [diammonium phosphate (DAP) and monoammonium phosphate (MAP)], copper in concentrate, crude petroleum, gold, iron and steel, refined petroleum products, silver, sulfur, urea, and zinc. Saudi Arabia was the world's fourth-ranked producer of direct-reduced iron (DRI) according to Midrex Technologies Inc.'s world direct reduction statistics, and it was among the world's top 10 producers of ammonia, clinker, phosphate rock, pumice, and sulfur. Saudi Arabia was the world's 13th-ranked producer of cement in 2017. The country also produced basalt, coke, dolomite, feldspar, granite, gypsum, kaolin, industrial sand, limestone, magnesite, marble, refined lead, salt, sand and gravel, schist, and talc (table 1; Apodaca, 2019a, b; Crangle, 2019; Jasinski, 2019; Midrex Technologies Inc., 2019, p. 3; van Oss, 2019).

Saudi Arabia was the world's second-ranked producer of crude petroleum after the United States in 2017; it held the world's second largest proven crude petroleum reserves after Venezuela. The country's proven crude petroleum reserves were reported to be 266.2 billion barrels, which was 15.7% of the world's total. Saudi Arabia also was the sixth-ranked country in the world in terms of the volume of proven natural gas reserves; it held 8.0 trillion cubic meters of proven natural gas reserves, which was 4.2% of the world total in 2017. Saudi Arabia was the world's ninth-ranked producer of natural gas, accounting for 3.0% of total world production in 2017 (BP p.l.c., 2018, p. 12, 14, 26, 28).

Minerals in the National Economy

Saudi Arabia's economy was the leading economy in the Middle East and North Africa region and the world's 19th-ranked economy in terms of the value of its nominal gross domestic product (GDP), which was 2,582 billion Saudi riyals (\$688 billion¹) in 2017 compared with 24,185 Saudi riyals (\$645 billion) in 2016. The country's GDP decreased in real terms by 0.9% in 2017 compared with an increase of 1.7% in 2016 (Saudi Arabian Monetary Agency, 2018, p. 25; Worldometer, 2018).

The contribution of the mineral industry to the GDP (at current 2017 prices), which included crude petroleum, natural gas, and nonfuel minerals, was 25.4%. The nonfuel mining sector contributed about 0.5% to the GDP. The manufacturing sector, which included aluminum, electricity, fertilizer, natural gas processing, petroleum refining, and steel production, contributed 12.9% to the GDP; and the building and construction sector, 6.0% (Saudi Arabian Monetary Agency, 2018, p. 126).

¹Where necessary, values have been converted from Saudi riyals (SAR) to U.S. dollars (US\$) at an annual average exchange rate of SAR3.75=US\$1.00 for 2016, 2017, and 2018.

Government Policies and Programs

Royal Decree No. 47 M (the mining investment code) of October 4, 2004, regulates the mining and quarrying industry in Saudi Arabia. The Deputy Ministry of Mineral Resources (DMR) within the Ministry of Energy, Industry, and Mineral Resources (MEIM) supervises the country's mining activities, promotes investments, provides services, and issues mining licenses and concessions in the country. In 2017, the DMR issued licenses for mineral exploration, material collection, reconnaissance, and for four types of mining—building materials quarry, mining, raw materials quarry, and small mines. The mining investment code allows for the granting of mining rights to other corporations and individuals and for transferring them to other persons with technical and financial competence and expertise. In 2017, the DMR issued 1,994 licenses, including 1,288 for quarries that produced building materials; 542 for exploration; 94 for large-scale quarrying and mining of copper, gold, and zinc ores, and for such industrial minerals as clay, dolomite, iron, and schist; and 70 for small-scale mining of barite, clay, dolomite, feldspar, gypsum, industrial sand, iron sand, limestone, marble, perlite and pyrophyllite, pozzolan, salt, and sandstone (International Mining, 2012; General Authority of Statistics, 2018).

The Government planned to update its mining law to attract local and foreign investment in the country's mining and quarrying sector. The draft of a new mining law was expected to be released by the MEIM in 2018 for public comment. The MEIM managed the petroleum sector in the country through the Saudi Arabian Oil Co. (Saudi Aramco) and its subsidiaries (Ministry of Energy, Industry, and Mineral Resources, 2018).

In 2016, the Government announced that it planned to offer shares in Saudi Aramco for a maximum 5% equity in the company. The company had been under Government control since it was nationalized in the 1970s. Saudi Aramco's initial public offering (IPO) was expected to take place in 2018. The IPO was part of a larger Government plan (Vision 2030) to transform the Saudi economy. Vision 2030 aims to diversify the Saudi economy beyond the petroleum sector while addressing the budget deficits in place since the crash of petroleum prices in 2014 (Gross, 2017).

Production

Notable increases in Saudi Arabia's mineral commodity production in 2017 compared with that of 2016 included the increase in mined zinc (Zn content), by 755%; secondary lead, by 64%; copper (Cu content), by 56%; secondary aluminum, by nearly 52%; gold, by 47%; and silicomanganese, by 18%. The increase in zinc production was attributed to the resumption of Al Masane Al Kobra Mining Co.'s (AMAK's) mine operation in 2017 following a stoppage to increase capacity in 2016.

Notable decreases in mineral commodity production in 2017 compared with that of 2016 included nonmetallurgical (low-grade) bauxite, which decreased by 33%; hydraulic cement, by about 16%; urea, by 14%, and raw steel, by nearly 12%. Data on mineral production are in table 1.

Structure of the Mineral Industry

In 2017, the Government was the sole owner of Saudi Aramco and had majority interest in several companies that operated in the mineral fuels sector. The Government played a significant role in supporting the private mineral sector through the Public Investment Fund and the Saudi Industrial Development Fund. Major mining companies that operated in Saudi Arabia in 2017 included AMAK, Al-Ittefaq Group, Saudi Arabian Mining Co. (Ma'aden), Saudi Basic Industries Corp. (SABIC), and United Arabian Mining Co. (Manajem) as well as seventeen cement companies. Table 2 is a list of major mineral production facilities.

Ma'aden, which was a joint stock company, was owned by the Public Investment Fund (50%), the General Organization for Social Insurance (9.6%), the Public Pension Agency (7.45%), and private investors (32.95%). The company produced, through its subsidiaries, aluminum, alumina, gold, kaolin, metallurgical and low-grade bauxite, magnesite, phosphate rock and phosphate-based fertilizers, silver, and zinc. Ma'aden subsidiaries included three wholly owned companies: Ma'aden Infrastructure Co. (MIC), Industrial Minerals Co. (IMC), and Ma'aden Gold and Base Metals Co. (MGBM). Ma'aden Aluminum Co. (MAC), Ma'aden Bauxite and Alumina Co. (MBAC), and Ma'aden Rolling Co. (MRC) were joint ventures between Ma'aden (74.9%), and Alcoa Inc. of the United States (25.1%). Ma'aden Phosphate Co. (MPC) was a joint venture of Ma'aden (70%) and SABIC (30%). Ma'aden Wa'ad Al-Shamal Phosphate Co. (MWSPC) was a joint venture of Ma'aden (60%), Mosaic Co. of the United States (25%), and SABIC (15%). Ma'aden Barrick Copper Co. (MBCC) was a 50-50 joint venture of Ma'aden and Barrick Gold Corp. of Canada (table 2; Saudi Arabian Mining Co., 2018, p. 44; Saudi Basic Industries Corp., 2018).

Mineral Trade

Saudi Arabia's total exports increased by 21% to \$222 billion in 2017 from \$184 billion in 2016. The increase was attributed to the increase in crude petroleum prices on world markets, which, for Saudi Arabia, averaged \$52.59 per barrel in 2017 compared with \$40.96 per barrel in 2016. The value of Saudi Arabia's crude petroleum exports increased to \$137 billion in 2017 from \$112 billion in 2016, and that of refined petroleum products exports increased to \$33 billion from \$24 billion in 2016 (Organization of the Petroleum Exporting Countries, 2018, p. 90; Saudi Arabian Monetary Agency, 2018, p. 101).

In terms of volume, Saudi Arabia's crude petroleum exports averaged 7.0 million barrels per day (Mbbbl/d) in 2017, which was a 0.5 Mbbbl/d decrease from the 7.5 Mbbbl/d produced in 2016. Most of Saudi Arabia's crude petroleum exports went to Asia (68.5%) followed by the United States (14.1%), northwestern Europe (5.5%), the Mediterranean region (5.6%),

and other countries and regions (6.3%). Refined petroleum products exports increased to about 1.8 Mbbbl/d in 2017 from 1.5 Mbbbl/d in 2016. Forty-six percent of Saudi Arabia's refined petroleum products were shipped to the Asia and the Pacific region, followed by the Middle East (18%), Africa (15%), and Europe 14%. In 2017, Ma'aden's mineral exports included about 2.8 million metric tons (Mt) of ammonium phosphate, which was exported mainly to Brazil and India; 1.7 Mt of ammonia, to India and other countries in the Asia and the Pacific region; 576,000 metric tons (t) of aluminum, to Brazil, Egypt, India, Lebanon, Spain, and Turkey; 54,000 t of unspecified industrial minerals, to countries in the Asia and the Pacific region, Africa, and Europe; 35,500 t of copper concentrate, to India (60%) and China (40%); 30,000 t of alumina, to the United Arab Emirates; and 10,369 kilograms (kg) of gold, to Singapore and Switzerland (Organization of the Petroleum Exporting Countries, 2018, p. 8, 57, 59; Saudi Arabian Mining Co., 2018, p. 135; Saudi Arabian Oil Co., 2018, p. 80).

Saudi Arabia's exports of semifinished and finished steel products increased to 1.1 million metric tons per year (Mt/yr) on average in 2015–17 from 123,000 t in 2014. Imports of semifinished and finished steel products decreased by 38% to 4.6 Mt in 2017 from 7.4 Mt in 2016. The increase in steel products exports and the decrease in imports were attributed to a weak domestic demand for steel products because of the slowdown in construction sector activity throughout the country. Saudi Arabia's imports of DRI increased to 1.7 Mt in 2017 from 1.3 Mt in 2016, and iron ore imports increased slightly, to 6.7 Mt from 6.6 Mt in 2017 (World Steel Association, 2018a, p. 52, 55, 97, 104).

The value of Saudi Arabia's imports decreased, by 4% to \$134 billion in 2017 from \$140 billion in 2016. In 2017, jewelry imports, including gold and silver, increased to \$3.5 billion from \$3.0 billion in 2016. Saudi Arabia imported \$866 million of refined copper products and was the world's 13th-ranked net importer of steel products; it imported 3.5 Mt of finished and semifinished steel products in 2017 (Saudi Arabian Monetary Agency, 2018, p. 104; World Steel Association, 2018b p. 27).

Saudi Arabia's exports to the United States increased by 12% to \$18.9 billion in 2017 from \$16.9 billion in 2016. The increase was mainly attributed to the increase in the value of crude petroleum exports, which were valued at \$17.5 billion in 2017 compared with \$15.6 billion in 2016. Other mineral-related export categories from Saudi Arabia to the United States included organic chemicals (\$291 million), bauxite and aluminum (\$164 million), fertilizers (\$155 million), petroleum products (\$61 million), fuel oil (\$70 million), and precious metals other than gold (\$56 million). Saudi Arabia's imports from the United States decreased to \$16.3 billion in 2017 from about \$18.0 billion in 2016. The main mineral and mineral-related import categories were finished metals shapes (\$166 million), drilling and oilfield equipment (\$152 million), petroleum products (\$108 million), excavation machinery (\$90 million), iron and steel products (\$82 million), alumina and aluminum (\$5 million), steelmaking materials (\$14 million), and fertilizers (\$9 million) (U.S. Census Bureau, 2018a, b).

Commodity Review

Metals

Bauxite and Alumina, and Aluminum.—In 2017, MBAC produced 3.7 Mt of bauxite at Al Ba'itha, which was the country's sole metallurgical bauxite mine. The mine was located in Qassim Province about 600 kilometers (km) northwest of Ras Al Khair on the Gulf coast, where the country's sole alumina refinery and aluminum smelter were located. IMC produced low-grade bauxite at the Az Zabirah Mine, which was located in Ha'il Province. Bauxite ore was crushed at the Al Ba'itha Mine and transported by rail to the alumina refinery, where it was treated with a hot solution of caustic soda (NaOH) and the precipitating alumina (Al₂O₃) was separated and removed. At the end of 2017, the Al Ba'itha Mine's proven and probable reserves of metallurgical bauxite at a cutoff rate of 40% total available alumina (TAA) were reported to be 74.1 Mt grading 49.9% TAA and 7.7% silica dioxide (SiO₂) and 123.3 Mt grading 47.2% TAA and 10.1% SiO₂, respectively. Total metallurgical bauxite mineral resources at the Az Zabirah ML deposit at a cutoff rate of 52% TAA were reported to be 18.4 Mt, and those at the Az Zabirah Central prospect exploration project were 19.0 Mt (table 1; Saudi Arabian Mining Co., 2018, p. 82).

The Ras Al Khair alumina refinery had a nameplate capacity of 1.8 Mt/yr of alumina; it increased its output to about 1.5 Mt in 2017 from 1.4 Mt in 2016. The refinery supplied alumina for the MAC aluminum smelter and the MRC rolling mill (table 2; Saudi Arabian Mining Co., 2018, p. 81).

MAC increased its output of primary aluminum by 6% to 786,000 t in 2017 from 740,000 t (revised) in 2016. The company, which was one of the three operating companies at Ras Al Khair, ramped up production of flat-rolled aluminum products to 152,000 t in 2017 from 101,000 t in 2016 following the commissioning of the plant in 2014. The rolling mill plant was expected to have a total capacity of 430,000 metric tons per year (t/yr) (Saudi Arabian Mining Co., 2018, p. 81).

Copper and Zinc.—In 2017, Saudi Arabia's output of copper concentrate increased to 173,200 t from 110,000 t in 2016, and its zinc concentrate output increased to 43,574 t from 5,100 t in 2016. Copper and zinc production came from the Jabal Sayid Mine and the Masane Al Kobra Mine following the resumption of operations at the Masane Al Kobra Mine in 2017, which had been halted in 2016 to improve production capacity. The Masane Al Kobra Mine was located in Najran Province about 640 km southeast of Jeddah. By the end of January 2018, Joint Ore Reserves Committee (JORC)-compliant resources at the Al Houra and the Saadah mining zone were 5.8 Mt of ore. AMAK had been operating the mine since 2011, and in 2017, the projected mine life was another 8 years. AMAK was a joint venture of local investors (50%), Trecora Resources of the United States (33.4%), and Arab Mining Co. of Jordan (16.6%) (table 1; Al Masane Al Kobra Mining Co., 2018; Trecora Resources, 2018).

MBCC began precommercial production at the Jabal Sayid Mine in late 2015 and shipped its first copper in concentrate in early 2016. MBCC expected the mine's capacity to be 165,000 t/yr of copper in concentrate (44,000 t/yr of copper). Copper production continued to ramp up at the Jabal Sayid Mine in 2017. Production at the mine increased to 38,600 t of

copper in concentrate in 2017 from 14,800 t in 2016. The mine was expected to operate at full capacity in 2018. The Jabal Sayid project had an estimated 650,000 t of contained copper from measured and indicated mineral resources. The project was also expected to produce unspecified quantities of cobalt, lead, nickel, silver, sulfur, and zinc. The project's mining license permitted further mining exploration in the surrounding licensed area. MBCC planned to extend the mine's life, which was estimated to be 17 years (Saudi Arabian Mining Co., 2018, p. 106–107).

Gold.—MGBM increased gold production from the six mines that it operated in 2017, by 47% to 10,333 kg in 2017 from 7,010 kg in 2016. The company mined a total of 27 Mt of gold ore in 2017. Most of the increase in gold production in 2017 was due to a full year of production at the Ad Duwayhi Mine. The mine began production in October 2015; it produced 175 kg in 2016 and 5,073 kg in 2017. Production from other mines in 2017 included that of the Bulghah Mine, which produced 1,815 kg of gold, the Al Amar Mine (1,403 kg); the As Suq Mine (918 kg), the Mahd Adh-Dhahab Mine (716 kg), and the Sukhaybarat Mine (407 kg) (Saudi Arabian Mining Co., 2018, p. 82, 86, 102–103).

Gold and Minerals Ltd. was a joint venture of Abdul Rahman Saad Al-Rashid Co. (60% interest) and Kefi Minerals of Australia (40% interest) created to develop gold resources at the Jibal Qutman prospect and copper and gold at the Hawiah permit. The company set a 1 million-troy-ounce (31,100 kg) gold-equivalent deposit target for its exploration and development work at the Jibal Outman prospect, which is located in Saudi Arabia's underexplored Precambrian Shield. Gold and Minerals, which identified more than 700,000 troy ounces (21,800 kg) of gold-equivalent resources in 2017, was evaluating gold production at the Jibal Qutman open-pit, heap-leach operation and exploring for additional shallow gold resources at the site (Kefi Minerals, 2018).

Iron and Steel.—In 2017, Saudi Arabia's DRI output decreased to 4.81 Mt from 5.11 Mt in 2016 and crude steel production decreased to 4.83 Mt in 2017 from about 5.46 Mt in 2016. Saudi Iron and Steel Co. (Hadeed), which was a wholly owned subsidiary of SABIC, produced most of the country's crude steel and DRI. The other producer was Al-Ittefaq Steel Products Co. (ISPC), which was a subsidiary of Al-Ittefaq Group. ISPC was the largest private steel producer in Saudi Arabia; it comprised Al Faisal Steel Products Co., Arab Steel Co., Direct Reduction Iron Co. Ltd., Metal Recycling Mill, National Steel Co, and Tauwarqi Energy, all of which operated in Dammam in eastern Saudi Arabia. ISPC produced billet, DRI, reinforced steel bar and other semifinished and finished steel products. The company was building a 2.5-Mt/yr iron pelletization plant at its complex in Dammam (tables 1, 2; Al-Ittefaq Steel Products Co., 2018; World Steel Association, 2018a, p. 2).

Titanium.—A joint-venture of the National Industrialization Co. (Tasnee), the National Titanium Dioxide Co. Ltd. (Cristal) (32.5% interest each), and Toho Titanium Co. of Japan (35% interest) was building a new titanium sponge plant at Yanbu Industrial City on the Red Sea coast in Western Saudi Arabia. The plant would have the capacity to produce 15,600 t/yr of titanium sponge. The titanium sponge plant was expected to

start production in the second half of 2017 but startup was delayed to the second half of 2019 owing to technical problems. The plant would use titanium tetrachloride (TiCl_4) supplied by Cristal as feedstock. Cristal was owned by Tasnee (79%), Gulf Investment Corp. of Kuwait (20%), and Al Shair Group (1%) (Tasnee, 2017; Cristal, 2018; Trimble Solutions Corp., 2018).

Industrial Minerals

Cement.—According to the General Authority of Statistics of Saudi Arabia, the country's cement output decreased by 16% to 47.1 Mt in 2017 from 55.9 Mt in 2016. Operations at many cement plants in the country slowed in 2016 and 2017 compared with their output 2015 and 2014. The decrease was mainly attributed to the accumulation of a high inventory of clinker at cement plants, which was estimated to be 22.8 Mt at the end of 2015, owing to reduced activity in the construction sector. Seventeen companies operated 19 cement plants in Saudi Arabia in 2017. Southern Province Cement Co. was the leading producer of cement in the country in terms of tonnage (5.6 Mt), followed by Yanbu Cement Co. (5.4 Mt), Saudi Cement Co. (5.0 Mt), Yamama Cement Co. (4.2 Mt), and Arabian Cement Co. (3.5 Mt). Production at Southern Province Cement Co. decreased by 1.9 Mt to 5.6 Mt in 2017 from 7.5 Mt in 2016, and that of the Saudi Cement Co. decreased by about 2.4 Mt to 5.0 Mt in 2017 from about 7.4 Mt in 2016 (table 1; Global Cement, 2017; General Authority of Statistics, 2018).

Clay and Shale (Kaolin).—IMC was the main producer of kaolin in Saudi Arabia at its Az Zabirah Mine. In 2017, IMC's output of kaolin increased to 111,000 t in 2017 from 106,000 t in 2016. At the end of 2017, the company's total mineral resources of kaolin at the Az Zabirah ML and the Az Zabirah Central EL deposits totaled 223 Mt. Other unspecified companies produced 95,000 t in 2017 compared with 90,000 t in 2016 (Saudi Arabian Mining Co., 2018, p. 87, 98).

Nitrogen.—Saudi Arabia produced and exported nitrogen in four main forms: ammonia, DAP, MAP, and urea. Ma'aden produced ammonia at the Ras Al Khair complex for use in the manufacturing of DAP and MAP and for direct sales. The company nearly doubled its ammonia production to 2.3 Mt in 2017 from 1.2 Mt in 2016. Phosphate fertilizer production increased to about 2.9 Mt in 2017 from 2.7 Mt in 2016; the increase was attributed to ramping up production to full capacity of 3 Mt/yr (Saudi Arabian Mining Co., 2018, p. 96).

Saudi Arabian Fertilizer Co. (Safco) was a joint venture of SABIC (42.99%) and private investors (57.01%) created to produce, process, manufacture, and market ammonia and urea fertilizers. Safco comprised the National Chemical Fertilizer Co. (Ibn Al Bitar), which produced nitrogen fertilizer at its plant in Jubail Industrial City, and the Safco-5 urea plant, which was located 100 km north of Dammam in eastern Saudi Arabia. Safco-5 had the capacity to produce 1.1 Mt/yr of urea. Safco's total output of urea decreased to 5.1 Mt in 2017 from 5.9 Mt in 2016 (Saudi Arabian Fertilizer Co., 2018, p. 12; 2019, p. 16).

Phosphate Rock.—In 2017, MPC produced 5.67 Mt of concentrated phosphate rock at the Al Jalamid Mine and more than 2.8 Mt of ammonia phosphate fertilizer at the Ras Al Khair Industrial City. The company started phosphate rock production at the Al Khabra Mine, which had the capacity

to produce 12 Mt/yr of phosphate rock and 5 Mt/yr of concentrated phosphate. Estimates of phosphate rock reserves at the Al Jalamid, the Al Khabra and the Umm Wu'al deposits increased to 1,406 Mt in 2017 from 1,384 Mt in 2016 (Saudi Arabian Mining Co., 2018, p. 82–83; Jasinski, 2019).

MWSPC started producing ammonia, DAP and MAP, phosphoric acid, and sulfuric acid in 2017 at the Wa'ad Al Shamal phosphate rock and phosphate-based fertilizer project. The project, which was located about 45 km northeast the town of Turaif in the Al Hudud as Shmaliyah Region, included the Al Khabra phosphate rock mine and six phosphate manufacturing plants; it was expected to have the capacity to produce 15 Mt/yr of phosphate rock, 5.3 Mt of concentrated phosphate, 5 Mt of sulfuric acid, 3 Mt/yr of DAP, and 1.1 Mt of ammonia (Saudi Arabian Mining Co., 2018, p. 13–14, 37–45; Jasinski, 2019).

At the end of 2017, Saudi Arabia's phosphate rock proven and probable phosphate ore reserves were estimated to be 725 Mt grading 17.5% P_2O_5 and 675 Mt grading 16.1% P_2O_5 , respectively. The main reserves were at the Al Jalamid, the Al Khabra and the Umm Wu'al sites, which are located in the northern part of the country (Saudi Arabian Mining Co., 2018, p. 82).

Sulfur.—Production of sulfur had been steadily increasing since 2013, to 6.5 Mt in 2017 from 3.9 Mt in 2013. Most sulfur output, which was produced solely by Saudi Aramco as a byproduct of natural gas and petroleum refining operations, was exported. Sulfur exports decreased to 3.0 Mt in 2017 from 3.6 Mt (revised) in 2016 (table 1; Saudi Arabian Mining Co., 2018, p. 77).

K+S Group of Germany acquired a 30% equity interest in the Al-Biariq for Fertilizer Plant Co., Ltd. (Al-Biariq) in Saudi Arabia. Al-Biariq was a manufacturer of fully soluble potassium sulfate. In 2017, Al-Biariq doubled its soluble potassium sulfate production capacity to 40,000 t/yr (K+S Aktiengesellschaft, 2016).

Mineral Fuels

Natural Gas.—Saudi Aramco's production of dry natural gas increased to 109.3 billion cubic meters in 2017 from 105.3 billion cubic meters in 2016. Natural gas output came from both onshore and offshore fields. Offshore gasfields included the Arabiyah, the Habshan, and the Karan Fields, and onshore natural gasfields were associated with major Saudi crude oilfields, including the Ghawar, the Safaniya, and the Zuluf Fields. Saudi Arabia had been gradually increasing its output of natural gas in recent years and planned to double output in the next decade to meet increased domestic demand (BP p.l.c., 2018, p. 28; Saudi Arabian Oil Co., 2018, p. 76).

In October 2015, Saudi Aramco completed the construction of the Wasit gas plant, which was located in Jubail Industrial City, and started processing natural gas fed from two offshore gasfields near the eastern coast of Saudi Arabia. The plant had the capacity to process about 27.8 billion cubic meters per year of nonassociated natural gas and about 88 million barrels per year of natural gas liquids. Saudi Aramco completed the construction of Midyan gas plant in the Tabuk region in northwestern Saudi Arabia in 2017. The plant had the capacity to produce 2.1 million cubic meters per day of nonassociated natural gas and 4,500 barrels per day of condensate.

Saudi Aramco planned to build the greenfield Fadhili gas plant 30 km west of Jubail in the Ash Sharqiyah Region. The plant would process natural gas from offshore and onshore fields to produce 70.8 million cubic meters per day of natural gas by 2019. The Fadhili gas plant would be able to recover 99.9% of the sulfur contained in the natural gas (Saudi Arabian Oil Co., 2018, p. 24, 28).

Petroleum.—Saudi Arabia's crude petroleum and condensate output decreased to 10.2 Mbbbl/d in 2017 from 10.7 Mbbbl/d in 2016. In 2017, Saudi Aramco continued to focus on maintaining a petroleum production capacity of 12 Mbbbl/d and increasing its nonassociated natural gas-processing capacity to 141.6 million cubic meters per day by 2019 (Saudi Arabian Oil Co., 2017, p. 14, 23, 2018, p. 76).

Saudi Aramco had nine domestic refineries with a combined capacity of 2.9 Mbbbl/d. Saudi Aramco produced refined petroleum products through its four wholly owned subsidiaries in Jeddah, Ras Tanura, Riyadh, and Yanbu, and five joint ventures with major international oil companies. These joint ventures included Rabigh Refining & Petrochemical Co. (PetroRabigh) of Saudi Aramco and Sumitomo Chemical Co. of Japan (37.5% each) and private investors (25%); Saudi Aramco Mobil Refining Co. Ltd. (SAMREF) of Saudi Aramco (50%) and Mobil Yanbu Refining Co. Inc. (a subsidiary of Exxon Mobil Corp. of the United States) (50%); Saudi Aramco Shell Refining Co. (SASREF) of Saudi Aramco (50%) and Shell Saudi Arabia Refining Ltd. (50%); Saudi Aramco Total Refining and Petrochemical Co. (SATORP) of Saudi Aramco (62.5%) and Total S.A. of France (37.5%); and Yanbu Aramco Sinopec Refining Co. Ltd. (YASREF) of Saudi Aramco (62.5%) and China Petrochemical Corp. (SINOPEC) (37.5%) (Saudi Arabian Oil Co., 2017, p. 76).

Saudi Aramco continued construction at the Jazan refinery and terminal project at Jazan Economic City in southwestern Saudi Arabia. The project was designed to build a 400,000 bbl/d-capacity refinery capable of processing Arabian Heavy and Medium crude petroleum and to install an integrated gasification combined cycle (IGCC) powerplant, which would have the capacity to generate 4,000 megawatts of electricity. The completion of the Jazan refinery and the IGCC powerplant was expected by yearend 2019 (table 2; Saudi Arabian Oil Co., 2017, p. 26; 2018, p. 34).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

The economy of Saudi Arabia grew by 2.2% in 2018 compared with a contraction of 0.7% (revised) in 2017 at 2010 constant prices. The GDP amounted to 2,934 billion Saudi riyals (\$782 billion) in 2018 compared with 2,582 billion Saudi riyals (\$688 billion) in 2017. The contribution of the mineral industry to the GDP (at current 2018 prices), which included nonfuel minerals, crude petroleum, and natural gas, was 30.1%. The nonfuel mining sector's contribution to the GDP was about 0.4%. Industrial activity, which included aluminum, electricity, fertilizer, and steel production, natural gas processing, and petroleum refining, contributed 12.8% to the GDP; the building and construction sector contributed 5.1%. The value added of the crude petroleum and natural gas activities increased

by 3.2%; the value of other mining and quarrying activities increased by 2.7%; and the value added of construction sector activity decreased by 3.1% in 2018 (Saudi Arabian Monetary Agency, 2019, p. 27, 135).

In 2018, the DMR posted a draft of the country's new mining law for public comment. The new law was not finalized by yearend. The DMR reported a total of 2,045 valid mining and exploration licenses in 2018. They included 1,342 licenses for construction materials (sand and stone); 545 licenses for mineral exploration; 94 licenses for the mining of mineral ores (gold, copper, iron ore, phosphate rock, and zinc); and 69 licenses for small-scale mining operations (barite, clay, gypsum, limestone, and salt) (Saudi Arabian Monetary Agency, 2019, p. 49).

Production

Notable increases in mineral commodity output in 2018 compared with that of 2017 included output of ferromanganese, which increased by 130%; dead-burned magnesite, 117%; secondary aluminum, 51%; copper (Cu content) 37%; copper (gross weight); 36%, silicomanganese, 31%; urea, 28%; gold, 25%; alumina, 20%; silver, 14%; calcined caustic magnesite, 13%; diammonium phosphate fertilizer, 11%; and zinc (Zn content and gross weight), 10% each. Notable decreases included output of naphtha, which decreased by 19%; asphalt, 18%; secondary lead, 17%; and hydraulic cement, 11% (table 1).

Mineral Trade

Saudi Arabia's total exports increased by 32% to \$294 billion in 2018 from \$222 billion in 2017. The increase was attributed to an increase in crude petroleum prices in world markets, which for Saudi Arabia averaged \$70.59 per barrel in 2018 compared with \$52.59 per barrel in 2017. Saudi Arabia's crude petroleum exports increased to \$188 billion in 2018 from \$137 billion in 2017, and exports of refined petroleum products increased to \$44 billion from \$33 billion in 2017 (Organization of the Petroleum Exporting Countries, 2019, p., 90; Saudi Arabian Monetary Agency, 2019, p. 112).

In terms of volume, Saudi Arabia's petroleum (crude and refined) exports averaged 9.34 Mbbbl/d in 2018 compared with 8.4 Mbbbl/d in 2017. Saudi crude petroleum exports went to the Asia and the Pacific region (67.6%) followed by North America (13.8%), Europe (11.8%), the Middle East (3.6%), Africa (2.2%), and South America (1.0%). In 2018, Ma'aden's mineral exports included about 3.13 Mt of ammonium phosphate, which were shipped mainly to countries in the Asia and the Pacific region, Brazil, and India; 1.35 Mt of ammonia, to the Asia and the Pacific region and India; 501,000 t of aluminum, mainly to Brazil, Egypt, India, Lebanon, Turkey, and Vietnam; 311,000 t of alumina, to other Gulf countries; 217,000 t of copper concentrate, to China, India, and Japan; 61,000 t of unspecified industrial minerals, to countries in the Asia and the Pacific region, Africa, and Europe; and about 13,000 kg of gold, to Singapore and Switzerland (Organization of the Petroleum Exporting Countries, 2019, p. 8, 57, 59; Saudi Arabian Mining Co., 2019, p. 131–134).

Commodity Review

Metals

Bauxite and Alumina, and Aluminum.—In 2018, Saudi Arabia, which had the capacity to produce 4.6 Mt/yr of metallurgical bauxite, mined about 3.9 Mt of metallurgical bauxite at the Al-Ba'itha Mine; refined nearly 1.8 Mt of alumina; and smelted 802,000 t of primary aluminum and 130,000 t of recycled cans at the Ras Al-Khair refinery. The country also produced 231,000 t of flat-rolled products at its aluminum rolling mill in Ras Al-Khair, which had the capacity to produce 460,000 t/yr of rolled products and to recycle 130,000 t/yr of aluminum cans (Saudi Arabian Mining Co., 2019, p. 101).

Copper and Zinc.—MBCC produced 50,340 t of copper in 2018, which was a record output for the company and the country compared with 38,587 t in 2017; the company had a production target of 45,573 t for 2019. The increase in copper output by MBCC was attributed to the processing and throughput of higher grade ore. MGBM produced 18,000 t of zinc concentrate and 10,000 t of copper concentrate as byproducts from its Al Amar gold mine. Ore reserves at the Jabal Sayid Mine as of yearend 2018 were 27.1 Mt grading 2.38% copper and 0.24 g/t gold. AMAK's copper output from the Al Masane Mine increased to 6,000 t in 2018 from 2,649 t in 2017. Zinc production at the AMAK Mine increased to 15,051 t in 2018 from 6,730 t in 2017 (Saudi Arabian Mining Co., 2019, p. 82, 109; Trecora Resources, 2019, p. 19–20).

Gold.—MGBM produced a total of 12,905 kg of gold in 2018 compared with 10,333 kg in 2017. The company's active mines were the Ad Duwayhi, the Mahd Ad Dhahab, the Al Amar, the Bulghah, the Sukhaybarat, and the As Suq Mines. MGBM planned to reach production capacity of 31,100 kilograms per year by 2025; most of the increase in production would come from the Ar Rjum and the Mansourah-Massarrah Mines, which were expected to be commissioned by 2023. Reserves at the Ad Duwayhi Mine were estimated to be 51.1 t of gold (table 1; Saudi Arabian Mining Co., 2019, p. 14, 105–106).

AMAK began an independent feasibility study for the Jabal Guyan gold project, which is located 190 km east of the city of Khamis Mushait in southwestern Saudi Arabia. The Jabal Guyan deposit was estimated to contain about 4,700 kg of gold. The company completed an advance scoping study and exploration drilling program in 2017 (Al Masane Al Kobra Mining Co., 2019).

Iron and Steel.—Although raw steel production increased to 5.2 Mt in 2018 from 4.8 Mt in 2017, the country's production was significantly less than the 2014 output of 6.29 Mt. Similarly, DRI output, which increased to 5.0 Mt in 2018 from 4.8 Mt in 2017, was still less than the 2014 output of 6.5 Mt. The decrease in DRI and raw steel output was attributed to decreased domestic demand, especially that of the construction and building materials sector (table 1; Saudi Arabian Monetary Agency, 2019, p. 136).

Industrial Minerals

Cement.—Saudi Arabia's cement production continued its decline since its peak of 61.9 Mt in 2015, which was the country's highest production; it decreased to 42.2 Mt in 2018 from 47.1 Mt in 2017. The decrease was attributed to weak domestic demand because of limited Government capital spending and rising construction costs. The cement sector was expected to partially recover in the next 5 years with the startup of the Government's mega projects, including the building of a new city (Neom) and other touristic complexes on the Red Sea (table 1; Davids, 2019).

Nitrogen and Phosphate Rock.—In December, MWSPC started commercial phosphate fertilizer production at the Wa'ad Al-Shamal phosphate project. The company signed an engineering, procurement, and construction contract to build a third ammonia plant, which had a planned capacity of 1.1 Mt/yr. The ammonia plant, which would feed ammonia to the phosphate fertilizer plant, was expected to be completed in 2021. The phosphate fertilizer plant was expected to increase its capacity by 1 Mt/yr each year in 2023, 2024, and 2025 (Saudi Arabian Mining Co., 2019, p. 95).

Mineral Fuels

Natural Gas and Petroleum.—Saudi Aramco crude petroleum production increased slightly to 3,766 million barrels (Mbbbl) in 2018 from 3,635 Mbbbl in 2017. Natural gas production increased to 112.3 billion cubic meters in 2018 from 109.3 billion cubic meters in 2017 (table 1; Saudi Arabian Oil Co., 2019, p. 6). The major onshore oilfields in Saudi Arabia included the Ghawar Field, which was the world's largest conventional oilfield in 2017; it had the capacity to produce 5.8 Mbbbl/d; the Khurais Field (1.2 Mbbbl/d); the Shaybah Field (1 Mbbbl/d); the Khurasaniyah and the Qatif Fields (0.5 Mbbbl/d each); and the Abqaiq Field (0.4 Mbbbl/d). The Safaniya (1.2 Mbbbl/d), the Manifa (0.9 Mbbbl/d), and the Zuluf (0.68 Mbbbl/d) Fields were the country's main offshore oilfields. Most natural gas production in Saudi Arabia comes from oilfields as a byproduct of crude petroleum and condensate production; however, the country's main offshore gasfields (the Arabiyah, the Habshan, and the Karan Fields) produced only natural gas (table 2; U.S. Energy Information Administration, 2017, p. 6, 14).

Outlook

The output of most metals is expected to significantly increase in the next 5 years as Ma'aden affiliates ramp up production of aluminum, copper, and gold. Titanium sponge production by the Cristal-Taho-Tasnee joint venture is expected to restart in 2019. Saudi Arabia's production of phosphate rock and phosphate-based products is expected to increase in the short and medium terms as Ma'aden has set a production target of 9 Mt/yr of ammonium phosphate following the completion of its third phosphate project by 2024. Consequently, exports of aluminum, ammonium phosphate, copper, gold, sulfur, titanium sponge, urea, and zinc are also likely to increase in the next 5 years because of planned production increases of these commodities. The growth of the building and construction sector is likely to remain dependent mainly on Government contracts and programs upon the approval of major housing, tourism, and

infrastructure projects throughout the country. By contrast, the slowdown in the building and construction sector in 2016–18 is expected to continue in 2019. Thus, consumption of cement, steel products, and other building and construction materials is expected to continue to decrease in 2019 owing to weak domestic demand.

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TABLE 1
 SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons, gross weight, unless otherwise specified)

Commodity ²	2014	2015	2016	2017	2018	
METALS						
Aluminum:						
Bauxite	1,096 ^r	1,148 ^r	3,843	3,708	3,885	
Alumina	23	846	1,429	1,484	1,774	
Metal:						
Primary	662	682 ^r	740 ^r	786	802	
Secondary	--	59	101	153	231	
Copper, mine, concentrates:						
Gross weight	metric tons	33,116	46,253	110,000 ^r	173,200	235,200
Cu content	do.	10,800 ^r	11,600 ^r	27,500 ^r	43,000	58,800
Ferroalloys:						
Ferromanganese	do.	8,000	7,000	10,000	10,000	23,000
Silicomanganese	do.	60,000	63,000	55,000 ^r	65,000	85,400
Gold, mine, Au content	kilograms	4,954	5,078 ^r	7,010 ^r	10,333	12,905
Iron and steel:						
Direct-reduced iron		6,460	5,800	5,119 ^r	4,812	5,000
Steel, raw steel		6,291	5,229 ^e	5,461	4,831	5,240
Lead, smelter, secondary	metric tons	36,000 ^e	37,000 ^e	50,000 ^e	82,000	68,000
Silver, mine, Ag content	kilograms	4,800	4,500	4,710 ^r	5,069	5,760
Zinc, mine, concentrate:						
Gross weight	metric tons	39,798	39,008	5,100 ^r	43,574	48,000
Zn content	do.	17,350 ^r	18,757 ^r	2,550 ^r	21,800	24,000
INDUSTRIAL MINERALS						
Barite		32	-- ^r	-- ^r	--	--
Bauxite, low grade		1,086 ^r	797 ^r	625 ^r	417	438
Cement, hydraulic		57,223	61,900	55,943 ^r	47,134	42,181
Clay:						
Kaolin		106	187 ^r	196 ^r	206	216
Unspecified		7,220	7,650	9,240 ^r	9,702	10,187
Feldspar, mine		168 ^r	179 ^r	188 ^r	197	206
Fertilizers, diammonium phosphate		2,301	2,656	2,723	2,859	3,170
Gypsum		1,780 ^r	2,780 ^r	3,000 ^r	3,150	3,307
Magnesite:						
Caustic-calcined		36 ^r	37 ^r	36 ^r	38	43
Dead-burned		--	--	--	12	26
Nitrogen, N content:						
Ammonia		3,600	3,040 ^r	3,684 ^r	4,000	4,300
Urea		2,229	2,248	2,100 ^r	1,800	2,300
Phosphate rock:						
Gross weight		3,425	4,100	5,400 ^r	5,670	6,090
P ₂ O ₅ content		1,096 ^r	1,281 ^r	1,730 ^r	1,800	1,949
Pumice and related minerals, pozzolan		480	480 ^r	504 ^r	509	555
Salt		1,990	2,000 ^r	2,400 ^r	2,520	2,646

See footnotes at end of table.

TABLE 1—Continued
SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons, gross weight, unless otherwise specified)

Commodity ²	2014	2015	2016	2017	2018
Sand and gravel, industrial, unspecified	1,210 ^r	1,230 ^r	1,300 ^r	1,365	1,433
Stone, sand, and gravel, construction:					
Sand and gravel:					
Common sand	30,400	31,800	22,155	23,000	24,000
Gravel	315,000	330,000	347,000	364,000	382,200
Iron sand	676	708	706 ^r	741	778
Stone:					
Crushed:					
Basalt	--	--	30 ^r	32	33
Dolomite	191 ^r	203 ^r	2,131 ^r	2,237	2,348
Limestone, for cement	59,500	60,000 ^r	63,000 ^r	66,150	69,457
Marble, for industrial use	3,150	2,700 ^r	2,800 ^r	2,940	2,947
Schist, scoria	680	576 ^r	604 ^r	634	665
Dimension:					
Granite, block	1,155 ^r	1,100 ^r	1,053 ^r	1,105	1,160
Limestone, block	1,260	132 ^r	104 ^r	109	114
Marble, block	115 ^r	219 ^r	120 ^r	126	132
Sulfur, all forms and sources, unspecified, S content, hydrocarbon processing	4,400	4,900	6,000	6,500	6,500 ^e
Talc and related minerals, pyrophyllite	7	40 ^r	42 ^r	44	46
MINERAL FUELS AND RELATED MATERIALS					
Natural gas:					
Gross					
million cubic meters	117,000	120,000	124,000	129,000	133,000 ^e
Dry basis	97,300 ^r	99,200 ^r	105,300 ^r	109,300	112,300
Ethane	9,365 ^r	9,210 ^r	9,513 ^r	9,678	9,800 ^e
Petroleum:					
Crude					
million 42-gallon barrels	3,545	3,720 ^r	3,818 ^r	3,635	3,766
Natural gas liquids:					
Butane	114 ^r	120	120	127	130 ^e
Condensate	84	83	83	79	79
Natural gasoline	87	91	91	91	90 ^e
Propane	177 ^r	181	181 ^r	191	195 ^e
Refinery:					
Asphalt	20	22	18	17	14
Coke	9	27	80 ^r	84	84
Distillate fuel oil	275	351	385 ^r	394	392
Gasoline	161	180	202	204	199
Kerosene	77	77	90 ^r	90	96
Liquefied petroleum gas	16	17	16 ^r	16	17
Naphtha	70	69	76 ^r	74	60
Residual fuel oil	176	163 ^r	168	170	166
Total	800	900 ^r	1,000 ^r	1,000	1,000

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through October 28, 2019. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²In addition to the commodities listed, carbon black, lime, and methanol may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Ma'aden Bauxite and Alumina Company (MBAC) [Saudi Arabian Mining Co. (Ma'aden), 74.9%, and Alcoa Inc., 25.1%]	Refinery at Ras Al Khair, Jubail Industrial City	1,800
Aluminum:			
Primary	Ma'aden Aluminium Co. (MAC) [Saudi Arabian Mining Co. (Ma'aden), 74.9%, and Alcoa Inc., 25.1%]	Smelter at Ras Al Khair, Jubail Industrial City	800
Secondary	Ma'aden Rolling Co. (MRC) [Saudi Arabian Mining Co. (Ma'aden), 74.9%, and Alcoa Inc., 25.1%]	Rolling plant at Ras Al Khair, Jubail Industrial City	460
Bauxite:			
Metallurgical	Ma'aden Bauxite and Alumina Company (MBAC) [Saudi Arabian Mining Co. (Ma'aden), 74.9%, and Alcoa Inc., 25.1%]	Mine at Al Ba'itha, Ha'il Region	4,600
Low-grade	Industrial Minerals Co. (IMC) [Saudi Arabian Mining Co. (Ma'aden), 100%]	Az Zabirah Mine, Ha'il Region	1,100
Caustic soda	Sahara and Ma'aden Petrochemical Co. (SAMAPCO) [Sahara Petrochemical Co., 50%, and Saudi Arabian Mining Company (Ma'aden), 50%]	Plant at Ras Al Khair, Jubail Industrial City, Ash Sharqiyah Region	25
Do.	Arabian Alkali Co. (SODA)	Plant at Jubail Industrial City	55
Do.	Saudi Factory for Chlorine and Alkalies (SACHLO)	Plant at Riyadh	NA
Cement:			
Gray portland	Al Jouf Cement Co.	Plant South of Turaif	1,750
Do.	Al Madinah Cement Co.	Plant at Al Madinah, Madinah Region	3,000
Do.	Al Safwa Cement Co. (El Khayat Group, 50%; General Pension Agency, 25%; General Organization for Social Insurance, 25%)	Plant in Makka Region	2,000
Do.	Arabian Cement Co. Ltd.	Plant at Rabigh, Makkah Region	4,800
Do.	Eastern Province Cement Co.	Plant at Al Khursaniyah, Ash Sharqiyah Region	3,400
Do.	Hail Cement Co.	Plant at Turba, Hail Region	2,000
Do.	Najran Cement Co.	Plant at Aakfa, Najran Region	3,000
Do.	Northern Region Cement Co.	Plant at Turaif, Al Hudud ash Shamaliyah Region	1,700
Do.	Qassim Cement Co.	Plant at Jal al Watah, Buraydah, Qassim Region	4,000
Do.	Riyadh Cement Co.	Plant at Riyadh	3,800
Do.	Saudi Cement Co.	Plant at Al Hofuf, 120 kilometers southwest of Dammam	8,600
Do.	Southern Province Cement Co. (Government, 52%)	Plant at Suq Al Ahad, Jazan	7,500
Do.	do.	Plant at Bishah, southeast Jiddah	2,000
Do.	do.	Plant at Tihama	1,800
Do.	Tabuk Cement Co.	Plant at Tabuk	1,300
Do.	Yamama Cement Co. Ltd.	Plant at Riyadh	6,300
Do.	Yanbu Cement Co.	Plant at Yanbu, Al Madinah Region	6,400
White	Al-Gharbiah Cement Factory	Plant at Jeddah	250
Do.	Saudi White Cement Co.	Plant 30 kilometers southwest of Riyadh	200
Clay, kaolin	Ma'aden Industrial Minerals Co. (IMC) [Saudi Arabian Mining Co. (Ma'aden)]	Mine at Ranyah in Makkah Region	120
Do.	Unspecified producers	NA	100
Copper in concentrate	Ma'aden Barrick Copper Co. (MBCC) [Barrick Gold Corp., 50%, and Saudi Arabia Mining Co. (Ma'aden), 50%]	JabaL Sayid Mine, Al Madinah Region	220
Do.	Al Masane Al Kobra Mining Co. (AMAK) (local investors, 50%; Trecora Resources, 35%; Arab Mining Co., 15%)	Al Masane Mine, Najran Region	50

See footnotes at end of table.

TABLE 2—Continued
SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Direct-reduced iron		Saudi Iron and Steel Co. (Hadeed) [Saudi Basic Industries Corp. (SABIC), 100%]	Plants A, B, C, D, and E, Jubail, Ash Sharqiyah Region	5,500
Do.		Direct Reduction Iron Co. Ltd. (Al-Ittefaq Group, 100%)	Plants I and II, Dammam, Ash Sharqiyah Region	1,300
Dolomite		Saudi Lime Industries Co.	Mine and plant at Riyadh	1,000
Do.		Saudi Dolomite Co. Ltd.	Mine and and plant at Al Khobar	1,500
Feldspar		United Mining Investment Co.	Mine at Rabigh	30
Do.		Al Rashed Cement	Dammam, Ash Sharqiyah Region	NA
Ferroalloys		Gulf Ferro Alloys Co. (SABAYEK)	Plant at Jubail Industrial City, Ash Sharqiyah Region	140,000
Gold	kilograms	Ma'aden Gold and Base Metals Co. (MGBMC) [Saudi Arabian Mining Co. (Ma'aden)]	Al Amar Mine, Ar Riyadh Region; Ad Duwayhi Mine, Makkah Region; Al-Hajar Mine, Asir Region; As Suq Mine, Makkah Region; Bulghah Mine, Al Madinah Region; Mahd Adh-Dhahab Mine, Al Madinah Region; Sukhaybarat Mine, Al Madinah Region	13,000
Granite	cubic meters	Red Sea Mining Co. Ltd.	11 quarries in Najran Region and Ranyah in Makkah Region	18,000
Do.	do.	Tanhat Mining Co. Ltd.	Quarries in Jamour (1), Najran (2), Ranyah in Makkah Region (2), Rowaidah (3), and Samakh (1)	360,000
Gypsum		National Gypsum Co.	Plants at Damman, Jeddah, Riyadh, Yanbu	960
Do.		Al-Zahid Industrial and Mining Group	Quarry at Taymah, Tabouk Region	NA
Do.		Mada Gypsum Co. (Al Rajhi Holding, 100%)	Plant at Yanbu Industrial City	400
Do.		Global Gypsum Co. Ltd.	do.	300
Lime:				
Hydrated		Astra Mining (Astra Industrial Group, 60%, and Tharawat Holding, 40%)	Plant at Al Kharj Industrial City	66
Do.		Saudi Lime Industries Co.	Plant at Riyadh	100
Quick		Astra Mining (Astra Industrial Group, 60%, and Tharawat Holding, 40%)	Plant Al Kharj Industrial City	99
Do.		Saudi Lime Industries Co.	Plant at Riyadh	400
Magnesite:				
Crude ore		Ma'aden Industrial Minerals Co. (IMC) [Saudi Arabian Mining Co. (Ma'aden)]	Mine at Al Ghazalah, Al Madinah Region	90
Cuastic calcined		do.	Processing plant, Al-Madinah Al-Munawwara Industrial City	39
Dead burned		do.	do.	32
Methanol		Saudi Methanol Co. (Ar-Razi) [Mitsubishi Gas Chemical Consortium, 50%, and Saudi Basic Industries Corp. (SABIC), 50%]	Jubail Industrial City, Ash Sharqiyah Region	850
Do.		National Methanol Co. (Ibn Sina) [Saudi Basic Industries Corp. (SABIC), 50%; Celanese Corp., 25%; Duke Energy, 25%]	do.	1,000
Natural gas, gross	million cubic meters	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	Arabiyah gasfield, offshore	12,408
Do.	do.	do.	Gawar Field, onshore	75,000
Do.	do.	do.	Hasbah gasfield, offshore	34,122
Do.	do.	do.	Karan gasfield, offshore	18,612
Do.	do.	do.	Safaniya oilfield, offshore	10,000
Do.	do.	do.	Zuluf oilfield, offshore	10,000

See footnotes at end of table.

TABLE 2—Continued
SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners		Location of main facilities	Annual capacity
Natural gas, gross— Continued	million cubic meters	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)		Wasit gas processing plant, Jubail Industrial City	27,800
Nitrogen:					
Ammonia		Al Jubail Fertilizer Co. (Al-Bayroni) [Saudi Basic Industries Corp. (SABIC), 50%, and Taiwan Fertilizer Co. Ltd., 50%]		Plant at Jubail Industrial City	1,200
Do.		Ma'aden Phosphate Co. (MPC) [Saudi Arabian Mining Co. (Ma'aden)]		Plant at Ras Al Khair, Jubail Industrial City, Ash Sharqiyah Region	1,200
Do.		Ma'aden Wa'ad Al- Shamal Phosphate Mining Co. (MWSPC) [Saudi Arabia Mining Co. (Ma'aden), 60%; Mosaic Co., 25%; Saudi Basic Industries Corp. (SABIC), 15%]		Plant at Ras Al Khair, Jubail Industrial City, Ash Sharqiyah Region	1,200
Do.		Saudi Arabian Fertilizer Co. (Safco) [Saudi Basic Industries Corp. (SABIC), 42.99%; public investors, 44.77%; General Organization for Social Insurance, 12.24%]		Plant at Jubail Industrial City, Ash Sharqiyah Region	2,300
Do.		National Chemical Fertilizer Co. (Ibn Al-Baytar) [Saudi Basic Industries Corp. (SABIC), 50%, and Saudi Arabian Fertilizer Co. (Safco), 50%]		do.	1,200
Urea		do.		do.	2,600
Petroleum:					
Crude	million 42-gallon barrels	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)		Ghawar oilfield, onshore	2,117
Do.	do.	do.		Safaniya oilfield, offshore	438
Do.	do.	do.		Shaybah oilfield, onshore	365
Do.	do.	do.		Manifa oilfield, onshore	328
Do.	do.	do.		Qatif oilfield, onshore	182
Do.	do.	do.		Khursaniyah oilfield, offshore	182
Do.	do.	do.		Zuluf oilfield, offshore	248
Do.	do.	do.		Abqaiq oilfield, onshore	146
Refined products	do.	Jeddah Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]		Refinery at Jeddah	32
Do.	do.	Rabigh Refining & Petrochemical Co. (PetroRabigh) [Saudi Arabian Oil Co. (Saudi Aramco), 37.5%; Sumitomo Chemical Co., 37.5%; private investors, 25%]		Refinery at Rabigh, Makkah Region	146
Do.	do.	Riyadh Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]		Refinery at Riyadh	45
Do.	do.	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)		Refinery at Ras Tanura, Jubail	201
Do.	do.	do.		Refinery Yanbu, Al Madinah Region	86
Do.	do.	Saudi Aramco Mobil Refinery Co. Ltd. (SAMREF) [Saudi Arabian Oil Co. (Saudi Aramco), 50%, and Mobil Yanbu Refining Co. Inc., 50%]		do.	146
Do.	do.	Saudi Aramco Shell Refining Co. [Saudi Arabian Oil Co., (Saudi Aramco), 50%, and Shell Saudi Arabia Refining Ltd., 50%]		Refinery at Jubail, Ash Sharqiyah Region	113
Do.	do.	Saudi Aramco Total Refining and Petrochemical Co. (SATORP) [Saudi Arabian Oil Co. (Saudi Aramco), 62.5%, and Total S.A., 37.5%]		Refinery at Jubail, Ash Sharqiyah Region	146
Do.	do.	Yanbu Aramco Sinopec Refining Co. Ltd. (YASREF) [Saudi Arabian Oil Co. (Saudi Aramco), 62.5%, and China Petrochemical Corp. (SINOPEC), 37.5%]		Refinery at Yanbu, Al Madinah Region	146

See footnotes at end of table.

TABLE 2—Continued
SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Phosphate:			
Ore	Ma'aden Phosphate Co. (MPC) [Saudi Arabian Mining Co. (Ma'aden), 70%, and Saudi Basic Industries Corp. (SABIC), 30%]	Al Jalamid Mine, Al Hudud ash Shamaliyah Region	6,000
Do.	Ma'aden Wa'ad Al-Shamal Phosphate Mining Co. (MWSPC) [Saudi Arabia Mining Co. (Ma'aden), 60%; Mosaic Co., 25%; Saudi Basic Industries Corp. (SABIC), 15%]	Al Khabra Mine, 45 kilometers northeast of Turaif, Al Hudud ash Shamaliyah Region	5,000
Fertilizer	Ma'aden Phosphate Co. (MPC) [Saudi Arabian Mining Co. (Ma'aden), 70%, and Saudi Basic Industries Corp. (SABIC), 30%]	Plant at Ras Al Khair, Jubail Industrial City, Ash Sharqiyah Region	3,000
Do.	Ma'aden Wa'ad Al-Shamal Phosphate Mining Co. (MWSPC) [Saudi Arabia Mining Co. (Ma'aden), 60%; Mosaic Co., 25%; Saudi Basic Industries Corp. (SABIC), 15%]	Plant at Wa'ad Al Shamal, Turaif, Al Hudud ash Shamaliyah Region	3,000
Salt	Al-Zahid Industrial and Mining Group	Mines at Eastern Region	100
Silica sand	Adwan Chemical Industries Co. Ltd.	Eldarees Quarry, Ad Dohm, Riyadh	NA
Do.	Al Raddadi Group	Quarry at Taymah, Tabuk Region	1,000
Do.	Al-Zahid Industrial and Mining Group	do.	100
Do.	Gulf Sand (Al-Marbaie Group)	do.	NA
Steel, raw	National Steel Co. Ltd. (Al-Ittefaq Group, 100%)	Plant at Dammam, Ash Sharqiyah Region	1,300
Do.	Saudi Iron and Steel Co. (Hadeed) [Saudi Basic Industries Corp. (SABIC), 100%]	Plant at Jubail, Ash Sharqiyah Region	5,500
Do.	Solb Steel	Plant at Jizan Economic City	1,200
Do.	Rajhi Steel Industries Co. Ltd.	Plant at Jeddah	850
Sulfur	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	Refineries and gas processing plants at Jeddah, Jubail, Rabigh, Ras Tanura, and Yanbu	6,000
Sulfuric acid	Basic Chemicals National Co. (BCNC) (Basic Chemical Industries, 100%)	Plant at Yanbu Industrial City, Al Madinah Region	365
Do.	Ma'aden Phosphate Co. (MPC) [Saudi Arabian Mining Co. (Ma'aden), 70%, and Saudi Basic Industries Corp. (SABIC), 30%]	Plant at Ras Al Khair, Jubail Industrial City, Ash Sharqiyah Region	4,900
Do.	Ma'aden Wa'ad Al-Shamal Phosphate Co. (MWSPC), [Saudi Arabia Mining Co. (Ma'aden), 60%; Mosaic Co., 25%; Saudi Basic Industries Co. (SABIC), 15%]	Wa'ad Al Shamal, Turaif, Al Hudud ash Shamaliyah Region	5,500
Do.	Saudi Arabian Fertilizer Co. (Safco) (Saudi Basic Industries Corp. (SABIC), 42.99%)	Plant at Ras Al Khair, Jubail Industrial City	130
Do.	National Company for Sulphur Products (NCSP)	Riyadh	170
Titanium dioxide	National Titanium Dioxide Co. Ltd. (Cristal) [National Industrialization Co. (Tasnee), 79%; Gulf Investment Corp. (GIC), 20%; Al Shair Group, 1%]	Plant at Yanbu, Al Madinah Region	100
Zinc, Zn in concentrate	Ma'aden Gold and Base Metals Co. (MGBM) [Saudi Arabian Mining Co. (Ma'aden)]	Al Amar Mine, Ar Riyadh Region, and Mahd Adh-Dahab Mine, Al Madinah Region	20
Do.	Al Masane Al Kobra Mining Co. (AMAK) (local investors, 50%; Trecora Resources, 33.4%; Arab Mining Co., 16.6%)	Al Masane Mine, Najran Region	45

Do., do. Ditto. NA Not available.